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Waste Pits Remedial Action Project (WPRAP) Remedial Action Package

Submitted by:

U.S. Department of Energy
Fernald Area Office
P.O. Box 398705
Cincinnati, Ohio 45239-8705

000001

September 1998

Waste Pit Remedial Action Project (WPRAP)
Remedial Action Package Contents

Design Document	Document Description
Overview of Remedial Action Package	Summary of Remedial Action Package Contents
Operations and Maintenance Plan	Summary of the means for controlling operations and ensuring that worker health and safety and the environment are protected while conducting the remedial action.
Operational Environmental Control Plan	Description of methods and materials to be used during remedial activities to control erosion, dust, and storm water
Sampling and Analysis Plan	Description of sampling and analysis activities
Performance Test Criteria	Description of dryer off gas vent stack test criteria
Storm Water / Wastewater Management Plan	Description of methods to be used to manage storm water and wastewater.
Health and Safety Plan for Remedial Action Operations	Project specific health and safety plan to be used during remedial activities.

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Waste Pits Remedial Action Project
(WPRAP)
Overview of Remedial Action Package

***

PREPARED
for
Fluor Daniel Fernald, Inc.
Fernald, Ohio

FDF Subcontract No. 98SC000001

***

PREPARED
by
IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 773481

***

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Issue Date: September 25, 1998

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Record of Issue/Revisions

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Date	Rev. No.	Description of Issue/Revision
6/24/98	A	Draft issue for FDF review
8/20/98	B	Draft issue for FDF review
9/25/98	C	Draft issue for EPA review

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List of Acronyms/Abbreviations

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AASHTO	American Association of State Highway Transportation Officials
ABMA	American Bearing Manufacturers Association
ACGIH	American Conference of Government Industrial Hygienists
ACI	American Concrete Institute
ACM	Asbestos Containing Material
ACOE	United States Army Corps of Engineers
AEDO	Assistant Emergency Duty Officer
AFBMA	Anti-Friction Bearing Manufacturers Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
ALARA	As Low As Reasonably Achievable
ALTER	Accelerated Life Testing and Environmental Research Facility
AMCA	Air Movement and Control Association
ANS	American Nuclear Society
ANSI	American National Standards Institute
API	American Petroleum Institute
ARAR	Applicable or Relevant and Appropriate Requirement
ARI	American Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
AWWT	Advanced Wastewater Treatment
BAT	Best Available Technology
BSL	Biodenitrification Surge Lagoon
CAM	Continuous Air Monitor
CBR	California Bearing Ratio
CDF	Commercial Disposal Facility
CEM	Continuous Emissions Monitor

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List of Acronyms and Abbreviations *(Continued)*

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CEMA	Conveyor Equipment Manufacturers Association
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMMS	Computerized Maintenance Management System
CO	Carbon Monoxide
COC	Constituent of Concern
CPT	Cone Penetrometer Test
CRSI	Concrete Reinforcing Steel Institute
CRU	CERCLA/RCRA Unit
CWA	Clean Water Act of 1977, as amended
D&D	Decontamination and Dismantlement
DAC	Derived Air Concentration
DCD	Design Criteria Document
DEEP	Dewatering Excavation Evaluation Program
DOE	United States Department of Energy
DOE-NV	United States Department of Energy - Nevada Office of Operations
DOT	United States Department of Transportation
EDM	Electromagnetic Distance Measurement
EJMA	Expansion Joint Manufacturers Association
EMT	Emergency Medical Technician
ERDA	Energy Research and Development Administration
ERT	Emergency Response Team
ESD	Emergency Shut Down
F	Fahrenheit
FDF	Fluor Daniel Fernald, Inc.
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
FFCA	Federal Facilities Compliance Agreement
fpm	feet per minute
FS	Feasibility Study
FSAR	Final Safety Analysis Report
ft^2	square foot (feet)
GCS	Gas Cleaning System

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List of Acronyms and Abbreviations *(Continued)*

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GFCI	Ground Fault Circuit Interrupter
GLC	Ground Level Concentration
gpm	gallons per minute
HEPA	High Efficiency Particulate Air (filter)
hr	hour
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineers Society
ID	Induced Draft
I/O	Input/Output
IPC	Inclined Plate Clarifier
ISA	International Society for Measurement and Control
IT	IT Corporation
kg	kilogram
kV	kilovolt
kVA	kilovolt-ampere
kW	kilowatt
lb	pound
LLRW	Low Level Radioactive Wastes
m^2	square meter
MAGLC	Maximum Allowable Ground Level Concentration
MAWC	Maximum Average Waste Concentration
MBMA	Metal Building Manufacturers Association
MCC	Motor Control Center
MEI	Maximally Exposed Individual
MHB	Material Handling Building
µCi/cc	microcurie per cubic centimeter
mrem	millirem
MSDS	Material Safety Data Sheet
MSS	Manufacturers Standardization Society
NAD	North American Datum
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association

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List of Acronyms and Abbreviations *(Continued)*

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NESHAP	National Emission Standards for Hazardous Air Pollutants
NETA	National Electrical Testing Association
NFC	National Fuel Code
NFPA	National Fire Protection Association
NP	Non-plastic
NPDES	National Pollutant Discharge Elimination System
NPH	Natural Phenomenal Hazard
NTS	Nevada Test Site
OAC	Ohio Administrative Code
OBBC	Ohio Basic Building Code
ODOT	Ohio Department of Transportation
OEPA	Ohio Environmental Protection Agency
OSDF	On Site Disposal Facility
OSHA	Occupational Safety and Health Administration
OSWP	Operations Safe Work Plan
OU	Operable Unit
PC	Performance Category
PCB	Polychlorinated Biphenyl
pcf	pounds per cubic foot
pCi/L	picoCuries per liter
PFD	Process Flow Diagram
PID	Photo ionizing Detector
PLC	Programmable Logic Controller
PPE	Personal Protective Equipment
psf	pounds per square foot
psi	pounds per square inch
psig	pounds per square inch gauge
PTI	Permit to Install
PTO	Permit to Operate
PVC	Polyvinyl Chloride
QAP	Quality Assurance Plan
RA	Remediation Action
RAHASP	Remedial Action Health And Safety Plan

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List of Acronyms and Abbreviations *(Continued)*

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RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
RLB	Railcar Loadout Building
ROD	Record of Decision
RWP	Radiological Work Permit
SAE	Society of Automotive Engineers
SCS	Soil Conservation Service
scfm	standard cubic feet per minute
SDI	Steel Deck Institute
sec	second
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SOP	Standard Operating Procedure
SPT	Standard Penetration Test
SSC	Structure, System and Component
STD	Standard (DOE)
SWM	Storm Water Management
SWPPP	FERMCO Storm Water Pollution Prevention Plan
TBC	To Be Considered
TBP	Tributyl Phosphate
TDS	Thermal Dryer System
TEMA	Tubular Exchanger Manufacturers Association
TO	Thermal Oxidizer
TOC	Total Organic Carbon
TSDF	Waste Treatment, Storage or Disposal Facility
UBC	Uniform Building Code
UCRL	University of California Research Laboratory
UL	Underwriters Laboratory
UPS	Uninterruptible Power Supply
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency (EPA)
V	Volt

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List of Acronyms and Abbreviations *(Continued)*

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VOC	Volatile Organic Compound
WAC	Waste Acceptance Criteria
WESP	Wet Electrostatic Precipitator
WPRAP	Waste Pits Remedial Action Project
WTS	IT Corporation Wastewater Treatment System
yd^3	cubic yard
yr	year

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1.0 PURPOSE OF DOCUMENTS

The documents contained in this Remedial Action Package are submitted for review by the United States Environmental Protection Agency (US EPA)/Ohio Environmental Protection Agency (Ohio EPA) for the Fernald Waste Pits Remedial Action Project (WPRAP) remediation of the Fernald Environmental Management Project (FEMP) Operable Unit 1 (OU1) waste pits.

2.0 PROJECT BACKGROUND

2.1 Site Location and Description

The FEMP is a 1050-acre, government owned facility located approximately 18 miles northwest of the city of Cincinnati, Ohio. It is situated on the boundary between Hamilton and Butler Counties. The FEMP, which operated under the name of the Feed Materials Production Center, produced high purity uranium metal products for the United States Department of Energy (DOE) and its predecessor agencies from 1952 to 1989. Former uranium processing operations at the FEMP were limited to a fenced, 136-acre tract, closed to public access, known as the production area. In June 1991, the site was officially closed for production by an act of Congress. The Fernald site was included on the Comprehensive Environmental Response, Compensation, and Liability Act National Priorities List in 1989. The current mission of the site is the safe environmental restoration of the site in accordance with all applicable requirements.

OU1 is a well-defined, 37.7-acre area located in the northwest quadrant of the FEMP site. Large quantities of liquid and solid wastes that were generated by various chemical and metallurgical processing operations were stored or disposed in the six waste pits and the Clearwell, or burned in the Burn Pit. These waste pits are located in a portion of the FEMP Waste Storage Area and are contained within the boundaries of OU1. A detailed discussion of each waste pit's construction, contents, and volume of waste material is provided in the Remedial Investigation Report for Operable Unit 1 (DOE 1994).

2.2 Remediation Strategy

Remediation of OU1 is based on the final Record of Decision (ROD) for Remedial Action at Operable Unit 1 (DOE 1995a), signed by the US EPA on March 1, 1995. The overall goal of the Waste Pits Remedial Action Project (WPRAP) (the area known as OU1) is to remediate all the OU1 components in a timely, efficient, and cost-effective manner, ensuring compliance with all Applicable or Relevant and Appropriate Requirements (ARARs), and protecting human health and the environment. The selected remedy presented in the OU1 ROD is excavation of the waste

pit contents, waste processing and treatment by thermal drying (as necessary to remove free water), and off-site disposal at a Commercial Disposal Facility (CDF).

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3.0 REMEDIAL ACTION PACKAGE CONTENTS

3.1 Operations and Maintenance Plan

This document contains a description of the operation and the means for controlling operations. Many portions of the O&M Plan provide overviews of other documents which will address the operation and maintenance of the facility. The following issues will be addressed in this plan:

- Description of operations and equipment
- Process control plan describing:
  - controlling limits and operating parameters
  - methods for measuring parameters, monitoring components
  - frequency of measurements
  - means for preventing and correcting deviations and incorporating results into operations
  - plan for handling processed waste that does not meet waste acceptance criteria
- Process flow diagram
- Site layout drawing
- Description of Health and Safety controls
- Continency Plan containing:
  - list of potential problems that could be anticipated
  - plan for developing corrective actions and contingency operations to prevent undue hazard in the event of a failure
  - plan for emergency situations and emergency shutdowns
  - safety tasks required in the event of systems failure
- Maintenance of existing facilities plan containing:
  - description of inspection and maintenance activities to be performed
  - items to be inspected and maintained
  - frequency of inspections and maintenance activities
- Handling, transport, and management of non-typical wastes encountered during operations
- List of procedures and plans governing the project operations
- Substantive Permitting Crosswalk identifying compliance strategy
- ARARs Compliance Tables identifying compliance strategy

3.2 Operational Environmental Control Plan

This document contains a description of the methods and materials to be used during waste pit excavation and facility operation to control erosion, dust, and storm water to minimize the impact of these activities upon the environment.

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3.3 Sampling and Analysis Plan

This document will describe the sampling and analysis activities including methods to certify that the processed waste material meets the CDF WAC, to verify that water will meet the acceptance criteria established for discharge from WPRAP to the on-site AWWT, and to verify that air contaminants are controlled. This plan will also address: methods of sample collection; analytical methods for air, waste, and water analysis; screening or sampling methods for process control; quality control for sampling and analysis; sample chain-of-custody procedures; data management functions; and analytical reporting format.

3.4 Performance Test Criteria

The Performance Test Criteria document provides a description of the dryer off gas vent stack testing methods. The document is intended to provide the supplemental information required by the State of Ohio in the Intent to Test Notification Procedures.

3.5 Storm Water / Wastewater Management Plan

The purpose of this plan is to describe the WPRAP storm water and wastewater management methods. The plan also addresses storm water management contingencies. This document is intended to compliment the existing FDF Storm Water Pollution Prevention Plan (SWPPP).

3.6 Health and Safety Plan for Remedial Action

The Operational Health and Safety Plan provides the methods which will be implemented to comply with the health and safety requirements for the project and to facilitate the safe performance of the operational remedial activities.

4.0 SUMMARY AND CONCLUSIONS

The documents contained in this Remedial Action Package support the planned OU1 remediation activities.

5.0 REFERENCES

U.S. Department of Energy (DOE), 1998, ***Draft Final Waste Pits Remedial Action Project (WPRAP) Remedial Design Package***, Fernald: DOE Fernald Field Office, June 1998.

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Waste Pits Remedial Action Project (WPRAP)

Operations and Maintenance Plan for Remediation Facilities

***

PREPARED
for
Fluor Daniel Fernald, Inc.
Fernald, Ohio

FDF Subcontract No. 98SC000001

***

PREPARED
by
IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 773481

***

Revision C
Issue Date: September 25, 1998

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9/17/98	B	Draft issue for FDF review
9/25/98	C	Draft issue for EPA review

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No. M-05-82-002 Waste Pit Area Existing Conditions Cross Section A-A through D-D

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List of Appendices

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Appendix I Description of Operations and Process

Appendix II Process Flow Diagrams and Site Plan Drawing

Appendix III Substantive Permitting Requirements and ARARs(Applicable Requirements, Relevant and Appropriate Requirements)

Appendix IV O&M Plan for Existing Facilities

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List of Acronyms/Abbreviations

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AASHTO	American Association of State Highway Transportation Officials
ABMA	American Bearing Manufacturers Association
ACGIH	American Conference of Government Industrial Hygienists
ACI	American Concrete Institute
ACM	Asbestos Containing Material
ACOE	United States Army Corps of Engineers
AEDO	Assistant Emergency Duty Officer
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ANS	American Nuclear Society
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ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
AWWT	Advanced Wastewater Treatment
BAT	Best Available Technology
BSL	Biodenitrification Surge Lagoon
CAM	Continuous Air Monitor
CBR	California Bearing Ratio
CDF	Commercial Disposal Facility
CEM	Continuous Emissions Monitor
CEMA	Conveyor Equipment Manufacturers Association
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CFR	Code of Federal Regulations
CMMS	Computerized Maintenance Management System
CO	Carbon Monoxide
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CPT	Cone Penetrometer Test
CRSI	Concrete Reinforcing Steel Institute
CRU	CERCLA/RCRA Unit
CWA	Clean Water Act of 1977, as amended
D&D	Decontamination and Dismantlement

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List of Acronyms/Abbreviations (Continued)

DAC	Derived Air Concentration
DCD	Design Criteria Document
DEEP	Dewatering Excavation Evaluation Program
DOE	United States Department of Energy
DOE-NV	United States Department of Energy - Nevada Office of Operations
DOT	United States Department of Transportation
EDM	Electronic Distance Measurement
EJMA	Expansion Joint Manufacturers Association
EMT	Emergency Medical Technician
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ft^2	square foot (feet)
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GFCI	Ground Fault Circuit Interrupter
GLC	Ground Level Concentration
gpm	gallons per minute
HEPA	High Efficiency Particulate Air (filter)
hr	hour
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineers Society
ID	Induced Draft
I/O	Input/Output
IPC	Inclined Plate Clarifier
ISA	International Society for Measurement and Control
IT	IT Corporation
kg	kilogram
kV	kilovolt
kVA	kilovolt-ampere
kW	kilowatt
lb	pound
LLRW	Low Level Radioactive Wastes
m^2	square meter

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List of Acronyms/Abbreviations (Continued)

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MAGLC	Maximum Allowable Ground Level Concentration
MAWC	Maximum Average Waste Concentration
MBMA	Metal Building Manufacturers Association
MCC	Motor Control Center
MEI	Maximally Exposed Individual
MHB	Material Handling Building
µCi/cc	microcurie per cubic centimeter
mrem	millirem
MSDS	Material Safety Data Sheet
MSS	Manufacturers Standardization Society
NAD	North American Datum
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NESHAP	National Emission Standards for Hazardous Air Pollutants
NETA	National Electrical Testing Association
NFC	National Fuel Code
NFPA	National Fire Protection Association
NP	Non-plastic
NPDES	National Pollutant Discharge Elimination System
NPH	Natural Phenomenal Hazard
NTS	Nevada Test Site
OAC	Ohio Administrative Code
OBBC	Ohio Basic Building Code
ODOT	Ohio Department of Transportation
OEPA	Ohio Environmental Protection Agency
OSDF	On Site Disposal Facility
OSHA	Occupational Safety and Health Administration
OSWP	Operations Safe Work Plan
OU	Operable Unit
PC	Performance Category
PCB	Polychlorinated Biphenyl
pcf	pounds per cubic foot
pCi/L	picoCuries per liter
PFD	Process Flow Diagram
PID	Photo ionizing Detector
PLC	Programmable Logic Controller
PPE	Personal Protective Equipment
psf	pounds per square foot
psi	pounds per square inch
psig	pounds per square inch gauge
PTI	Permit to Install
PTO	Permit to Operate

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List of Acronyms/Abbreviations (Continued)

PVC	Polyvinyl Chloride
QAP	Quality Assurance Plan
RA	Remediation Action
RAHASP	Remedial Action Health And Safety Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
RLB	Railcar Loadout Building
ROD	Record of Decision
RWP	Radiological Work Permit
SAE	Society of Automotive Engineers
SCS	Soil Conservation Service
scfm	standard cubic feet per minute
SDI	Steel Deck Institute
sec	second
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SOP	Standard Operating Procedure
SPT	Standard Penetration Test
SSC	Structure, System and Component
STD	Standard (DOE)
SWM	Storm Water Management
SWPPP	FERMCO Storm Water Pollution Prevention Plan
TBC	To Be Considered
TBP	Tributyl Phosphate
TDS	Thermal Dryer System
TEMA	Tubular Exchanger Manufacturers Association
TO	Thermal Oxidizer
TOC	Total Organic Carbon
TSDF	Waste Treatment, Storage or Disposal Facility
UBC	Uniform Building Code
UCRL	University of California Research Laboratory
UL	Underwriters Laboratory
UPS	Uninterruptible Power Supply
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency (EPA)
V	Volt
VOC	Volatile Organic Compound
WAC	Waste Acceptance Criteria
WESP	Wet Electrostatic Precipitator
WPRAP	Waste Pits Remedial Action Project
WTS	IT Corporation Wastewater Treatment System

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List of Acronyms/Abbreviations (Continued)

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yd^3	cubic yard
yr	year

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1.0 DESCRIPTION OF OPERATIONS AND EQUIPMENT

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1.1 INTRODUCTION

The waste materials in the pits are to be excavated, treated and/or blended as necessary, and ultimately transported to an off-site Commercial Disposal Facility (CDF). The general steps and activities associated with fulfilling this process are:

- Waste excavation and initial segregation
- Preparation of the excavated waste materials (i.e., sorting, blending, size reduction, etc.)
- Thermally drying some or all of the waste materials
- Storage and loadout for transport to the CDF.

Rainwater and other waters associated with the excavation and processing of the materials will be controlled and treated as necessary. Dust control procedures will be followed at all project areas including the excavation, haul roads, and processing area. The thermal drying process, which will utilize two indirectly heated rotary dryers, requires that the materials be prepared and fed to the rotary dryers, and that the emissions from the drying process be properly controlled with a gas cleaning system. Railcars utilized for hauling the processed wastes to the CDF will be properly prepared and maintained.

1.2 PROCESS DESCRIPTION

A general facility process description was previously given in Section 2.0 of the Description of Operations & Process document included in Volume 1 of 3 of the Remedial Design (RD) Package. This information is provided by reference and is included in Appendix I of this document in order to maintain consistency between the Remedial Design (RD) and Remedial Action (RA) Packages.

2.0 PROCESS CONTROL PLAN

This section covers the overall control philosophy for the remediation activities. A programmable logic controller (PLC) based system will be utilized to monitor the operations of the rotary dryer and gas cleaning system and to provide certain control functions. The PLC system will be capable of providing the following:

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- Collection and display of process parameters (i.e., temperature, pressure, flow rate, etc.).

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- Orderly display of information on video monitors. The monitor display program includes graphic features for displaying process parameters.

- Automatic or manual operation of selected control loops through the operator interface station.

- Initiation of an audible and/or visual alarm signal when any input parameter exceeds a preset limit or status.

- Data retention for data management, manipulations, trending, and report generation.

- Automatic printing of alarms on a dedicated printer.

The following general statements apply to all process equipment, but not necessarily heating, ventilation, fire protection, etc.:

- An emergency shutdown (ESD) system provides emergency shutdown protection for all motors associated with the Thermal Dryer System (TDS). If the ESD is activated, all of the motor starters located in the motor control center (MCC) lose their control power, preventing the motors from running. Once an ESD has occurred, the operator must enter the power van and reset the ESD system before any motors can be re-started.

- Pumps and other motor driven equipment will generally be started locally, not from the central PLC. The PLC will be able to stop pumps and other equipment, as appropriate, for safety and other interlock functions.

- Local controls will be provided for major processes (i.e., rotary dryer, gas cleaning system, wastewater treatment system). Monitoring, interlocks, and certain controls will also be provided by the central PLC.

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- Alarms will be audibly and visually displayed on local panels as well as on the control room operator consoles.

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2.1 Waste Removal, Blending, and Preparation

Waste removal, segregation, and handling in the excavations will be manual operations utilizing heavy equipment. No automated controls will be required in the excavations. Operation of the water transfer pumps in the excavations will be manual. The pumps will be started and stopped, as necessary, by the personnel in the excavation area. The pumps will be monitored to ensure that the suction lines remain submerged and the working areas are adequately dewatered. Pumps may be provided with instrumentation to prevent dry-running and overheating.

Waste blending and preparation in the Material Handling Building will consist primarily of manual operations utilizing heavy equipment. The physical size (e.g., dimensions, weight, volume, etc.) of the waste materials will be measured during the excavation phase. If the waste materials obviously require size reduction, they will be segregated and handled together once a workable volume is comprised. Examples include concrete debris, lumber refuse, empty drums, etc. Other wastes destined for processing through the rotary dryer will be processed through a screen in order to remove oversized waste materials. These initial screening parameters are intended to produce a rotary dryer feed product which is less than four inches in dimension. Other oversized waste material will be segregated and handled once adequate volume accumulates.

Moisture levels will be measured as an informative screening tool in order to assess the current and target moisture levels for blending/drying purposes. Moisture levels may be checked during the excavation process by utilizing the Oven Dry Method or other accepted standard. Control of moisture levels from within the excavation areas will be limited to mechanical blending, pumping, and natural evaporation of exposed excavations.

Radiological levels of waste materials during the excavation process will be monitored in a similar fashion as the moisture levels, in an effort to identify current and target levels of radiological activity. Control of radiological levels is limited, with mechanical blending of pit waste materials as the only option for varying the degree of radiological activity.

Horizontal and vertical controls are important considerations of the excavation activities. Drawing No. M-05-82-001 provides the plan view of the waste pit areas. The horizontal extent

of excavation activities will be limited, at least initially, to the waste pit perimeters identified. Should IT be directed by FDF (as a result of their sampling efforts once the wastes and liners are removed), the excavation may expand laterally to within the surrounding berms and/or soils. Drawing No. M-05-82-002 provides the cross sections of the respective pits. The vertical extent of excavation will be separated into two basic phases. Phase I will include the pit covers, waste materials, and liners (along with approximately one foot of subsoil in Waste Pit No. 3 and the Clearwell). Phase II will be incremental excavations of contaminated subsoils, as directed by FDF.

Elevation of the excavation penetration depth into the waste materials will be controlled through the use of Electronic Distance Measurement (EDM) devices and reflective prisms. The EDM will be mounted on a portable tripod, over a set (surveyed) control point. From this point, the EDM will transmit an infrared beam of light (harmless and invisible to the naked eye) to the pre-sighted reflective prism. The reflective prisms will either be mounted on a hand-held range pole or directly on the boom of the excavator. The reflective prism will receive the infrared signal from the EDM and reflect it back, at the same predetermined frequency, wavelength, and amplitude. The EDM will then receive the returned signal and interpret the resulting information. A built-in microprocessor inside the EDM will calculate the elevation and location (Northing and Easting) of the prism. The surveyor will then communicate the necessary information (i.e., working elevation) back to the excavator operator.

In addition to the survey controls, IT will proceed with the excavation of the waste pits in a phased approach. Nineteen (19) phases are currently planned. Each phase takes into consideration the moisture and radiological levels of the materials within the pits. Based on existing data, these phases illustrate a waste blending philosophy which attempts to blend wastes during the excavation according to these parameters in order to optimize the resulting end product. Extremely wet materials will be blended with drier materials. Wastes with higher radiological levels will be blended with wastes having lower radiological levels. A detailed Excavation Plan has been developed and submitted (as part of the RD Package) which discusses the phased excavation approach, along with several other issues pertaining to waste excavation. Refer to that plan for further details.

Further consideration of controlling parameters includes the waste stability with respect to sloping concerns and bearing capacity. Both of these geotechnical parameters are functions of several factors such as particle size, cohesion, material type, etc.; however, the single most

important aspect of both is the moisture level. Favorable conditions of these geotechnical parameters are inversely proportional to the amount of moisture contained within the waste, in that the likelihood of slope failure or inadequate bearing capacity increases as the moisture level increases. IT has performed detailed slope stability analyses and bearing capacity calculations for each pit based upon existing data. Should drier conditions be encountered (through evaporation or dewatering) during the excavation, these operating parameters will only improve. Refer to the previously referenced Excavation Plan for further details.

The rate of excavation will be set by the rate of waste blending and/or thermal drying. The rate will be monitored by a daily count of the number of truck loads taken from the respective pits and pit area(s) to the material handling building, as well as an estimate of bin space and capacity from within the building. The rate of waste blending and feeding within the material handling building will depend on the size of the waste, as well as its moisture and radiological levels.

Minimal automated controls will be used in the Material Handling Building. This automation will consist of electrical controls on the transfer conveyer from OU1 Contaminated Soil Stockpile to the Material Handling Building.

Sump pumps and the collection tank transfer pump will operate based on the level in the sump or tank. A single float switch with a 60-degree operating angle will be used for on/off operation of the pumps, or separate high- and low-level switches and a pump control relay will be used. The following is a list of sump pumps and transfer pumps associated with waste excavation, blending and preparation that will operate in this fashion:

- Truck wash sump pump
- Truck turnaround area sump pump
- Decontamination pad sump pump
- Material handling building sump pump
- Material handling building Collection Tank transfer pump.

The truck wash sump pump, the truck turnaround area sump pump, and the decontamination pad sump pump transfer water to the Clearwell as needed as dictated by the float switches in the sumps. The sump pumps in the material handling building transfer water to the material handling building collection tank. The level switch(es) in the tank dictate when water is

transferred from the tank to the Clearwell.

2.2 Rotary Dryer Feed System (PFD D-20-10-001 and -002)

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2.2.1 Operations

As shown on PFD D-20-10-001 and -002, the solid feed will be transferred (inside of the material handling building) to the mass flow screw feeder (H-1001). This transfer will be by a front end loader. The mass flow screw feeder is variable speed driven for variable flow control. The mass flow screw feeder has an anti-jam program in the PLC that senses a jam condition, causing the affected screw to automatically stop and reverse for one revolution in an attempt to free the jam before returning to forward running condition. If after three attempts within a specified time limit normal operation is not restored, the drive is shut down and an alarm beacon is lit to indicate operator assistance is necessary to free the jam condition. Level in the mass flow screw feeder hopper is visually monitored.

The screw feeder discharges onto the belt feed conveyor. The conveyor is electrically driven and runs at a constant speed. The belt conveyor is equipped with a single idler weigh belt scale. The weight of the feed material and the speed of the conveyor are measured for calculation of the feed rate by a PLC controller. The feed rate is continuously compared with a set point feed rate and a feed back loop will adjust the screw feed rate until the feed rate matches the set point. If the measured feed rate cannot meet the set point feed rate within a specified time limit, the drive is shut down and an alarm beacon is lit to indicate operator assistance is necessary. It is expected that failure to maintain controlled feed will usually be caused by a plug condition at the screw discharge.

The weigh belt discharges into the dryer feed screw. The feed screw is driven for variable speed control and fixed maximum torque. The feed screw is designed such that it can be retracted for maintenance. Depending on the moisture content, the cohesive and adhesive strength of the material can cause material bridging in the feed screw hopper. Therefore, the screw speed will be manually adjusted to maintain a feed rate that will meet or exceed the feed rate of the material being delivered to it so as to prevent an accumulation of material in the feed screw hopper. A video camera is located in the feed screw hopper that will be monitored by the control room operator. The operator can visually determine if material plugging is occurring in the feed screw or the screw feeder is delivering material to the rotary dryer at a rate that is slower than the rate delivered to it by the feed belt conveyor.

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The dryer feed screw has an anti-jam program in the PLC that will sense a jam condition. The screw will automatically stop and reverse for one revolution in an attempt to free the jam before returning to forward running condition. If after three attempts within a specified time limit normal operation is not restored, the drive is shut down and an alarm beacon is lit to indicate operator assistance is necessary to free the jam condition. All upstream equipment is shut down on the sensing of a jam condition.

2.2.2 Instrumentation and Controls

To support and control the rotary dryer feed operation depicted on PFD D-20-10-001 and -002, the following major controls and instrumentation are implemented:

1) The belt speed and material weight on the feed conveyor belt are automatically measured and converted to mass feed rate by the belt scale.

2) Video monitoring on the dryer feed screw hopper.

2.3 Rotary Dryer Operation (PFD D-20-10-001, and -002)

2.3.1 Operations

As shown on PFD D-20-10-001, and -002 the rotary dryer receives waste materials with various moisture contents depending on the type of waste. Waste materials are fed into the rotary dryer from the storage pile. Waste materials are metered into the rotary dryer and dried to a design basis product with 10 percent moisture content (wet weight basis).

The rotary dryer system consists of a cylindrical shell rotated with a variable speed drive. The rotating cylinder is heated externally by a furnace with adequate length to satisfy heat transfer requirements. Using natural gas as fuel for combustion, heat energy for the indirect drying is produced in multiple furnace zones by a set of burners located in each zone. Burners are operated with adjustable primary air/fuel ratio, and secondary air addition to control the flame temperature so the rotating cylinder does not exceed its design temperature. Air to the burners is supplied by the combustion air fan.

The drying operation is controlled by adjusting the temperature conditions in each zone of the rotary dryer, the feed rate into the rotary dryer, and the retention time in the rotary dryer. The retention time is controlled by varying the speed of rotation of the rotary dryer shell. The feed

rate is controlled by a variable rate feeder, and the temperature conditions are manually set on the temperature controllers for each zone of the multiple-zone furnace. Product temperature which will be correlated to product moisture is monitored and will be used to control drying operation.

The product moisture content is targeted at 10 percent so that the optimum moisture content of the waste can be achieved in the railcar by mixing the rotary dryer product with wet (not dried) material from the storage pile. Knowing the moisture content and flow rate of the dried product, and the moisture content of the wet material, the flow of the wet material is controlled to achieve the desired moisture content.

2.3.2 Instrumentation and Controls

To support and control the operation depicted in PFD D-20-10-001, and -002 the following major controls and instrumentation are implemented:

1. A burner management system ensures safe operation of the rotary dryer. The safety-interlock logic ensures that the required limits and conditions (as specified by the vendor and standard burner management/safeguard practice) are satisfied prior to permitting start-up, continued operation, or shutdown of the rotary dryer. If the limits and conditions of the logic are not met, the management system does not allow start-up of the burners, or shuts them down if in operation.

2. The burners in each zone are automatically controlled to maintain the selected shell temperatures. The shell temperatures are selected manually by the operator. Vendors recommended shell temperatures will not be exceeded.

3. The fuel/air ratio of each burner is controlled by a pressure-balanced regulator or a fully-metered electronic control integrated with a programmable microprocessor as determined by the vendor.

4. The pressure inside the rotary dryer shell is maintained at a negative pressure by adjusting the speed of the induced draft fan (B-5001).

5. Temperature instrumentation is provided in the following locations: primary combustion air to burners, rotary dryer shell temperature in each

zone, combustion gases in each furnace zone in various locations in the annular space between the furnace wall and the rotary dryer shell, combustion gases exiting each furnace zone, process off - gas from the rotary dryer, rotary dryer product temperature just before leaving the last rotary dryer zone, and furnace stack gas.

6. Flow instrumentation is provided on the following: natural gas to the burners, primary combustion air to the burners.

7. Pressure instrumentation is provided on the following: natural gas to burners, primary combustion air to burners, and process off - gas from rotary dryer.

The following alarm process input parameters protect the dryer operation:

Dryer Draft Pressure. A pressure transmitter located on the dryer discharge hood transmits dryer pressure.

Dryer Rotation Sensor. The rotation of the dryer is monitored by a motion detector.

Solids Discharge System Rotation Sensing. All solids discharge conveyors have motion sensors that monitor the operational status of the solids discharge system.

Dryer Exhaust Temperature High. A thermocouple mounted in the Cyclone monitors the dryer exhaust gas and cyclone temperature. When the alarm is actuated, the operator must check the zone temperature profiles along with other process parameters to determine what action is needed to bring the exhaust temperature back down to preset limits.

Dryer Zone(s) Temperature High. The four dryer control zone thermocouples are alarmed when a zone temperature rises above a preset value. An operator response is required to determine the cause of the temperature excursion and the corrective action to be taken.

Dryer Solids Discharge Temperature High. A thermocouple mounted in the base of

the discharge hood outlet senses the solids discharge temperature.

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2.4 Gas Cleaning System (PFD D-50-10-001, and -002)

2.4.1 Operations

PFDs D-50-10-001 and -002 present the process design for the cleaning of the off-gases from the rotary dryer operation. The PFDs also indicate the various solid and liquid purge streams from the gas cleaning process.

The off-gas from each rotary dryer initially passes through the high efficiency cyclone separators (S-5001 A/B) to remove large, entrained particulate. The solids removed from the off-gas are transferred from the cyclones via the cyclone solids transfer screws (H-5001A/B) to the rotary dryer product system and combined in a mixing operation to assure the proper product consistency and moisture content. This design mitigates dust generation and minimizes worker exposure as defined in the ALARA concept.

The off-gas from the cyclones is conditioned in the scrubber (V-5001) to cool the rotary dryer off-gas, remove a portion of the entrained particulate, and partially condense water vapor generated by the drying process. The scrubber spray water is recirculated at a nominal rate of 150 GPM. The water and condensate pass from the scrubber into the scrubber sump tank (T-5001). The scrubber pumps (P-5001A/B) recycle water from the scrubber sump tank back to the scrubber. A continuous blowdown (Stream 506) circulates to the process blowdown pre-treatment system to control suspended solids concentration in the scrubber water. The majority of the blowdown stream is then returned as makeup to the scrubber. Sodium hydroxide (caustic) from the caustic tank and/or acid from the acid tank is added to the Scrubber recycle stream to neutralize the process as needed.

The off-gas from the scrubber flows to the subcool quench (V-5002). Cooling water is recirculated through the subcool quench at a nominal rate of 1600 GPM by the subcool quench recirculation pumps (P-5002A/B). This recycle water is cooled in the quench heat exchangers (E-5002 A/B) prior to introduction into the off-gas stream in the subcool quench. This further reduces the temperature of the off-gas to a nominal 100° F. Subcooling the off-gas generates a nominal 30 GPM of condensate (Stream 517) which flows to the Process Blowdown Pre-treatment System (PFD D-60-10-001) and ultimately to the Wastewater Treatment System.

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A cooling tower (W-5001) and recirculating cooling water loop is used as the cooling medium

for the subcool quench heat exchangers. Cooling water is recycled by the cooling tower recirculation pumps (P-5003 A/B) from the cooling tower through the heat exchangers back to the tower. A small purge stream is discharged from the cooling tower to the Clearwell. This water does not contact contaminated materials and is not expected to be contaminated.

Off-gas from the Subcool Quench flows into a wet electrostatic precipitator (WESP) (S-5004) for the removal of submicron particulate and water droplets. Water and particulate collected in the WESP are pumped to the Process Blowdown Pretreatment System.

The off-gas from the WESP is slightly reheated in the electrically heated off-gas reheater (E-5003) to prevent any condensation in the HEPA filters. The HEPA filters (FX-5004 A/B) are mounted in parallel with only one set being used at a time, with the other on standby or being replaced as necessary. The HEPA filters remove particulate greater than 0.3 microns that may have passed through the WESP. Two induced-draft fans (B-5001 A/B) are used to pull the off-gases through the system from the rotary dryer through the HEPA filters, keeping the entire system under negative pressure so that any leakage is into the system. The two ID Fans are arranged as an in-line spare configuration with one fan normally operating and the other on standby.

The filtered off-gas from the HEPAs is directed into the Thermal Oxidizer (F-5001) which provides an effective means for the treatment of remaining volatile organic compounds (VOCs) and carbon monoxide (CO) in the off-gas stream. The system off-gasses are finally released to the atmosphere through the vent stack (X-5001). Point source emission estimates are discussed in the Point Source Emission Data section of this design package.

2.4.2 Instrumentation and Controls

To support and control the operation depicted in PFD D-50-10-001, and -002 the following major controls and instrumentation are implemented:

1) The off-gas pressure differential across the cyclones is continuously monitored.

2) Purge from the cooling tower is manually adjusted, and is based on periodic manual sampling and analysis of the cooling tower water.

3) Pressure differential across the scrubber is continuously monitored.

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4) Caustic addition rate to the scrubber recycle flow is automatically adjusted based on pH measurement of the recycle stream.

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5) The rate of water sprayed into the WESP is manually adjusted.

6) The output voltage on the WESP is continuously monitored.

7) Electrical power to the off-gas reheater is automatically controlled based on the off-gas exit temperature.

8) The speed of the ID fan is automatically controlled based on the pressure (vacuum) in the rotary dryer.

9) The off-gas in the stack is continuously monitored for radon.

10) Temperature instrumentation is provided on the following: scrubber off-gas, subcool quench off-gas, subcool quench recycle water into and out of the heat exchanger, off-gas reheater inlet and outlet, and thermal oxidizer outlet.

11) Flow instrumentation is provided on the following: recycle flow to the scrubber, recycle flow to the subcool quench, recycle flow to the cooling tower, and water flow to the WESP spray.

12) Pressure differential instrumentation is provided across the following: cyclone, scrubber, subcool quench, ID fan, and HEPA filter.

13) Level instrumentation is provided on the following: scrubber sump tank, and quench sump tank.

14) Makeup water addition to the cooling tower is automatically controlled based on level measurement in the cooling tower sump.

The following alarm process input parameters protect the operation of the gas cleaning system:

Sub-Cooling Quench Exhaust Oxygen Level. An oxygen sensor located at the HEPA filter inlet senses the oxygen content in the process gas stream to the dryer.

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Recirculation Pump Failure. All pumps associated with the scrubber recirculation, sub-cooling quench recirculation, critical Wastewater Treatment System (WTS) recirculation flows and fresh water supply systems contain backup pumps. Whenever the primary on-line pump fails to provide adequate flow and/or pressure, an alarm will be indicated which will prompt a switch to the respective backup pump. The operator must take the appropriate corrective action to the primary pump failure.

Liquid Flow Rates Low. The flow rates of all critical process fluid flows are alarmed using signals from magnetic flow meters. The following is a list of liquid flow rate alarms:

- Scrubber water weir flow-Low
- Scrubber nozzle recirculation flow rate-Low
- Scrubber blow down rate-High
- Sub-cooling quench nozzle recirculation flow rate-Low
- Sub-cooling quench blow down flow rate-High
- Cooling tower blowdown flow-Low
- Primary clarifier inlets flow-Low
- Filter Press blowdown to water treatment plant flow-Low

The operator must determine the cause for the low or high liquid flow condition and take the appropriate corrective action.

Sump Liquid Levels. Each sump is equipped with a high and low level alarm which is activated at preset levels. The operator will determine the cause of the high/low level condition and take the appropriate corrective action.

Pressure Drop Across The Hot Cyclones, Off-gas Reheater and HEPA Filters. The

pressure drop across the hot cyclones and across the off-gas reheater and HEPA filters are monitored. An alarm will sound if the pressure drop exceeds a preset value. The operator must review all current operating parameters and take appropriate corrective action to alleviate the deviation.

Thermal Oxidizer Temperature. If the TO exhaust temperature goes above or below preset limits, a thermocouple located in the exhaust stack initiates an alarm signal to the PLC. A second high level temperature alarm deactivates the TO burner.

Compressed Air and Nitrogen Supply Pressure Low. Pressure switches mounted in the compressed air and nitrogen supply manifolds initiate alarms when the supply pressures fall below preset pressure levels. The operator must identify the source of the problem(s) and switch to the back up supply systems, if required.

2.5 Railcar Loadout and Lidding Operations (PFD D-35-10-001)

Railcar decontamination and loadout activities in the Railcar Loadout Building will consist primarily of manual operations. Manual controls will be used in the Railcar Loadout Building for operation of the lid hoist and railcar scale.

The collection sump pump in the Railcar Loadout Building will operate based on the level in the sump. A single float switch will be used for on/off operation of the pump, or separate high- and low-level switches and a pump control relay will be used.

2.6 Water Treatment System (PFD D-65-10-001)

The WTS operates semiautomatically. Automated controls will be provided by the PLC based facility process control system. Plant operators initiate operation of the system by placing the hand switches for the electrical equipment in the AUTO position and starting the Clearwell transfer pump.

The following is a summary of how each piece of electrical equipment is controlled:

- The caustic feed control valve operates based on a pH probe signal. The pH probe will be located in the flash mix tank.

- The flash and flocculation mixers are started and stopped by placing the associated hand switch in the ON or OFF position. No interlocks govern

operation of these mixers.

- The polymer and flocculent feed pumps are controlled based on the influent flow rate. Polymer and flocculent feed rates will be based on influent water quality.

- The clarifier sludge transfer pump is started and stopped based on timers by placing the associated hand switch in the AUTO position.

- The filter feed pump will operate based on level switches in the clarifier overflow tank. A high level will start the pump and a low level will stop the pump. The pump can transfer water to the sand filter or to the effluent tank depending on the need for filtration. The operator will manually adjust the necessary valves to direct the flow.

- The effluent pump will operate based on level switches in the effluent tank. A high level will start the pump and a low level will stop the pump. The operator will manually adjust the necessary valves to direct the flow.

In the event that the water level in the influent tank reaches a very high level (i.e., if the filter feed pump fails, etc.), flow to the tank must be stopped. Because it would be cumbersome to interlock control of the existing Clearwell transfer pumps to level switches in the influent tank, an actuated valve in the influent line may be used to stop flow to the WTS. The existing discharge line from the Clearwell transfer pumps will be protected by including a pressure switch that will cause the transfer pump to shut down once the actuated valve closes at the WTS.

Alarm indicators will be used to alert WTS operators of conditions requiring attention when a process upset condition arises.

2.7 Handling Plan for Processed Waste Which Does Not Meet WAC

2.7.1 Processed Waste in Bins

In the unlikely event that sampling and analysis indicate that a material in a storage bin does not meet the CDF WAC due to radiological or moisture content, the material will be removed from the bin and re-blended with other materials to meet the WAC. If a material is determined to be RCRA characteristic waste and/or TSCA regulated waste, it will be turned over to FDF for

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subsequent handling and disposal.

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2.7.2 Processed Waste in Railcars

In the event that the contents of a railcar do not meet the WAC, the railcar will be unloaded and material handled in the same manner as described in Section 2.7.3.

2.7.3 Railcar Rejection at the CDF

In the event that the contents of a railcar are rejected at the CDF, measures may be taken at the CDF to render compliance with the WAC. If unsuccessful, the railcar will be returned to the FEMP because its contents do not pass the WAC, then the railcar will be unloaded in the load out area. Unloading will be done with conventional earth-moving equipment during an off-shift. If this unloading results in the liner being incapable of containing the waste (i.e., if it is ripped or torn), it will be folded into the railcar and a new liner will be installed over it. If the material was rejected because of radiological content or moisture, it will be reblended with other pit waste until it satisfies the CDF WAC. If the material is rejected because of RCRA characteristics and/or TSCA characteristics, it will be unloaded and turned over to FDF for handling and disposal.

The measures to deal with non-compliant railcar contents at the CDF, including specific actions and payments, will be dealt with on a case-by-case basis and are subject to various contractual relationships between DOE, FDF, IT, and the yet to be developed contractual relationships with rail carriers and the CDF. Actions to deal with non-compliant railcars are dependent on a number of variables including the specific basis for non-compliance, contractual requirements and remedies between involved parties, specific methods and alternatives available to bring the materials into compliance, and costs. Such actions can include treatment at the CDF, and/or disposal potentially at an increased cost. The ultimate receipt and disposal of the waste materials will be in compliance with applicable regulations and licensing agreements.

2.8 Health And Safety Controls

Notwithstanding the numerous safety features designed into the processing systems and described in this Process Control Plan, IT will implement additional health and safety controls to ensure personnel safety and to protect the public and the environment. These additional safety controls are described below:

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2.8.1 Operator Training

IT will implement an in-depth operator training program to include classroom and on-the-job instruction on system design parameters, standard operating procedures, response to unusual conditions and emergency response actions.

2.8.2 Hazard Communication

Personnel will be informed of chemical hazards associated with hazardous chemicals that are used in the process (e.g., acid and caustic) through review of Material Safety Data Sheets (MSDSs) in accordance with the IT WPRAP Hazard Communication Program.

Other hazard information (e.g., physical hazards, biological hazards, adverse weather conditions and engineering and administrative controls) will be conveyed to personnel through review/orientation on the Remedial Action Health & Safety Plan (RAHASP), Operations Safe Work Plan (OSWP) and at Tool Box Safety Meetings will be conducted prior to start of work each day, prior to start of work after the lunch break and whenever there is a change in the scope of work or in area or site conditions that may present a new hazard.

Radiological hazard information (e.g., airborne contamination, surface contamination, radiation and engineering and administrative controls) are identified in the RAHASP, OSWP, and RWPs. Personnel will be informed of radiological hazards through review/orientation on these documents and are updated on site radiological conditions at Tool Box Safety Meetings.

2.8.3 Emergency Response

An Emergency Contingency and Response Plan has been developed to cover extraordinary conditions that might occur at the WPRAP. This plan is given in Section 13.0 of the Remedial Action Health & Safety Plan which is part of this Remedial Action (RA) Package.

3.0 OPERATIONAL SYSTEM CONTINGENCY PLAN

3.1 Introduction

This document provides a detailed analysis of the potential operational problems that could be encountered during the implementation of the remedial action operation activities. The operation of the Thermal Drying Process critical system components is evaluated for possible system failures that may create emergency situations. Corrective actions, contingency measures,

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equipment redundancies and backup systems that could prevent component failures are investigated. This document also describes the safety tasks or precautions implemented in case of a system upset and links them to the site Health and Safety Plans.

3.2 Excavation Operation

Contingency measures for encountering slurried wastes and other non-typical wastes have been evaluated. In particular, Pit Nos. 3, 5 and 6 are of most concern. Certain unique factors arise when developing contingency measures associated with slurried waste excavation.

Though the possibility of encountering slurries during the excavation of these pits is certainly real, it is not anticipated. Waste dewatering will be undertaken in the pits prior to, and during, the excavation to allow for the use of conventional excavation methods. Site excavation and pit dewatering will be performed in a manner to ensure that a safe waste pit working face and berm slope stability is maintained at all times. In the event that pockets of waste slurry are encountered, stabilization efforts will be performed by dewatering, admixing suitable dryer materials, or allowing adequate drying to occur to allow for the safe removal of material using conventional excavation techniques.

Additional contingency measures for excavation operations in Pit Nos. 3, 5 and 6 as a result of slurry waste conditions include daily observations of the excavation sidewalls, faces, and upper edges for such indicators as spalling, heaving, and tension cracking which are used to indicate whether the existing controls are adequate. Should these conditions be observed, IT will relocate equipment to a safe operating range (in accordance with OSHA requirements), perform a cut back of the waste materials to a flatter slope, use equipment with extended reaching capabilities (i.e., long reach excavator in lieu of excavators with conventional booms and sticks), perform additional dewatering, perform excavation operations of the affected area from a drier position, or relocate the excavation efforts to a more suitable location until such time as the affected area is stabilized.

Contingencies for bearing capacity concerns include all the measures discussed above and the proper selection of equipment that will impose the lowest ground pressures while suitably performing the required work. Examples include machinery with high, wide, or swamp tracks.

Contingencies for encountering non-typical waste during the excavation operations include

relocating to another work area (if deemed necessary by IT's Safety and Health Representative) while non-typical waste is properly identified and associated hazards for its excavation are analyzed. Examples include drum, concrete or associated construction debris encounters.

A Maintenance Building has been provided in the facility design as a weather protected area to perform routine maintenance on excavation equipment as well as small process equipment items (pumps, etc.). Equipment will receive a gross decontamination within a containment area, at the Truck Wash, or on the Decon Pad prior to being transferred to the WPRAP Maintenance Building. The Maintenance Building will most likely be a contamination area since it is unlikely that rolling stock can be practically decontaminated to free release levels prior to performing routine maintenance. It may be necessary to send equipment off-site for maintenance for certain major maintenance repairs. FDF Radiological Control will determine when equipment has been sufficiently decontaminated to allow release from site for maintenance. Decontamination will be performed using methods similar to those described in Section 4.13.4 of the Excavation Plan included in Volume 2 of 3 of the Remedial Design (RD) Package.

3.2.1 Alternative Waste Production Strategy

An alternative waste production strategy has been developed as a contingency to allow the production of waste material which meets the CDF WAC without processing the material through the rotary dryer. If unforeseen delays preclude the timely operation of the dryer facility as scheduled during the pre-operational phase, alternative production (in lieu of thermal drying) can be accomplished by excavation and blending of waste materials which have a blended moisture content suitable for direct loadout. This method and may be used as the principal method of production for some excavation phases. Waste materials will be excavated, blended, sampled, and loaded onto railcars as described in Section 1.2 (Appendix I) for materials which do not require processing through the rotary dryer.

An example of this type of production would be the use of Waste Pit 3 cap material with the OU1 Contaminated Soil Stockpile material. It is anticipated that a blend of these materials will meet the CDF WAC.

3.3 Rotary Dryer System Potential Failure Analysis

The Thermal Drying Process has been designed to ensure safe operation of the system under various operating scenarios. The following general categories of failure modes are addressed by

the redundancy of mechanical components and process backup systems:

- Failure of a critical system resulting in automatic switch-over to a backup component.
- Failure of a critical system resulting in automatic switch-over to a backup system and causing immediate shutdown of the TDS feed system.
- Failure of a critical utility source which would result in an automatic switch-over to a backup utility or cause immediate shutdown of the TDS.

he following sections identify specific scenarios of systems and/or component failures or of the description of operation and process and section malfunctions which must be addressed through redundancies or system backups, since their occurrences could present a health and safety concern to operating personnel or general public.

3.3.1 Emissions of Radionuclides and Particulate from Dryer Stack

An operational malfunction of the gas cleaning system could cause increased emissions of particulate and radionuclides. To minimize the potential for this occurrence, the final stage of dust collection for the dryer exhaust gases includes a redundant HEPA filtration system with differential pressure gauge and alarms. The differential pressure across the HEPA filters is monitored and transmitted to the PLC. If this pressure exceeds a predetermined alarm limit, the exhaust gas will be diverted through the redundant filter. This feature allows for the system to continue to operate while replacing the overloaded HEPA filter. If the HEPA filtration system cannot be operated within the emission limits, waste feed to the rotary dryer will be suspended and appropriate corrective action will be undertaken.

The dryer exhaust gas stream is also equipped with a continuous air monitor (CAM) system with an isokinetic sampler designed and built in accordance with 40 CFR 61.92. The CAM will provide indication and alarm of elevated Beta/Gamma particulate levels which could indicate failure of the HEPA filters. Additionally, the CAM will provide an indication and alarm of elevated radon concentrations in the stack gas.

3.3.1.1 Fugitive Dust Emissions

Dust emissions during excavation, hauling and processing of soils could present health hazards.

This condition will be mitigated by the use of the following measures or practices:

- Periodic application of water or other suitable dust suppressing chemicals on soil or gravel roads, parking lots, or other surfaces.
- Maintaining roadways in clean conditions.
- Covering open bodied vehicles when transporting materials likely to become airborne.
- Application of poly shell or other crusting agents to materials stored or exposed for extended periods.
- Conveyor systems installed outdoors will be covered and equipped with water spray dust suppression systems to control airborne dust at the outfeed.

Additional discussion of dust control measures is given in Section 5.0 of the Operational Environmental Control Plan which is included in the Remedial Action (RA) Package, and in the Substantive Permitting Requirements Tables included in Appendix III of this plan.

3.3.1.2 Organic Emissions

BAT shall be implemented to control organic emissions with the use of a thermal oxidizer. If the gas cleaning system, upon a failure of any of its subsystems, cannot be operated within the emission limits, waste feed to the rotary dryer will be suspended. The system will be returned to service after its proper operation has been restored.

3.3.1.2.1 Thermal Oxidizer

The design of the Thermal Oxidizer (TO) burner management system has been done in accordance with the National Fire Protection Association (NFPA) guidelines. The single burner system has been designed to ensure that the combustion chamber temperature is maintained within specified levels to provide maximum oxidation capabilities. The following TO design requirements have been implemented to maximize system reliability and safe operation:

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- A continuous gas igniter with dedicated scanner will maintain a permanent source

of ignition with positive indication of flame failure.

- A gas burner with dedicated scanner will provide flame failure notification which will shut off gas supply to the TO.

- High temperature sensing at the TO gas exhaust will initiate an automated system response to lower the temperature.

- A flame arrester, with high temperature detection, switch, alarm and interlocked to promote an appropriate automatic system response, has been incorporated in the inlet duct to the thermal oxidizer as a contingency against flame propagation to upstream equipment.

- The temperature of the TO exhaust gas will be monitored to ensure that it is maintained above the minimum value.

3.3.2 TDS Control System

Failure of the Control System could result in system operating conditions outside of the normal range. The TDS control room is equipped with two identical PLC systems for backup and redundancy. The systems and control logic are designed to automatically switch from one PLC controller to the other on any PLC system fault or error. Both PLCs are updated simultaneously to ensure that all real-time information is identical in both controllers at all times. In case of a failure of the TDS control system, waste feed to the rotary dryer will be suspended until the failure condition is resolved.

3.3.2.1 Operator Control Station

There are two identical control room operator workstations installed in the control room for backup and redundancy. The control room operator can operate the TDS by using either of the stations. All control functions can be performed from a single station. If one of the systems fails during operation, the operable system serves as backup.

3.3.2.2 Uninterruptible Power Supply

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The entire TDS monitoring and control system, including the PLC, work stations, data storage system, I/O racks, instrumentation, and continuous emission monitors is protected from loss of

electric power by a UPS system. This system provides continuous power protection and uninterruptible computer grade power to these critical systems during a failure of normal utility power. In the case of a failure of the Uninterruptible Power Supply, waste feed to the system will be suspended until the failure condition is resolved.

The UPS is a battery-powered central invertor system operated in the on-line mode, supplying the connected load from a continuously running invertor. Upon loss of normal power, the invertor continues to operate, with the input now supplied by the storage battery system.

3.3.3 Induced Draft System

Failure of the Induced Draft (ID) Fan would result in a loss of system suction and could create an unwanted pressurized condition within the process. This failure condition is addressed by the utilization of identical redundant ID Fans designed to allow switching from one to the other when a Fan loss is identified. Redundant pressure transmitters located on the rotary dryer inlet hood sense and transmit to the PLC a signal reflecting the system suction pressure. The PLC is programmed to allow the startup of the Redundant ID Fan should the system pressure fall outside the operating range. Gravity dampers located at the outlet ducts of the ID Fans can be activated to allow for a smooth transition between ID Fans. If system draft cannot be maintained because of a malfunction of the ID Fan or related systems, waste feed to the system will be suspended until the condition is resolved.

3.3.4 Electric Power Supply

Loss of electric power supply could result in an unwanted pressurization of the dryer system. Electric power supply is also critical to the safe operation of the remaining processes and treatment systems of the TDS.

A diesel powered emergency generator supplements the UPS system and is sized to operate the critical high-voltage components (e.g., pumps, drives) which do not require instantaneous backup. The auxiliary generator will be started upon loss of normal utility service.

An automatic transfer switch is utilized to switch from the commercial to the emergency power supply. The transfer switch senses a loss in the commercially supplied power and enables the diesel emergency generator to supply emergency power. The proper operation of the emergency generator is checked periodically.

3.3.5 Instrument and Process Air

Loss of compressed air to the TDS process and to the instrumentation can cause significant operation upsets which could cause the different treatment systems to operate outside the normal range.

The compressed air system is composed of two (2) compressors specifically designed to provide compressed air backup and redundant capacity. The primary compressor is powered by an electric motor and is backed up by a diesel powered unit capable of supplying all compressed air capacity for the operation of the TDS system. In the event of a compressed air supply failure, waste feed to the system will be suspended until the condition is resolved.

3.3.6 Material Feed System

The material feed system mechanical components failures will affect the overall availability of the Rotary Dryer System; however, they should not pose major personnel safety concerns with the exception of a loss of feed material in the dual screw feeder. This could cause the loss of air seal to the dryer, allowing air infiltration. To maintain a reduced oxygen atmosphere within the dryer system, inert gas is injected into the rotary dryer on an as-needed basis. This inert gas addition minimizes the potential for self-ignition. Process water can also be injected to the dual feed screw hopper, as a last resource, to extinguish a potential fire.

3.3.7 Rotary Dryer Combustion System

The Combustion System for the Rotary Dryer could be affected by system component failures which could affect the pressures of the main gas and combustion air supplies. This combustion system consists of sixteen (16) burners, grouped in four (4) zones of four (4) burners each. Each burner is equipped with a flame scanner. The flow of gas is controlled at each of the sixteen (16) burners and the combustion air is controlled at each of the four (4) zones. Combustion control logic is governed by the National Fire Protection Association (NFPA) guidelines. This logic requires a purge cycle before any burner light-off attempt. After the purge cycle, the burners are lighted individually. Failure of one burner to light immediately causes the whole zone to be shut-off, thus preventing excess gas to escape into the combustion zone. High or low gas burner pressure will immediately cause a main gas supply shut-off. High or low air pressure will shut-off the individual zone experiencing the deviation. High temperature in any individual zone will cause a shut-off at the gas supply to that zone. The logic for the dryer burner management

system is designed to prevent the operation of the system with the gas and combustion air volume outside the safe operating range. If a mechanical malfunction condition in the dryer system is identified which is critical to the safe operation of the process, waste feed to the rotary dryer will be suspended until the condition is resolved. Each rotary dryer unit may operate independently of the other such that one unit may be operated while maintenance is performed on the off-line unit.

3.3.8 Rotary Dryer Rotation

The rotary dryer is furnished with a back-up emergency drive that would allow the dryer to continue to rotate in the event that the main drive has failed. This would prevent excessive material to be accumulated in the dryer and allow the system to go through an orderly load reduction and system shutdown.

3.3.9 Dried Product Material Conveying System

Failure of the double dump valves could create a condition where air may infiltrate the rotary dryer. A knife gate located at the discharge breech of the rotary dryer allows the system to be isolated, thus reducing the infiltration of air. In the event of a mechanical system failure of the product material conveying system, waste feed to the dryer will be suspended until the condition is resolved. Each product conveying system may operate independently of the other such that one system may be operated while maintenance is performed on the off-line system.

3.3.10 Scrubber, Subcool Quench, Cooling Tower, Wet Electrostatic Precipitator Blowdown and Pre-treatment Pumping Systems

Failure of the pumping systems for the following areas could introduce operating conditions that would adversely affect the overall performance and may cause, in some instances, a release of contaminated fluids.

- Scrubber recirculation pumps
- Subcool quench recirculation pumps
- Cooling water circulation pumps
- Wet electrostatic precipitator recirculation pumps

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- Organic condensate transfer pumps

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- Primary clarifier sludge pumps
- Secondary clarifier sludge pumps
- Clarifier discharge pumps
- Filter press sludge pumps
- Filter discharge pumps

These pump systems are all supplied with redundant pumps for back-up which would be brought into service if and when their respective operating pump fails. Secondary containment is provided for pumps and vessels within the rotary dryer process areas.

3.3.11 Wastewater Treatment Pumping Systems

Failure of the following Wastewater Treatment Systems could adversely affect the performance of the Wastewater Treatment System, but it would not cause an immediate hazard condition:

- Clarifier feed pumps
- Temporary holding tank transfer pumps
- Filter feed pumps
- Effluent pumps.

These pumps are also backed-up by redundant units. Secondary containment is provided for pumps and vessels within the WTS area. Failure of critical components of the water recirculation and treatment systems may affect the operation of the TDS. The operator will take appropriate corrective action in response to water recirculation and treatment system upsets.

3.3.12 Instrumentation Interlocks and Alarms

Integral to the operation of the rotary dryer process is the network of instrumentation and attendant interlocks and alarms which provide the necessary process and equipment safeguards,

and are designed to alert and assist the operator in maintaining overall process control within the prescribed operating parameters. This is particularly true during TDS startup and shutdown when transient operating conditions must be carefully monitored and controlled. A thorough understanding of the instrumentation and process control system is essential in achieving and maintaining process conditions conducive to the safe and effective processing of contaminated materials. In the event of a failure of instruments critical to the safe operation of the TDS system, waste feed to the system will be suspended until the condition is resolved. Normal operation may be restored once the problem has been resolved.

3.3.13 Weather Protection

The facility has been designed to allow 24-hr per day, year round operation. The GCS/WTS equipment is housed within a building for winter weather protection. Heat tracing and insulation is provided on susceptible ducts and lines. The Material Handling Building and Railcar Loadout Buildings also provide cover and run-on protection for waste material storage piles.

3.4 Emergency Contingency And Response Plan

An Emergency Contingency and Response Plan has been developed to cover extraordinary conditions that might occur at the WPRAP. This plan is given in Section 13.0 of the Remedial Action Health & Safety Plan which is part of the Remedial Action (RA) Package.

4.0 OPERATION AND MAINTENANCE PLAN FOR EXISTING FACILITIES

This plan was previously submitted in Volume 3 of 3 of the Remedial Design (RD) Package, and is attached in Appendix IV.

5.0 NON-TYPICAL WASTE MANAGEMENT

5.1 Introduction

During the excavation of the various waste pits and the Clearwell, non-typical wastes may be encountered which will require special planning, handling, and treatment. These types of wastes may include the following:

- Pyrophoric materials
- Small explosive devices

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- Compressed gas cylinders

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- Transformers
- Unopened intact drums
- Polychlorinated biphenyl (PCB) wastes
- Large debris (mechanical equipment or reinforced concrete)
- Thorium metal/oxide
- Asbestos.

5.2 Non-Typical Waste Management

Non-typical wastes which are determined to meet the CDF WAC, or can be treated or size-reduced (i.e., non-processable waste) to meet the CDF WAC, will be transferred to the Material Handling Building. Treatment of non-typical wastes includes emptying and appropriately managing the contents of drums, cylinders, transformers, etc. It may not be feasible to treat or otherwise make acceptable for the CDF all non-typical waste streams. Non-typical wastes which cannot be made to meet the CDF WAC will be segregated according to guidance provided by FDF and placed in containers for transfer to FDF for further handling and disposition.

It is understood that there is a potential for encountering materials within the various units which may possess pyrophoric properties. Units which may present a potential for encountering pyrophoric materials include Waste Pit Nos. 3 and 5, the Clearwell, and the Burn Pit. Units which possess a greater potential for encountering these types of wastes include Waste Pit Nos. 2, 4, and 6. Care will be taken during the removal of any materials which are deemed pyrophoric. These materials will be handled in a manner which will prevent them from igniting due to the excavation activities. These materials will require handling by both on-site personnel and the excavation equipment. Once removed, the materials will be staged at a location within the excavation where minimal disturbance will occur. These materials will then be wetted as necessary and packaged in a manner which will minimize disturbance during transport to the Non-Typical Waste Transfer Area located between Waste Pit Nos. 4 and 6. In the event that pyrophoric materials are encountered which have ignited, they will be smothered using available

soils. After these materials have been extinguished, they will be wetted and handled in the same manner as described above.

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Debris which may be encountered within the waste pits include drums, cylinders, transformers, concrete rubble, and abandoned equipment. These materials will be identified by the on-site personnel who will be monitoring the working face. In the event that debris is encountered, it will be inspected to assess its condition. Furthermore, the location from which it was obtained will also be inspected to determine if additional debris is present.

Prior to the removal of additional debris, an area within the pit will be prepared to provide a suitable working platform upon which personnel may work and where excavated debris may be temporarily staged. It will be located at a safe distance away from the excavator. Depending upon the elevation along the working face at which the debris is encountered, it may be necessary to establish an area on top of the unexcavated cover due to safety concerns. If this is required, the slopes will be evaluated to assess their stability due to the loads induced by the excavator. The slopes will then be cut back, as necessary, based on this evaluation.

In order to minimize the handling of potentially damaged drums by personnel, a drum grappler mounted to the excavator will be used to extract these items. Once extracted, personnel will visually inspect the drum to assess its integrity. Intact drums will be over-packed and transferred to the Non-Typical Waste Transfer Area for subsequent disposal. The contents of all damaged drums will be emptied using the grappler and the contents will be inspected to determine if they shall be handled as either processable or non-processable. The drums will be flattened, one at a time or when a number of them have been accumulated, using the tracks of the excavator. The flattened drum will then be handled as non-processable wastes. All drum handling procedures will be performed in accordance with the Remedial Action Health and Safety Plan which has been submitted as part of this RA package.

Cylinders will primarily be handled by the on-site personnel to minimize the potential of damage which may be incurred if excavation equipment is used to remove these items. Once extricated, the cylinders will be stored at a stable and secure location within the excavation. These cylinders will be secured and/or palletized, if necessary, for transport to the Non-Typical Waste Transfer Area. All cylinders will be handled in accordance with the procedures outlined in the Remedial Action Health and Safety Plan.

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Transformers will also be removed using the drum grappler. Once removed, the transformer will be inspected by the on-site personnel to assess its integrity. If necessary, the transformer will be over-packed for transport to the Non-Typical Waste Transfer Area. Absorbent clothes and materials will be staged at the excavation so that any spills due to leaking oils may be contained. These materials will also be drummed prior to transport to the Non-Typical Waste Transfer Area.

Extremely large debris such as concrete rubble and abandoned equipment will be removed from the excavation using the earthmoving equipment. These objects will be size reduced as necessary to facilitate transport and placement into the railcar for disposal at the CDF, or into other containers for disposal as directed by FDF. Sizing of rubble will primarily be achieved using the buckets or blades of the heavy equipment. Some dismantling of equipment may be required by on-site personnel. Dismantling will be performed using mechanical means to the maximum extent practical. If necessary, acetylene torches may be required. The use of open flames in cutting/welding operations will be performed in accordance with the permits and procedures outlined in the Remedial Action Health and Safety Plan. Loading, slinging, and hoisting of oversized debris will be performed in accordance with the procedures outlined in the FDF Hoisting and Rigging Manual.

Asbestos materials, if encountered, will be removed manually and using the excavation equipment. Materials containing asbestos will be double-bagged or double-wrapped prior to transport to the Non-Typical Waste Transfer Area. Small items will typically be bagged. Larger items, such as pipes, will typically be wrapped in plastic sheeting.

Non-typical waste materials may be encountered in the Material Handling Building or Railcar Loadout Building. These materials would typically include smaller items which are not identified and segregated in the pit area. They could also include materials brought to the MHB for size reduction (e.g., shredding). In the MHB, non-typical waste will primarily be identified by visual observation but particle size screening activities may also remove some non-typical waste materials from other pit waste solids. These non-typical waste materials which cannot be made to meet the CDF WAC will be segregated according to guidance provided by FDF and placed in containers for transfer to FDF for further handling and disposition. Waste which is non-typical due to RCRA characteristics will be handled as described in Section 2.7.1.

6.0 OPERATIONS AND MAINTENANCE METHODS

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This section describes the general methods, guidelines and practices used in managing equipment

operations and maintenance. Managing equipment operation and maintenance in the context of this document includes not only routine control system monitoring and repair work, but also the preventive, predictive, and proactive actions used to maximize equipment operating efficiency and capacities. This section discusses some of the management systems that will help to assure that the Thermal Drying System (TDS) requirements are met, describes the key parameters used to monitor the performance of the TDS facilities, and describes the principal features and maintenance needs of the overall operation.

The TDS facility consists of solids handling and feeding systems, thermal drying system, gas cleaning system and wastewater treatment systems. Although the equipment used in these subsystems are different, the system performance parameters and maintenance requirements have no unique differences. These systems are designed and built with many redundant features and equipment to reduce potential down-time (for example, installed spare pumps, spare treatment units such as sand filter and ion exchange units). The equipment in these systems have easily discernible indicators of equipment conditions and are easily accessed for monitoring by operator walk-through.

6.1 MAINTENANCE AND SUPPORT

The WPRAP facility will have a maintenance program which utilizes maintenance inspections, schedules, procedures, specifications, plans, and reports as neccessary to manage and track maintenance activities.

Facility maintenance personnel are responsible for routine repairs, preventive maintenance, and minor modifications and improvements needed for maintaining the operational capability of the system. Full-time maintenance supervision and skilled, qualified craftsmen will be assigned to the TDS facility. The operations and maintenance groups work together closely on a day-to-day basis, promoting a sense of ownership and cooperation between the operators and maintainers of this system.

The TDS technical staff directly supports facility operation and maintenance, and includes chemical, civil and mechanical engineering, quality assurance, health and safety, radiological control, and environmental compliance personnel. The technical staff works together to resolve issues and improve operations. They also provide troubleshooting and technical assistance to

the day-to-day operations and maintenance groups.

Key responsibilities of the maintenance group include planning and performing maintenance activities, managing spare parts inventories, and developing maintenance work instructions. All work involving a modification is reviewed by knowledgeable technical personnel to ensure that it is appropriate. Maintenance work will be planned, except for emergency repairs, which are handled in a safe, expeditious manner. Major system maintenance turnarounds are planned in detail to help minimize the duration of system outages. Outside maintenance personnel may be required to aid with maintenance tasks during system outages or other times when supplemental support is needed. Some maintenance activities may require support from vendors or specialized technicians.

Maintenance activities will be performed in a manner which mitigates dust generation and minimizes worker exposure as defined in the ALARA concept. Containments and localized ventilation will be used during maintenance activities in areas which have an increased potential for personnel exposure. Contaminated debris/process residuals resulting from system cleanout/maintenance activities (i.e., tank bottom solids, filter media, etc.) will be handled and dispositioned in a manner consistent with pit waste materials.

A maintenance work order system will be used to manage maintenance activities. Work orders may be initiated for specific one-time tasks, or for regularly scheduled routine tasks. Radiological work permits may also be required for performing some maintenance activities in conjunction with a maintenance work order. A computerized maintenance management system (CMMS) will be used to aid in the tracking of maintenance activities including calibration / preventative maintenance schedules, maintenance work instructions, spare parts information (inventory), and repair history information.

The TDS facility consists of conventional thermal, gas cleaning and wastewater treatment unit processes that are typical for the industry. It is expected to have good reliability and has documented maintenance guidelines. Routine maintenance practices, as documented by the original equipment manufacturer's maintenance manuals, have been used to provide the basis for TDS maintenance procedures and practices. A spare parts inventory (developed from original equipment manufacturer's recommendations) is maintained to facilitate the completion of equipment repairs.

6.2 OPERATIONS

Operating personnel play an important role in maximizing equipment operating efficiency and capacity. One significant duty of the facility operators is to identify and report existing and potential future equipment problems. Operators perform routine scheduled checks, inspections and walk-throughs of the facilities and systems. Potential problems and maintenance needs are reported to supervision and maintenance work orders are initiated. Operators and shift supervisors maintain shift logbooks that document activities and specific actions taken during each shift. Information in the logbooks is used as the basis for transfer of duty from one shift to the next. The logbooks are kept as a historical record of operational activities. Management and technical staff periodically review the logbooks as additional assurance that the systems are being effectively operated.

6.3 STANDARD OPERATING PROCEDURES

Facility operation is performed in accordance with approved Standard Operating procedures (SOPs) that are developed by the technical staff with the assistance of operations personnel. The SOPs are living documents that are reviewed periodically, revised as necessary for the safe and consistent operation of treatment processes.

SOPs provide step-by-step instructions for performing all the TDS activities. They also contain health and safety precautions that must be followed while performing the steps contained in the procedure. SOPs are written from the perspective of the operator who will be performing the steps.

SOPs also contain instructions as to when management must be notified of non-routine operating conditions or events and to whom in TDS management these conditions must be reported.

7.0 APPLICABLE REGULATORY REQUIREMENTS AND COMPLIANCE DEMONSTRATIONS

The specific substantive permitting and ARAR-driven requirements associated with the OU1 remediation activities are found in Appendix III. Table 7-1 shows the ARAR compliance strategy. Table 7-2 shows a detailed listing of all substantive permitting requirements associated with the OU1 remedial action and references the specific sections of the Remedial Action (RA) Package documents where additional information on these requirements are addressed. Cross

references to the Remedial Design (RD) Package documents are given in a similar set of tables in the Design Criteria and Assumptions document in Volume 1 of the RD.

8.0 LIST OF PROCEDURES AND PLANS GOVERNING OPERATIONS

Hazard Specific Programs

Accident Prevention Program
Carcinogen Control Program
Cold Stress Program
Permit-Required Confined Space Entry Program
Fall Protection Program
Fire Protection Program
Hazard Communication Program
Heat Stress Program
Hearing Conservation Program
Portable Ladder Safety Program
Respiratory Protection Program
Scaffold Construction, Inspection and Tagging Program
Exposure Control Program for Lead
Site Access, Training and Medical Scheduling Program
Substance Abuse Program
Excavation, Trenching and Shoring Program

Safety Instructions

Safety Instruction #1 - Working with Hazardous Chemicals
Safety Instruction #2 - Hot Work Activities
Safety Instruction #3 - Posting Requirements
Safety Instruction #4 - Aerial Work Platforms
Safety Instruction #5 - Housekeeping
Safety Instruction #6 - FERMCO Lockout/Tagout
Safety Instruction #7 - Operating of Lifting and Handling Equipment
Safety Instruction #8 - Hand and Portable Power Tools
Safety Instruction #9 - Electrical

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Safety Instruction #10 - Stop Work Procedure
Safety Instruction #11 - Drum Handling Procedure
Safety Instruction #12 - Operation of Motorized Vehicles and Mechanized Equipment
Safety Instruction #13 - Handling, Use, and Storage of Compressed Gas Cylinders
Safety Instruction #14 - Manual Lifting
Safety Instruction #15 - Job Safety Analysis Procedure

Standard Operating Procedures

Railcar System

Railcar Liner Installation
Railcar Loading
Railcar Weighing
Removing Reject Material from Railcar
Waste Material Sampling

Waste Pits

Waste Pit Material Handling
Asbestos Material Identification
Geophysical Survey of Waste Pits
Non-Typical Waste Handling
Waste Pit Water Management
Clearwell Dredge out
Equipment Operation and Inspection

Material Handling Building

Waste Blending
Shredder Operation
Shredder Isolation and Maintenance
Waste Material Screening
Equipment Refueling

Rotary Dryer

Operation of Solid Feed System
Feed System Isolation and Cleanout

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Rotary Dryer System Operation
Rotary Dryer Isolation and Inspection
Dryer Product Handling System Operation
Dryer Product Handling System Isolation and Inspection

Gas Cleaning System
Cyclone Separator Operation
Cyclone Separator Isolation and Inspection
Scrubber Operation
Scrubber Isolation and Inspection
Subcool Quench Operation
Subcool Quench Isolation and Inspection
Cooling Tower Operation
Cooling Tower Isolation and Inspection
Chemical Addition
WESP Operation
HEPA Filter Operation and Change Out
Thermal Oxidizer Operation
Thermal Oxidizer Isolation and Inspection

Process Blowdown Pre-Treatment System
Pre-Treatment System Operation
Filter Press Operation

Wastewater Treatment System
Wastewater Treatment Operation
Filter Backwash and Changeout
Water Sampling

Utilities
Chemical Receiving and Handling
Operation of Electrical Distribution System
Operation of Utility Water System
Operation of Instrument and Plant Air System
Utility Water System

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General Operations 1

Equipment Decontamination 2

Respirator Wash Facility Operation 3

Laundry Facility Operation 4

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Maintenance 6

Maintenance Work Activities 7

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DRAWINGS

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Appendix I
Description of Operation and Process

Excerpt from the Description of Process and Operations document (Section 2.0) previously submitted in Volume 1 of 3 of the Remedial Design (RD) Package.

1.0 INTRODUCTION

The waste materials in the pits are to be excavated, treated and/or blended as necessary, and ultimately transported to an off-site Commercial Disposal Facility (CDF). The general steps and activities associated with fulfilling this processing are:

- Waste excavation and initial segregation
- Preparation of the excavated waste materials (i.e., sorting, blending, size reduction, etc.)
- Thermally drying some or all of the waste materials
- Blending of the processed material (e.g., Radiological WAC blending)
- Storage and loadout for transport to the CDF.

Rainwater and other waters associated with the excavation and processing of the materials will be controlled and treated as necessary. Dust control procedures will be followed at all project areas including the excavation, haul roads, and processing area. The thermal drying process, which will utilize two indirectly heated rotary dryers, requires that the materials be prepared and fed to the rotary dryers, and that the emissions from the drying process be properly controlled with a gas cleaning system. Railcars utilized for hauling the processed wastes to the CDF will be properly prepared and maintained.

This document provides a description of the operations and processes involved in the excavation, preparation, and loadout of the waste materials for transport off site. Section 2.0 provides a description of each process step from waste excavation through loading of the railcars, including associated activities such as the control and treatment of storm and waste waters. Section 3.0 provides the process control philosophy associated with each of the process steps. Section 4.0 describes the sampling and analyses. Section 5.0 describes the utilities associated with the processing activities.

2.0 PROCESS DESCRIPTION

2.1 Waste Excavation

Waste excavation will begin upon receipt of the Authorization to Operate from FDF. Two or more waste pits will be excavated concurrently to provide feed for the radiological and moisture

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content-based waste blending program. After initial segregation, the excavated materials will be transferred to the Material Handling Building.

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The excavation of the various pits and Clearwell will be performed using conventional earth moving equipment. This equipment will include bulldozers, articulating dump trucks, track mounted excavators and long reach excavators. Access for mechanical excavation of pit materials will be from existing berms and covers, constructed access ramps or the pit bottom. Areas will be provided for moisture conditioning, nontypical waste staging, and nonprocessable waste staging.

As the waste pit excavations progress, sump areas adjacent to the excavation face will be used for dewatering of pit areas. To the extent possible, water removal from the waste will be accomplished via gravity drainage into the pit area low-point sumps prior to excavation and transportation to the waste processing area. All water collected within the excavations will be transferred to the Clearwell prior to treatment through the IT Wastewater Treatment System (WTS).

Additional information regarding excavation sequence, health and safety, material handling and segregation, and loading and hauling is presented in the Excavation Plan.

2.2 Waste Blending

Waste material blending, sampling, and analysis activities are described throughout the RD documents. The blending described is for the purpose of producing material which meets the CDF WAC for radiological and moisture constraints and is not for the purpose of diluting characteristically hazardous waste to render it nonhazardous. Unless stated otherwise, sampling and analysis described in the RD documents will be for radiological, moisture, or other WAC compliance characteristics other than RCRA. The analysis of samples for the determination of RCRA characteristic hazardousness will occur only on the material staged in the railcar storage bins prior to railcar loadout as described in Sections 2.7 and 4.2.

Blending of the waste material will occur in several locations. In the excavation areas, blending of waste materials from a single waste pit will be performed to produce a consistent material coming from the pit. In the Material Handling Building, material from multiple sources will be combined to meet waste acceptance criteria (WAC). In the Railcar Loadout Building,

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nonprocessable material will be combined with dried waste in the railcars. The following sections detail the various waste handling and blending procedures.

During excavation, waste materials within the pit will be segregated into three categories:

- Nontypical waste
- Nonprocessable waste
- Processable waste.

Nontypical waste that does not meet the CDF WAC or cannot be treated to meet the CDF WAC will be stockpiled in the excavation areas and managed until the material is turned over to FDF for disposal. IT will transfer nontypical waste material to a designated area between Waste Pits 4 and 6, along the existing roadway, where the material can be containerized by IT (as-required) and containers radiologically surveyed prior to being transferred to FDF for subsequent handling and disposal.

Nonprocessable waste is waste material that meets the CDF WAC but cannot be fed into the rotary dryer. This type of waste may consist of debris that could not pass through a 4-inch screen such as rocks, wood, clumps of clay, etc. To the extent possible, nonprocessable waste will be segregated in the excavation areas and transported to the Material Handling Building separately.

Processable waste from a single source will be blended in the excavation, primarily on the basis of moisture content, to achieve a manageable material.

When excavated, wastes will be classified as low WAC or high WAC material, depending on the levels of radioactive constituents and other pertinent processing/disposal criteria. Historical surveys and investigations of each pit, the trend analysis from ongoing monitoring, and chemical analysis of waste materials as the remediation proceeds, will allow segregation of waste materials based on the levels of radioactive constituents. Wastes will be loaded into contained dump trucks (approximate 21-yard capacity) and transported from the pit area over the designated haul road to the Material Handling Building. Three trucks are expected to be making the continuous route at any given time, at an average rate of three trucks per hour up to a maximum rate of six trucks per hour.

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Additional waste blending will occur in the Material Handling Building and Railcar Loadout Building. The blending of material from more than one source will occur in the mixing pits,

located along the west side of the Material Handling Building. The blend ratios will be determined in the field, and dump trucks will be directed to haul material from designated pits to the appropriate mixing pit to achieve a blended material that meets the WAC for railcar loadout. Front end mixing loaders will be used to blend the materials in the mixing pits. The material will be removed from the pits, screened to remove oversize materials, and stored in bins along the east wall of the building awaiting sampling and drying.

In the event that waste delivered to the mixing pits in the Material Handling Building from the excavation is not dry enough for convenient handling, waste material from OU1 Contaminated Soil Stockpile (typically drier material) or material that has been dried can be mixed with incoming material to improve consistency.

2.3 Waste Preparation (PFD D-15-10-001)

Process flow diagram (PFD) D-15-10-001 depicts handling of the excavated waste. All waste preparation will take place in the Material Handling Building. Waste preparation includes the receipt of excavated waste material from the pits, followed by blending, further separation by screening, and size reduction of material. Finally, a portion of the conditioned waste material will be selected for drying while the balance of the waste material will bypass the rotary dryers to be blended later with dried material prior to being transferred to the Railcar Loadout Building. Waste preparation activities will be conducted on a 1-, 2-, or 3-shift per day schedule. Sufficient storage will be provided in the Material Handling Building to support three shifts per day operation of the rotary dryers and final blending operations.

2.3.1 Initial Waste Classification

Wastes will be received at the Material Handling Building from a number of sources as follows:

- Processable waste from the excavations as previously described,
- Certain nonprocessable waste such as pallets, wood boards, and similar wastes that may be considered shreddable will be transferred to the Material Handling Building. The shreddable material will be segregated inside the building prior to shredding,
- Used personal protective equipment, consisting mainly of disposable outer garments and expended air purifying respirator cartridges, will be sent to the Material Handling Building for processing as required to meet the WAC,
- Material from OU1 Contaminated Soil Stockpile will be conveyed across the rail spur into the Material Handling Building and will be stockpiled in a designated bin.

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Following segregation in the waste pit area, excavated material will be transferred at a rate of approximately 100 tons per hour, to one of two mixing pits in the Material Handling Building. A common sump, located to the south of the mixing pits, will collect free water runoff from the waste being received. The water collected in the sump will be pumped out as needed for processing through the WTS.

2.3.2 Initial Blending

Waste material will be removed from the mixing pits by a front end loader and moved to a blending area in the Materials Handling Building. The initial blending will serve two purposes: (1) to blend materials with high radioactive content and materials with low radioactive content in such proportions as to meet the off-site disposal facility WAC, and (2) attempt to achieve optimum moisture content without the need for processing through the rotary dryers. This blending is not for the purpose of diluting characteristically hazardous waste to render it nonhazardous. Should both of the objectives of the initial blending operation be achieved, the blended wastes will be transferred directly to the Railcar Loadout Building for storage and sampling prior to loading into railcars for shipment to the off-site disposal facility without further processing. Production of WAC-compliant blends bypassing the rotary dryer operations may be used as the principal method of production for some excavation phases. This mode of production is referred to as Alternative Waste Production.

2.3.3 Screening

Waste material will be screened with or without blending at the discretion of the IT Shift Supervisor. The primary objective of the screening operation is to properly size waste material for processing through the rotary dryer. Three screening systems are being evaluated for use in this operation. These are:

- A stationary 4-inch vibrating deck screen
- A rotating trommel-type screen
- An equipment-mounted rotating trommel-type screen.

Material handling equipment, such as a front end loader will be used to feed either of the screening devices. The screens will discharge both oversize and on-size materials to piles on the floor of the Materials Handling Building from which they will be moved by front end loaders (or other material handling equipment). Oversize material may be separated visually into shreddable and nonshreddable waste. When such a separation is made, the shreddable waste will be moved

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to the storage area for shreddable material to await processing, while the nonshreddable waste will be segregated for size reduction and final blending with rotary dryer-processed waste. Sized waste will be moved into bins on the east side of the building and held for processing through the rotary dryer or for final blending with rotary dryer-processed waste. Nonshreddable waste may be size-reduced in the pit area or the Material Handling Building using methods that may include cleavage of debris with equipment bucket/blade; runover by equipment track; cleavage with equipment mounted ram, jaws or other device; or flame cutting.

If an equipment-mounted rotating trommel-type screen is selected for this project, the waste will be picked up by the material handling equipment from the blending pile, the trommel screen closed, and the equipment will be moved to the selected storage bin where rotation will be started. Oversize material will be retained inside the rotating screen, while sized material will discharge through the screen into the bin. After each load of waste has been screened, the trommel device will be moved to the oversize material area, discharged, and the oversize handled as previously described.

2.3.4 Shredding

Waste material segregated and awaiting shredding will be processed in "campaigns" when sufficient material for shredding has accumulated. Shredding will be accomplished using a stationary, low-speed shear type debris shredder (M-1501). Wastes will be moved out of the holding bin and into the shredder feed hopper using conventional material handling equipment. The shredded material will be discharged onto the floor of the Materials Handling Building. It will be picked up by the material handling equipment and transferred to a segregated area to await final blending with rotary dryer-processed waste.

2.3.5 Dust Control

Water sprays will be used at stationary equipment transfer points in the waste preparation area to control dust. In general, the moisture content of the waste material received at the waste preparation area is expected to be high enough to prevent dusting during processing. Water sprays will be available, however, to suppress dust in the event that some material handling systems require dust suppression. Sumps in the floor of the Materials Handling Building will collect any free moisture from the dust suppression sprays and from housekeeping activities. The collected water will be discharged to the Clearwell for subsequent treatment in the WTS.

2.3.6 Waste Processing

The majority of the waste material is expected to require drying. However, a greater or lesser amount may be dried, depending upon actual waste condition in the pits upon excavation. Since these waste materials will ultimately be landfilled, proper moisture is critical to achieving adequate compaction when placed in the landfill. Uniformity and dryness are also necessary in handling to prevent bulking, cementing, or hold up in railroad cars during unloading.

2.3.7 Final Blending

Material loaded out in railcars must meet the WAC for the disposal facility. Wastes will be blended to meet moisture and radiological criteria and to maximize efficient loading of railcars. As noted earlier, most of the waste will be processed through the rotary dryer since it contains a significant overall excess of water. Some of the wastes including the pit soil caps and certain materials stockpiled in the OU1 Contaminated Soil Stockpile area are expected to be near optimum moisture as excavated. These materials may be loaded as is or reserved for blending.

The material exiting the rotary dryer may be further mixed with material that has bypassed the drying step. Further blending before or after the rotary dryer can be utilized to improve/ensure the blend quality of the final product.

The average bulk density of waste material loaded out into the railcars is expected to be 1.23 tons per cubic yard.

2.4 Rotary Dryer Feed System (PFD D-20-10-001 and -002)

PFDs D-20-10-001 and -002 depict operations for waste materials fed from the waste preparation area into the dual rotary dryer unit operations (F-2001 A/B). A front-end loader will be used to transfer solid waste materials from the staging bins to the feed hoppers of the mass flow screw feeders (H-1001A/B). Material is transferred from the mass flow screw feeders to the belt feed conveyors (H-1002 A/B) which include belt scales. The speed of each mass flow feeder is automatically controlled to adjust the mass rate of waste material being fed as measured and indicated by the belt scale. The feed material discharges from the belt feed conveyors into the dryer feed screws (H-2001 A/B) that extend into the rotary dryers. The screw feeders provide a positive feed mechanism to assure uniform transfer of the material into the rotary dryers, and it also provides a positive seal that limits the amount of infiltration air into the rotary dryers.

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2.5 Rotary Dryer Operation (PFD D-20-10-001 and -002)

Drawings D-20-10-001 and -002 also depict operations for waste materials being received from the waste preparation area and processed through the rotary dryer. Two indirectly heated rotary dryers (F-2001 A/B) receive and process wet waste material of various moisture contents, depending on the type of waste. The design basis moisture content is 40 percent (wet basis). The rotary dryers reduce the moisture content of the waste materials to 10 - 15 percent (wet weight basis). Waste materials are fed to each rotary dryer primarily as solids through the feed screws (Stream 116). The feed screws extend inside the rotary dryers to deposit wet waste within the heated zone.

Each rotary dryer system consists of a cylindrical shell rotated with a variable speed drive. The rotating cylinder is heated externally by a furnace with adequate length and diameter to satisfy heat transfer requirements. Using natural gas as fuel for combustion, heat energy for the indirect drying is produced in multiple furnace zones by a set of burners located in each zone. Burners are operated with adjustable primary air/fuel ratio and secondary air addition to control the flame temperature so the rotating cylinder does not exceed its design temperature. Air to the burners is supplied by combustion air fans (B-2001 A/B).

Burner exhaust gases from each furnace zone are vented directly to the atmosphere through multiple vent stacks. Heat energy from each furnace zone is indirectly transferred to the material advancing inside the rotating shell.

Each rotary dryer has multiple furnace zones and is provided with individual temperature control of each zone. This ability to control the temperature throughout the rotary dryer provides flexibility and simplicity in drying wastes with varying levels of incoming moisture content to achieve the desired moisture content in the dried product. It is anticipated that the rotary dryer shell temperature may vary from 1200°F to 1600°F.

The slope and speed of the cylinder's rotation determine the retention time in the rotary dryer. The slope is fixed, but the rotation speed is variable and is used to adjust the retention time as necessary, providing additional control of the drying process.

The product from each rotary dryer (Stream 204) is discharged to the product conveyors (H-3001 A/B). An enclosed drag flight conveyor will be used for this application. Atomized water sprays will be utilized at the outlet of the conveyors to control dust as required. A set of airlock valves

(H-3002A/B) will be located at the discharge of each dryer product conveyor to minimize air infiltration. The dryer product mixers (H-3003A/B) will be used as required to intermix rotary dryer product to a uniform consistency.

Infiltration air enters the rotary dryers operating under a vacuum at a predetermined rate to aid in carrying the water vapor produced during the drying process through the gas cleaning system. Inert gas is introduced as necessary to control the ultimate oxygen concentration in the system. After exiting the rotary dryers, the process off-gas stream (Stream 203) is routed to the gas cleaning system as shown on PFD D-50-10-001 and -002. A portion of the off-gas entrained solids are collected in the downstream cyclones (S-5001 A/B) and returned to the dryer product conveyors (H-3001 A/B) as Stream 501.

2.6 Gas Cleaning System (PFD D-50-10-001 and -002)

PFDs D-50-10-001 and -002 present the process design for the cleaning of the off-gases from the rotary dryer operation. The PFDs also indicate the various solid and liquid purge streams from the gas cleaning process.

The off-gas from each rotary dryer initially passes through the high efficiency cyclone separators (S-5001 A/B) to remove large, entrained particulate. The solids removed from the off-gas are transferred from the cyclones via the cyclone solids transfer screws (H-5001A/B) to the rotary dryer product system and combined in a mixing operation to assure the proper product consistency and moisture content. This design mitigates dust generation and minimizes worker exposure as defined in the ALARA concept.

The off-gas from the cyclones is conditioned in the scrubber (V-5001) to cool the rotary dryer off-gas, remove a portion of the entrained particulate, and partially condense water vapor generated by the drying process. The scrubber spray water is recirculated at a nominal rate of 150 GPM. The water and condensate pass from the scrubber into the scrubber sump tank (T-5001). The scrubber pumps (P-5001A/B) recycle water from the scrubber sump tank back to the scrubber. A continuous blowdown (Stream 506) circulates to the process blowdown pre-treatment system to control suspended solids concentration in the scrubber water. The majority of the blowdown stream is then returned as makeup to the scrubber. Sodium hydroxide (caustic) from the caustic tank and/or acid from the acid tank is added to the Scrubber recycle stream to neutralize the process as needed.

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The off-gas from the scrubber flows to the subcool quench (V-5002). Cooling water is recirculated through the subcool quench at a nominal rate of 1600 GPM by the subcool quench recirculation pumps (P-5002A/B). This recycle water is cooled in the quench heat exchangers (E-5002 A/B) prior to introduction into the off-gas stream in the subcool quench. This further reduces the temperature of the off-gas to a nominal 100° F. Subcooling the off-gas generates a nominal 30 GPM of condensate (Stream 517) which flows to the Process Blowdown Pre-treatment System (PFD D-60-10-001) and ultimately to the Wastewater Treatment System.

A cooling tower (W-5001) and recirculating cooling water loop is used as the cooling medium for the subcool quench heat exchangers. Cooling water is recycled by the cooling tower recirculation pumps (P-5003 A/B) from the cooling tower through the heat exchangers back to the tower. A small purge stream is discharged from the cooling tower to the Clearwell. This water does not contact contaminated materials and is not expected to be contaminated. (This stream is discussed in the request to route process water to the Clearwell given in Section 2.8.1.1.)

Off-gas from the Subcool Quench flows into a wet electrostatic precipitator (WESP) (S-5004) for the removal of submicron particulate and water droplets. Water and particulate collected in the WESP are pumped to the Process Blowdown Pretreatment System.

The off-gas from the WESP is slightly reheated in the electrically heated off-gas reheater (E-5003) to prevent any condensation in the HEPA filters. The HEPA filters (FX-5004 A/B) are mounted in parallel with only one set being used at a time, with the other on standby or being replaced as necessary. The HEPA filters remove particulate greater than 0.3 microns that may have passed through the WESP. Two induced-draft fans (B-5001 A/B) are used to pull the off-gases through the system from the rotary dryer through the HEPA filters, keeping the entire system under negative pressure so that any leakage is into the system. The two ID Fans are arranged as an inline spare configuration with one fan normally operating and the other on standby.

The filtered off-gas from the HEPAs is directed into the Thermal Oxidizer (F-5001) which provides an effective means for the treatment of remaining volatile organic compounds (VOCs) and carbon monoxide (CO) in the off-gas stream. The system off-gasses are finally released to the atmosphere through the vent stack (X-5001). Point source emission estimates are discussed in the Point Source Emission Data section of this design package.

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The condensed and purged liquids from the GCS are directed to the Process Blowdown Pretreatment System shown on PFD D-60-10-001. All liquid blowdown streams flow to the primary clarifier (T-6001) and then to the secondary clarifier (T-6002) for solids settlement using polymer and pH controlled clarification. The outflow from the secondary clarifier is accumulated in the clarifier surge tank (T-6008) and pumped via the clarifier discharge pump (P-6008) through dual sand filters (FX-6002 A/B), dual bag filters (FX-6003 A/B), and recycled to the drying process as scrubber makeup (Stream 505). Sludge from the clarifier bottoms (stream 603) is directed to the sludge mix tank (T-6005). Raked or skimmed organic materials are collected in the organic condensate surge container (T-6003) and subsequently pumped to the sludge mix tank. The sludge mix tank also receives site sump flows and the Wastewater Treatment System (WTS) solids blowdown (Stream 658). Solid materials are separated from the sludge in the filter press (FX-6001) with the liquid collected in the filtrate storage tank (T-6006). Oily liquids are pumped to the organic condensate storage tank (T-6004). The water fraction will be routed to the WTS influent tank for pretreatment prior to discharge to the BSL. The oil fraction will be turned over to FDF for subsequent handling and disposal.

2.7 Railcar Loadout and Lidding (PFD D-35-10-001)

PFD D-35-10-001 depicts the transfer of blended materials from the Material Handling Building to the storage bins in the Railcar Loadout Building. The material is transferred using conventional rubber-tired front end loaders. During storage bin filling, sampling of the material is undertaken per the Sampling and Analysis Plan and a composite sample is obtained to determine if the bin meets the requirements of the CDF WAC. The filled bins have a storage capacity of 600 tons approximately. The bin capacity should accommodate filling six rail road cars. Each railcar will have a unique identification number and will correspond to the Certificate of Analysis from the bin from which it was loaded.

In the unlikely event that sampling and analysis indicate that a material in a storage bin does not meet the CDF WAC due to radiological or moisture content, the material will be removed from the bin and reblended with other materials to meet the WAC. If a material is determined to be RCRA characteristic waste, it will be turned over to FDF for subsequent handling and disposal.

Railcar Loading. Railcar loading will be supervised from an enclosed elevated control position located on the east side of the Railcar Loadout Building adjacent to the rail weigh scale and directly in front of the loadout area. The Loadout Supervisor will be in radio or visible contact with the personnel involved in moving the railcars, lid removal, liner installation, waste loading,

liner sealing, lid replacement, and decontamination and survey activities. The supervisor will also be monitoring for dust generation and will have the ability to activate the dust suppression system if required. The supervisor will be responsible for completing the necessary documentation relating to the weight of each railcar and identifying from which storage bin each railcar is filled. A conventional front-end loader will remove the material from the characterized bin certified in meeting the WAC and place it evenly distributed in the railcar until the maximum cargo weight is achieved. The maximum cargo weight is 108.17 tons. Debris meeting the WAC will be placed in the railcar utilizing a front-end loader along with the waste per the constraints of the WAC.

Railcar Lining. Railcars will be lined with a material that will help prevent the contamination of the railcar. The liners will be constructed to resist tearing during normal loading operations. The liners will be stored in the lid/liner storage area and transferred to the liner installation area utilizing a pallet jack. The liner will be placed in the railcar and will be overlapped over the side of the railcar adjacent to the loadout position. The overhung liner will protect the railcar siding from contamination in the event of spillage during the loadout operation. Once the loadout is complete, the liner is folded over the waste.

2.7.1 Railcar Loadout and Lidding Operations

These operations involve moving four railcars at a time utilizing a track mobile. The railcars will enter the loadout building at the northeast corner (through the rail decontamination area). For discussion purposes, the first car that enters the building is referred to as Car 4, with all cars that follow being referred to in a descending numerical order because the last car to enter the building will be the first car to leave the building. Each car will proceed through five operations necessary for completion of loadout. These operations include:

- Lid removal and inspection
- Railcar lining
- Loadout
- Lidding and decontamination
- Radiological survey.

The following is a step-by-step description of the operation in the Railcar Loadout Building:

Step 1. As the railcars pass through the decontamination area, the lids will be removed and visually inspected to assess their condition and to identify any damages.

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- If the lid is in good condition, it will be placed in a rack located within the decontamination area and stacked/stored until the lid replacement step, after railcar loadout is completed.

- If a lid requires repair, it will be placed back on Car 1. The railcars then move to the liner and lid repair area at the southern end of the building where damaged lids will be removed as needed for repair.

Step 2. Once all of the lids are removed, either in the decontamination area or the liner and lid repair area, the cars will be moved to the liner and lid repair area. Car 1 is positioned in the lining area and lined, with Cars 2, 3, and 4 awaiting lining.

Step 3. The cars will advance so that Car 1 is awaiting loadout, Car 2 is being lined, and Cars 3 and 4 are awaiting lining.

Step 4. The cars will advance so that Car 1 is positioned on the scale in front of the loadout pad and filled to the desired weight, while Car 2 is awaiting loadout. Car 3 is lined, and Car 4 is awaiting lining. Following filling, the liner on Car 1 will be folded inward to cover the waste material.

Step 5. The cars will advance so that Car 1 is in the decontamination area where a lid will be placed back on the car, sealing the car, and the outside of the car decontaminated as required. Car 2 is filled and weighed, Car 3 is awaiting loadout, and Car 4 is lined.

Step 6. Car 1 will advance out of the decontamination area to a dedicated holding area to await radiological survey results. Car 2 is lidded and decontaminated, Car 3 is filled and weighed, and Car 4 is awaiting loadout.

Step 7. The cars will advance so that Car 2 awaits decontamination results in the holding area, Car 3 is covered and decontaminated, and Car 4 is filled and weighed.

Step 8. The cars will advance so that Car 3 awaits decontamination results in the holding area and Car 4 is covered and decontaminated.

Step 9. The cars will advance so that Car 4 awaits decontamination results in the holding area.

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Step 10. Once that the cars are verified for radiological release, FDF will be notified to transfer cars out of the area and replace with empty cars. FDF will subsequently transfer the cars to the on-site rail yard to await shipment off site.

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In the unlikely event that a railcar fails the radiological testing, the car will be returned to the decontamination area for additional cleaning. The car will then be tested to determine if it meets the radiological release requirements. Although the FEMP is optimistic that the railcars can be consistently decontaminated to the established radiological limits, if the limits cannot be met the railcar will not be released from the site.

2.7.2 Railcar Rejection at the CDF

In the event that the contents of a railcar are rejected at the CDF, measures may be taken at the CDF to render compliance with the WAC. If unsuccessful, the railcar will be returned to the FEMP because its contents do not pass the WAC, then the railcar will be unloaded in the load out area. Unloading will be done with conventional earth-moving equipment during an off-shift. If this unloading results in the liner being uncapable of containing the waste (i.e., if it is ripped or torn), it will be folded into the railcar and a new liner will be installed over it. If the material was rejected because of radiological content or moisture, it will be reblended with other pit waste until it satisfies the CDF WAC. If the material is rejected because of RCRA characteristics, it will be unloaded and turned over to FDF for handling and disposal.

The measures to deal with non-compliant railcar contents at the CDF, including specific actions and payments, will be dealt with on a case-by-case basis and are subject to various contractual relationships between DOE, FDF, IT, and the yet to be developed contractual relationships with rail carriers and the CDF. Actions to deal with non-compliant railcars are dependent on a number of variables including the specific basis for non-compliance, contractual requirements and remedies between involved parties, specific methods and alternatives available to bring the materials into compliance, and costs. Such actions can include treatment at the CDF, and/or disposal potentially at an increased cost. The ultimate receipt and disposal of the waste materials will be in compliance with applicable regulations and licensing agreements.

2.8 Water Management (PFDs D-65-10-001 and D-90-10-001)

Water management at the WPRAP site consists of collecting, sampling, treating (as necessary) and discharging water from multiple sources. Proper water management is a key part of project

operations and is critical to waste excavation. The following sections discuss site water based on where the water originates and how the water must be handled. The water being managed during the WPRAP is separated into the following categories:

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- Process wastewater
- Nonprocess wastewater and contact storm water outside the waste pit area
- Noncontact storm water outside the waste pit area
- Excavation water and contact storm water inside the waste pit area
- Noncontact storm water inside the waste pit area.

The following definitions are used in this document during discussion of water management:

- **Perched Water.** Subsurface water occurring in the glacial overburden. Perched water that seeps through the sidewalls of the excavations is referred to as "seepage."

- **Contact Storm Water.** Storm water that contacts raw waste material within an open excavation; storm water that lands on the water cover of the Clearwell, Waste Pit 5, and Waste Pit 6; and storm water that contacts potentially contaminated surfaces (e.g., haul roads, contaminated concrete pads, and roads).

- **Noncontact Storm Water.** Storm water that does not contact any raw waste or potentially contaminated surfaces. Examples include roof drains, storm water that lands on covered sections of the waste pits and is diverted to the K-65 Runoff Basin, and storm water that falls on the ground outside the waste pit area and is diverted to the Storm Water Management (SWM) Pond or to existing drainage swales. Storm water collected in the SWM pond will require monitoring to verify that it is noncontaminated.

- **Excavation Water.** The combined water pumped from an excavation to the Clearwell. This is composed of contact storm water, drainage from excavated materials, and perched water seepage into the excavation.

- **Nonprocess Wastewater.** Water streams requiring pretreatment by the IT Wastewater Treatment System (WTS) and/or discharge to the BSL and treatment by the FDF Advanced Wastewater Treatment (AWWT) Facility. Examples include laboratory wastewater, laundry wastewater, personnel decontamination shower wastewater, respirator wash water, drainage water and excess dust suppression spray collected in the sumps in the buildings, and decontamination water.

- **Process Wastewater.** Wastewater resulting from the Gas Cleaning System (GCS) system and WTS. Examples include GCS blowdown, WTS backwash water, and cooling tower blowdown.

- WTS. The IT WTS will be used to pretreat water as necessary prior to discharge to the BSL and subsequent treatment in the AWWT Facility.

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Portions of the water management activities described in this document refer to the placement of various water and wastewater streams into Waste Pit 5, Waste Pit 6 and the Clearwell. These descriptions constitute a request to the Ohio EPA in accordance with the 1988 Consent Decree. The following possible flow patterns are included in this request:

- FEMP fire water to the water covers on Waste Pits 5 and 6
- Waste Pit 6 storm water to the Clearwell
- Excavation water to the Clearwell or Waste Pit 5
- WTS backwash/recycle water to the Clearwell
- Nonprocess wastewater to the Clearwell
- Cooling Tower blowdown water to the Clearwell
- Noncontact storm water from the SWM Pond to the Clearwell.

The request to route these waters as described is put forth for the following reasons:

- All water streams being managed within OU1 (with the exception of FDF fire water, and FDF potable water supplies) originate from the waste pits or from the remediation of the waste pits.

- FDF fire water and FDF potable water is uncontaminated and will only be added to Waste Pits 5 and 6 as needed to manage the water covers.

- The only process wastewater streams that would be sent to the Clearwell are cooling tower blowdown (which is a noncontact stream and should be clean), backwash water (which is previously treated water from the WTS containing suspended solids from the WTS filters and resin beds), and recycle water (which is partially treated water from the WTS which may not or does not meet the BSL WAC).

- The Clearwell provides a logical surge capacity for water that must be pretreated by the WTS. Construction of an alternate surge point for these streams would be very impractical.

The following sections discuss management of the five site water categories given above. Routing of water to the Clearwell (part of the request to the Ohio EPA explained above) is included in these sections where appropriate.

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2.8.1 Process Wastewater

The following is a list of process wastewater sources:

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- Cooling tower blowdown water
- Water purged from the GCS
- Backwash/recycle water from the IT WTS.

These streams will remain relatively constant throughout operations at the site and are not expected to change during the various excavation phases. The sections below describe the method by which the water will be collected and transferred to the WTS, the expected flow rate, and notes on the chemical composition of each stream.

2.8.1.1 Cooling Tower Blowdown Water

A blowdown stream from the cooling tower in the rotary dryer system will be routed to the Clearwell for subsequent treatment by the WTS. This stream is expected to be approximately 14,400 gpd and is not expected to contain contaminants at levels higher than the BSL WAC.

2.8.1.2 GCS Blowdown Water

Process water generated by the GCS associated with the rotary dryer will be combined and routed through a primary and secondary clarifier for removal of any free-phase organics and suspended solids. The aqueous stream from the secondary clarifier will be pumped to the influent tank in the WTS. This stream is not expected to exceed 52,000 gpd.

2.8.1.3 Backwash/Recycle Water from the WTS

Water generated during the backwashing of the sand filter and ion exchange beds in the WTS is piped to flow directly to the Clearwell. The line pressure supplied by the backwash will be sufficient to transfer the water to the Clearwell, no additional pump is necessary. The average flow of backwash water from the WTS to the Clearwell is approximately 15,000 gpd. This stream will have a high suspended solids concentration.

Recycle water is partially treated water from the WTS which may not or does not meet the BSL WAC. Partially treated water may be diverted to the Clearwell during startup of the WTS or at times during which it is suspected that the WTS effluent does not meet the BSL WAC. This stream may also include water collected in the WTS containment area. Recycle water has an intermittent flow.

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2.8.2 Nonprocess Wastewater and Contact Storm Water

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The following is a list of nonprocess wastewater and contact storm water sources that originate outside the pit area:

- Laundry water
- Laboratory wastewater
- Material handling building collection sumps
- Railcar loadout building collection sumps
- Rotary dryer area collection sump
- Truck turnaround area collection sump
- Truck wash collection sump
- Decontamination pad water
- GCS/WTS building collection sump

These streams will remain relatively constant throughout operations at the site and are not expected to change during the various excavation phases. The sections below describe the method by which the water will be collected and transferred, the expected flow rate, and notes on the chemical composition of each stream.

2.8.2.1 Laundry Water

Wastewater from the washing machines in the laundry facility will flow by gravity from the laundry facility to the Grey Water Collection Tank as needed. The laundry facility will generate approximately 750 gpd average over a seven-day week. Because the clothes being washed are worn under PPE, the laundry water is not expected to contain contaminants at levels higher than the BSL WAC.

2.8.2.2 Respirator Wash Water

Wastewater from the respirator wash facility will flow by gravity from the respirator wash facility to the Grey Water Collection Tank. The respirator wash facility will generate approximately 100 gpd average over a seven-day week. Because the cartridges of the respirator will be disposed of prior to cleaning, the wash water is not expected to contain contaminants at levels higher than the BSL WAC.

2.8.2.3 Grey Water Collection Tank

Wastewater from the laundry facility, and respirator wash facility will flow by gravity to the Grey Water Collection Tank. The tank will be buried between the laundry and respirator wash facilities to allow for gravity flow from the facilities via buried lines. The tank will contain a submersible pump and a series of three level switches for pump on and off and high-level alarm.

The pump discharge line will be equipped with a flow meter/totalizer to track discharge. The tank will collect an approximate average of 850 gpd. The discharge pump will transfer water from the tank to the BSL. The water is not expected to contain contaminants at levels higher than the BSL WAC. A monitoring program will be established for the Grey Water Collection Tank effluent discharge to the BSL. Details of the monitoring program will be given in the Sampling and Analysis Plan.

2.8.2.4 Laboratory Wastewater

Wastewater generated in the on-site laboratory will be pumped to the Grey Water Collection Tank. This wastewater is generated as a result of analytical activities. The average flow rate from the laboratory is not expected to be greater than 100 gpd. The water is not expected to contain contaminants at levels higher than the BSL WAC.

2.8.2.5 Material Handling Building Collection Sumps

The Material Handling Building will contain three collection sumps. Water from the material being handled in the mixing pits will collect in a sump to the south of the pits. The trench from the mixing pits to the sump will include a weir to minimize the accumulation of solids in the sump. Water draining from material stock piles in the bins along the east wall of the building will be collected by an open trench behind the storage bins. This trench will be sloped to a sump in the center of the trench. The connection between the trench and the sump will include a weir to minimize the accumulation of solids in the sump. A third sump will be located in the southwest portion of the building near the filter press. The floor in this area will be sloped to drain free water to the collection sump. Each collection sump will contain a single sump pump and will transfer water to the Material Handling Building Collection Tank. The average flow rate from the three sumps in the Material Handling Building is not expected to be greater than 300 gpd average.

2.8.2.6 Railcar Loadout Building Collection Sumps

The Railcar Loadout Building contains three collection sumps. Water from railcar decontamination and excess water from dust suppression spraying will be collected by these sumps. Each sump will contain a dedicated sump pump. The sump pumps will transfer the water to the

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Material Handling Building Collection Tank. The average flow rate from the Railcar Loadout Building is not expected to be greater than 1,200 gpd.

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2.8.2.7 Rotary Dryer Area Collection Sump

The rotary dryer area is sloped to drain to a collection sump. Storm water will be collected by this sump. A sump pump will transfer the water to the Clearwell. The average flow rate from the sump is not expected to be greater than 418 gpd.

2.8.2.8 Material Handling Building Collection Tank

Wastewater from collection sumps in the Material Handling Building and Railcar Loadout Building will be pumped to the Material Handling Building Collection Tank. The tank will be an above ground storage tank with an open top, located along the wall in the Material Handling Building. The tank will have a horizontal centrifugal pump mounted outside the tank, and the level in the tank will be monitored. The tank will collect an average of 1,428 gpd. The discharge pump will transfer water from the tank to the Clearwell.

2.8.2.9 Truck Turnaround Area Collection Sump

The Truck Turnaround Area is sloped to drain to two low points: one in the center of the open eastern portion (an area of approximately 26,450 ft^2) and the other at the west end of the haul road portion of the area (an area of approximately 8,450 ft^2). Contact storm water and excess dust suppression spray landing in the Truck Turnaround Area will be collected in two catch basins that are tied together below grade. Water will be pumped from a sump tied to the basins to the Clearwell through a line buried along the southern edge of the Turnaround Area. The average flow rate is not expected to be greater than 1,800 gpd.

Storm water and excess dust suppression spray landing in the haul road leading to the Truck Turnaround Area will drain to a collection sump adjacent to the Truck Wash and Personnel Boot Wash. The average flow from this haul road to the Truck Wash sump is approximately 600 gpd.

2.8.2.10 Truck Wash Collection Sump

The Truck Wash and Personnel Boot Wash area is curbed and sloped to drain to a collection sump. Decontamination water, contact storm water landing in the area, and excess water from dust suppression spraying will be collected by this sump. In addition, water from the haul road leading to the Truck Turnaround Area will flow by gravity through a buried line to this sump. The Truck Wash sump pump will transfer the water directly to the Clearwell. The average flow

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rate of decontamination water and contact storm water from the Truck Wash pad is not expected to be greater than 420 gpd. The average combined flow from the haul road and the Truck Wash is not expected to be greater than 1,000 gpd.

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2.8.2.11 Decontamination Pad Wastewater

The Decontamination Pad located immediately south of the Truck Turnaround Area is sloped to drain to a collection sump. Wash water and contact storm water from this pad will be collected by the Truck Turnaround Area sump. The average flow rate from the pad is not expected to be greater than 1,500 gpd.

2.8.2.12 GCS/WTS Building Collection Sump

The floor of the GCS/WTS building is sloped to two sumps. Water will be transferred from these sumps to tankage in the WTS. The sumps are not expected to generate water during normal operation.

2.8.3 Noncontact Storm Water Outside the Pit Area

Storm water collected from certain areas within IT's work area in OU1 is not expected to contact contaminated materials. These areas include:

- The ground west and south of the Railcar Loadout Building, including the area around the warehouse and the laboratory
- The access road that runs along the north and east sides of the BSL
- The ground outside the waste pit area between Waste Pit 4 and the BSL, including the area around the trailers
- The roofs of the Material Handling Building, the Railcar Loadout Building, Railcar Prep and Liner Stoarge Building, and the GCS/WTS Building.

Storm water from these areas is not expected to be contaminated and, therefore, should not require treatment in the WTS or the AWWT. Storm water from the area identified in the first bullet will flow directly to Paddys Run. Storm water from the area identified in second bullet will flow to the K-65 Runoff Basin. Storm water from the areas identified in the third and fourth bullets will be directed to the SWM Pond. During construction of the Truck Turnaround area and the Material Handling Building, one or more of the catch basins will be closed to keep contact storm water from this area from entering the SWM Pond during facility operation. Roof

drains from the Material Handling Building and the Railcar Loadout Building will be directed into the SWM Pond. Roof runoff from other WPRAP buildings and structures may be directed to the collection basins or to other surface drainage features.

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A monitoring program will be established for the SWM pond consistent with the requirements of the SWPPP to allow discharge of this water directly to Paddys Run. If suitable for discharge, the water will be pumped directly to the drainage swales that lead to Paddys Run. If not suitable for direct discharge to Paddys Run, the water will be transferred to the Clearwell, WTS, or directly to the BSL. Water collected in the SWM pond may alternatively be used for dust suppression, Waste Pit 5 or Waste Pit 6 water cap management, or makeup water to the rotary dryer. Details of the SWM pond monitoring program will be given in the Sampling and Analysis Plan.

In the event of a 25-year, 24-hour storm event, the water in the SWM Pond naturally overflows to a series of smaller ponds north of the SWM Pond and eventually to drainage swales along the north boundary of OU1 to Paddys Run.

2.8.4 Contact Storm Water and Excavation Water from the Waste Pit Area

The following is a list of wastewater sources that originate inside the pit area:

- Contact storm water from Waste Pit 6
- Contact storm water from Waste Pit 5
- Contact storm water, drainage water, and perched water seepage in the excavation area (collectively referred to as excavation water)
- Contact storm water from haul roads in the waste pit area
- Contact storm water from the Clearwell and surrounding portions of Waste Pits 1 and 3 (which drain to the Clearwell).

Handling of these streams will change as the areas where the water originates are excavated and subsequently deemed clean. The sections below describe the method by which the water will be collected and transferred to the appropriate destination, the expected flow rate, and notes on the chemical composition of each wastewater stream.

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2.8.4.1 Contact Storm Water from Waste Pit 6

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During excavation Phases 1 through 7, the water cap on Waste Pit 6 will be maintained. The only source of water entering Waste Pit 6 is storm water that falls within the limits of the pit (an area of approximately 0.74 acres or 32,234 ft^2). Water is drained from the pit using a portable pump. Typically, the water will be pumped from the pit to the Clearwell for subsequent treatment by the WTS. The average flow rate is not expected to be greater than 2,210 gpd. In the event the water meets the BSL WAC, the water can be transferred directly to the BSL.

In the event of a 25-year/24-hour storm event, the freeboard in the pit will be used to manage the storm water (4.8 inches). Managing the water level in Waste Pit 6 may also involve adding water to the pit during especially dry periods, although this is not common. Water must be added to the pit when the level drops to a predetermined low level.

Beginning in excavation Phase 8, the water cap on Waste Pit 6 will be pumped to the Clearwell for subsequent treatment in the WTS to facilitate excavation. For Phases 8 through 11 of the excavation and during the six-month period prior to certification of the pit as "clean," any storm water that lands in the open section of the pit and perched water seepage into the excavated portion will be handled as described in Section 2.8.4.3. Storm water from the portion of the pit covered with Poly-Shell can be handled as before and pumped to the Clearwell or BSL if dikes are in place to keep it out of the excavation areas. After the pit has been certified as "clean," storm water landing in Waste Pit 6 will be treated as noncontact storm water and will be directed to Paddys Run or the K-65 Runoff Basin.

2.8.4.2 Contact Storm Water from Waste Pit 5

During excavation Phases 1 though 8, the water cap on Waste Pit 5 will be maintained. The only source of water entering Waste Pit 5 is storm water that falls within the limits of the pit (an area of approximately 3.74 acres or 162,914 ft^2). Water is drained from the pit through a concrete "well" structure located near the southwest corner of the pit. The "well" is equipped with several slide gate valves which act as weirs to control the water level in the pit. Water that drains into the "well" flows by gravity through a buried line to the Clearwell. The average flow rate is not expected to be greater than 11,170 gpd.

In the event of a 25-year/24-hour storm event, the freeboard in the pit will be used to manage the storm water (4.8 inches). Managing the water level in Waste Pit 5 may also involve adding water

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to the pit during especially dry periods, although this is not common. Water must be added to the pit when the level drops to a predetermined low level.

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Beginning in excavation Phase 9, the water cap on Waste Pit 5 will be pumped to the concrete "well" for drainage to the Clearwell for subsequent treatment in the WTS. When the water has been removed, the surface of the material in the pit will be sprayed with Poly-Shell (or equivalent). For Phases 9 through 18 of the excavation and during the six-month period prior to certification of the pit as "clean," any storm water that lands in the open section of the pit and perched water seepage into the excavated portion will be handled as described in Section 2.8.4.3. Storm water from the portion of the pit covered with Poly-Shell must be pumped to the concrete "well" for drainage to the Clearwell. After the pit has been certified as "clean," storm water landing in Waste Pit 5 will be treated as noncontact storm water and will be directed to Paddys Run or the K-65 Runoff Basin.

2.8.4.3 Excavation Water

During the excavation of a waste pit, several means will be employed to reduce the amount of contact storm water in the excavation area. These methods include: (1) minimization of exposed material surface; (2) excavating from a high area to a low area to allow continued drainage of untouched areas within the pit; and (3) where necessary, placement of berms around open areas to minimize run-on. The excavation sequence and the details of the excavation process for each phase are described in the Excavation Plan.

Water from the open excavations will consist of contact storm water, free drainage from excavated materials, and perched water seepage into the excavation. The amount of water generated will change constantly during the excavation process. The water in the excavations will be diverted to "sumps" by grading the bottom of the excavations and/or digging shallow (e.g., 6-inch) trenches in the excavations to direct the water to the sumps. One or more sumps may be required in each excavation (i.e., each waste pit) depending of the amount of open area. Portable pumps will be used to transfer excavation water to the Clearwell for subsequent treatment by the WTS. The excavation water average daily flow rates for each phase of the excavation are presented in the Excavation Plan.

Contact storm water from excavated waste pits awaiting certification as clean will continue to be collected and treated in the WTS. Existing pumps and piping (from the excavation phases) will be used in these areas to transfer water to the Clearwell. The average volumetric flow of this

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contact storm water is included on the site water balance process flow diagram (PFD) (D-90-10-001) as a separate stream, apart from excavation water.

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2.8.4.4 Contact Storm Water from Haul Roads in the Waste Pit Area

Contact storm water from the haul roads in the waste pit area will be directed to excavation areas to be collected and transferred to the Clearwell for subsequent treatment by the WTS. The existing area that will be used as haul roads consists of the road that runs along the southern side of Waste Pit 5 and Waste Pit 6, the branch that runs from that road to the south between Waste Pit 3 and Waste Pit 4 (over the Burn Pit), and a strip that continues toward the south between Waste Pit 3 and Waste Pits 2 and 1. The average flow rate is not expected to be greater than 2,060 gpd.

The haul roads will be isolated from the current noncontact storm water drainage patterns by curbing the road sides, regrading the roads to change the direction of drainage, and running noncontact storm water through designated ditches and under haul roads through culverts. All of these methods will be utilized to keep the noncontact storm water in the waste pit area from contacting the haul road contact storm water. This segregation allows the noncontact storm water to continue to flow to the K-65 Runoff Basin.

2.8.4.5 Contact Storm Water in the Clearwell and Surrounding Areas

Storm water that falls directly into the Clearwell or on areas that are sloped to drain into the Clearwell will be treated by the WTS. The sections of Waste Pits 1 and 3 that currently drain to the Clearwell will continue to drain in this way until some time during excavation Phases 4 and 9, respectively. The Clearwell will remain in operation until all the waste pits have been cleaned, therefore, storm water that falls in the Clearwell must be treated until the Clearwell is excavated starting during Phase 18. The average storm water rate from the Clearwell and surrounding drainage areas (total surface area of approximately 106,000 ft^2) is approximately 7,220 gpd. When the drainage area in Waste Pit 1 (approximately 45,000 ft^2) is removed, the average storm water flow from the remaining area is approximately 4,180 gpd. When the drainage area in Waste Pit 3 (approximately 32,620 ft^2) is removed, the average storm water flow from the remaining area is approximately 1,940 gpd.

While the Clearwell is being excavated during excavation Phases 18 and 19, the water that falls in the excavation will be pumped to the influent tank in the WTS.

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2.8.5 Noncontact Storm Water Inside the Pit Area

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There are locations in the pit area where storm water is not contacting raw waste. These locations include the following:

- Storm water from the covered section of Waste Pits 1, 2, and 3
- Storm water from the covered section of Waste Pit 4
- Storm water from other areas bordering the waste pits.

Estimated daily noncontact storm water rates from the waste pit area for each excavation phase are presented in the Excavation Plan and the site water balance PFD (D-90-10-001).

2.8.5.1 Noncontact Storm Water from Waste Pits 1, 2, and 3

Storm water that falls on the portions of Waste Pits 1, 2, and 3 that have not been exposed will continue to drain to the K-65 Runoff Basin (only small sections drain to the Clearwell). This water is referred to as noncontact storm water. This water drains off the western side of Waste Pit 3 to drainage trenches along the western boundary of the waste pit area to the basin. Water from the eastern side of Waste Pit 3 and most of Waste Pits 1 and 2 drains to drainage ditches along the access road that runs along the east side of Waste Pit 2. After Waste Pits 1, 2, and 3 have been certified "clean," the storm water that is collected in the excavations will be directed to Paddys Run or the K-65 Runoff Basin.

2.8.5.2 Noncontact Storm Water from Waste Pit 4

Noncontact storm water from Waste Pit 4 consists of the storm water that runs off the covered pit materials (an approximate area of 1.5 acres or 65,340 ft^2) and is collected in the trench around the pit. The average flow of noncontact storm water from Waste Pit 4 during Phases 1 through 4 is approximately 4,480 gpd. This water currently makes its way to the K-65 Runoff Basin through storm trenches that run along the access roads through the waste pit area. During excavation activities, care will be taken to route these streams across the waste pit area without allowing them to combine with contact storm water from the haul roads. This will be achieved by designating certain drainage trenches and culverts as "clean" and keeping them decoupled from contact storm water streams.

Beginning in Phase 5, a portion of the pit will be excavated. The pit will remain open to some degree through Phase 16. During this period, measures will be taken to separate storm water that lands on the unexcavated portion of the pit from entering the excavation and continuing to drain to the K-65 Runoff Basin.

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2.8.5.3 Noncontact Storm Water from Areas Bordering the Waste Pits 1730

There are other areas within the waste pit area which are considered uncontaminated and from which the storm water is allowed to drain to the K-65 Runoff Basin, or to drainage ditches to the north of the waste pit area which drain directly to Paddys Run. These areas include some of the areas between the radiological fences and the boundaries of the waste pits. During excavation activities, all operations in the pits will be performed from the inside of the waste pit area toward the fence limits, thus these streams should not be effected.

2.8.6 Storm Water Controls for Storage Piles

Clean soil stockpiled from foundation excavations during construction will be secured to preclude dust generation by providing a tight surface. Silt fencing will be provided to control soil erosion and sediment migration from the pile during storm events. Additionally, any contaminated soil found during the construction phase will be placed in a separate stockpile in the waste pit area. Similar measures as described above will be undertaken to control erosion and sedimentation for this pile. Water runoff from the contaminated stockpile will be directed to the clearwell and pumped to the BSL for treatment through the AWWT prior to discharge.

During the operational phase, waste stockpiles in the pit area will be managed as outlined in the excavation plan. Waste stockpiles in the Material Handling Building and Railcar Loadout Building are protected from the weather. Adequate drainage and collection sumps are provided to collect free water that is released from the stockpiles as a result of free drainage.

2.9 Water Treatment System (PFD D-65-10-001)

Several wastewater streams are expected to meet the WAC established by FDF for discharge to the BSL and will be piped directly to the BSL. Water that does not meet the WAC must be pretreated prior to discharge to the BSL. The WTS is used to provide this pretreatment. The system will be designed for approximately 250 gpm. The WTS is located outside the waste pit area, due north of the BSL. The following sections describe the unit operations to be included in the WTS.

2.9.1 Solids Settling and Equalization

The Clearwell will serve as the initial collection point and "surge tank" for the WTS. Wastewater streams from within the waste pit area and material drainage in the buildings will be pumped to the Clearwell for solids settling and equalization. Water will be pumped from the Clearwell to the influent tank in the WTS.

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Wastewater from the secondary clarifier in the rotary dryer system will be pumped to the influent tank, where it will combine with water from the Clearwell. Water will be pumped from the influent tank to the inclined plate clarifier for solids removal.

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2.9.2 Initial pH Adjustment

In the event that the pH of the water from the influent tank must be raised to enhance the removal of heavy metals in the clarifier, sodium hydroxide (caustic) will be added to the feed line to the flash mix tank upstream of an in-line static mixer. The feed rate of caustic will be controlled by a pH controller that receives a signal from a pH probe in the flash mix tank. Caustic addition will only be used as necessary. Lime may also be added to the Clearwell to increase pH if deemed necessary.

2.9.3 Clarification

Heavy metals precipitation and solids settling will take place in an inclined plate clarifier (IPC). The clarifier will be equipped with a Flash Mix Tank and a Flocculation Tank. A coagulating agent and a polymer will be added, if necessary, in these tanks to enhance the removal of suspended solids. In the event that heavy metals concentrations in the water exceed the BSL WAC, this system will be operated at the appropriate pH and sufficient coagulant and polymer will be added for the required precipitation. These parameters will be determined by performing bench-scale tests in the field. In the event that heavy metals are not present at levels higher than the BSL WAC, the IPC will be operated to remove as much suspended solids as possible while minimizing chemical usage and sludge generation.

Sludge will be transferred from the bottom of the IPC to a sludge holding tank in the process blowdown pre-treatment system (PFD D-60-10-001). Sludges will be dewatered using a filter press (FX-6001) located inside the Material Handling Building.

In the event that the effluent water from the clarifier meets the BSL WAC, the water will be transferred from the clarifier overflow tank to the effluent tank and then to the BSL without further treatment. If the water fails based on suspended solids, heavy metals, or uranium, the water will be pumped through the sand filter(s) for additional solids removal.

2.9.4 Sand Filtration

Two sand filters will be used for additional solids removal to meet discharge requirements or prepare the water for treatment in the ion exchange unit(s). During sand filter backwash

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operation only one filter will be operated. Backwash water will be supplied from the effluent tank to minimize the amount of water discharged from the site. In the event that the effluent from the sand filters meets the BSL WAC (i.e., the uranium concentration is less than 5,000 ppb), the water will bypass the ion exchange unit and be discharged in the effluent tank and then to the BSL. If the uranium concentration in the water is higher than 5,000 ppb, the water will be directed through the ion exchange unit.

2.9.5 Ion Exchange

Two ion exchange units will be used for removal of dissolved uranium to meet discharge requirements. The effluent from the ion exchange units discharges to the effluent tank. During backwash of the ion exchange units, only one ion exchange unit will be operated. Backwash water will be supplied from the effluent tank to minimize the amount of water discharged from the site. Regeneration of the ion exchange resin is not currently expected to be needed. The ion exchange system may be bypassed if the influent water meets the BSL WAC.

2.9.6 Final pH Adjustment

In the event that the pH of the water must be adjusted above or near 10 to precipitate the heavy metals, a final pH adjustment step is available to lower the pH through the addition of acid. This will only be used as necessary.

2.9.7 Effluent Discharge/Recycle

Water will be discharged from the effluent tank to the BSL. Sampling of the effluent to the BSL and reporting to FDF will be performed to monitor operation of the system and ensure that water discharge to the BSL meets the WAC. At times during which the WTS effluent may not be meeting the BSL WAC, such as startup or during process upset conditions, partially treated water may be recycled back to the WTS influent tank or to the Clearwell. This flow path may be used intermittently to facilitate operation of the WTS.

3.0 PROCESS CONTROL PHILOSOPHY

This section covers the overall control philosophy for the remediation activities. A programmable logic controller (PLC) based system will be utilized to monitor the operations of the rotary dryer and gas cleaning system and to provide certain control functions. The PLC system will be capable of providing the following:

- Collection and display of process parameters (i.e., temperature, pressure, flow rate, etc.).

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Appendix II
Process Flow Diagrams and Site Plan Drawings

Process Flow Diagrams and Site Plan Drawings previously submitted in Volume 1 of 3 of the Remedial Design (RD) Package.

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Appendix III

Substantive Permitting Requirements and ARARs (Applicable Requirements, Relevant and Appropriate Requirements)

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Appendix IV
O&M Plan for Existing Facilities

O&M Plan for Existing Facilities document previously submitted in Volume 3 of 3 of the Remedial Design (RD) Package

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Appendix II
Process Flow Diagrams and Site Plan Drawings

Process Flow Diagrams and Site Plan Drawings previously submitted in Volume 1 of 3 of the Remedial Design (RD) Package.

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Waste Pits Remedial Action Project
(WPRAP)
Process Flow Diagram(s) w/Mass & Energy Balance

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PREPARED
for
Fluor Daniel Fernald, Inc.
Fernald, Ohio

FDF Subcontract No. 98SC000001

***

PREPARED
by
IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 773481

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Revision 0
Issue Date: August 25, 1998

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Drawing List

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Drawing No.	Rev. No.	Description
D-15-10-001	0	Area 15 - Material Handling PFD
D-20-10-001	0	Area 20 - Waste Feed, Dryer & Product Handling PFD
D-20-10-002	0	Area 20 - Waste Feed, Dryer & Product Handling PFD
D-35-10-001	0	Area 35 - Railcar Loading/Lidding PFD
D-50-10-001	0	Area 50 - Gas Cleaning System PFD
D-50-10-002	0	Area 50 - Gas Cleaning System PFD
D-60-10-001	0	Area 60 - Process Blowdown Pretreatment System PFD
D-65-10-001	0	Area 65 - Wastewater Treatment System (WTS) PFD
D-70-10-001	0	Area 70 - Utilities PFD
D-90-10-001	0	Area 90 - Site Water Balance PFD
D-90-10-002	0	Area 90 - Site Water Balance PFD

DRAWING NUMBER D-15-10-001

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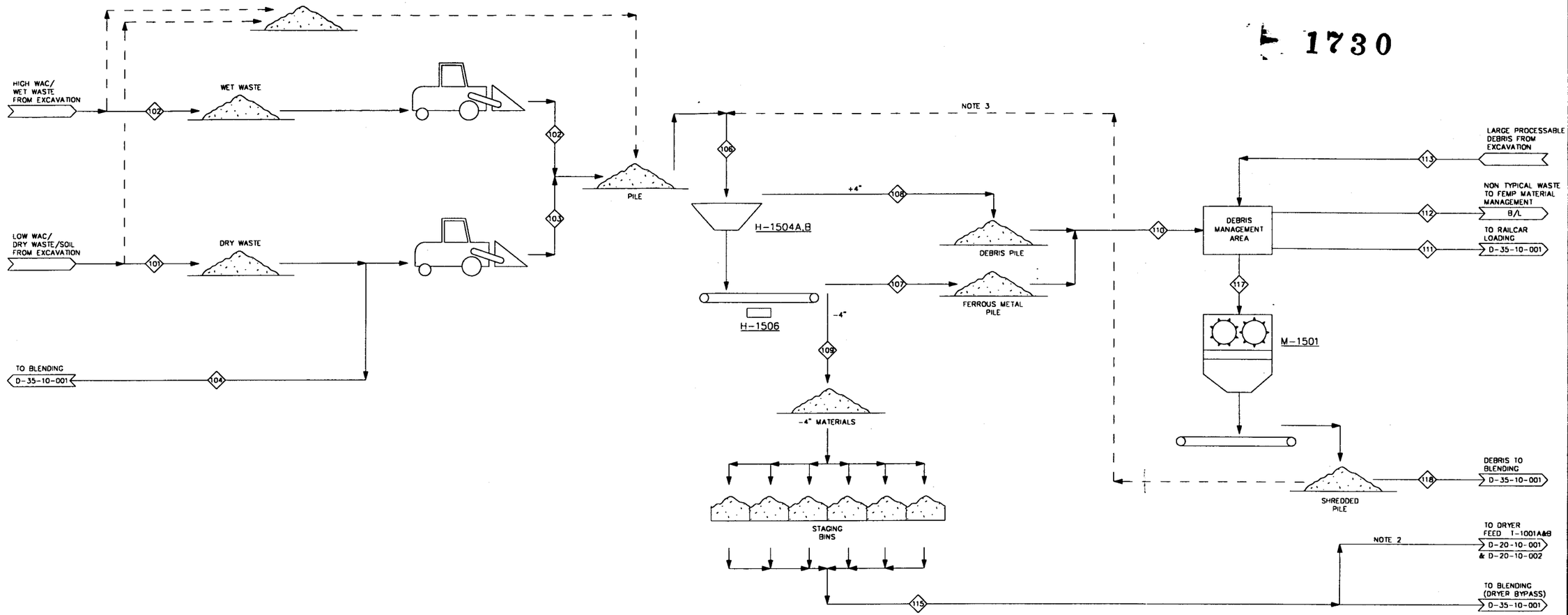

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H-1504A,B 4" VIBRATOR SCREEN

H-1506 MAGNETIC SEPARATOR

M-1501 DEBRIS SHREDDER

STREAM NO.	101	102	103	104	106	107	108	109	110	111	112	113	115	117	118
	NOTE 1	NOTE 1													
COMPONENT	LOW WAC WASTE FROM EXCAVATION	HIGH WAC WASTE FROM EXCAVATION	WASTE TO SIZE REDUCTION	WASTE TO BLENDING	WASTE TO SCREEN	FERROUS METAL	OVERSIZE	SCREEND MATERIAL	DEBRIS	DEBRIS TO LOADER	DEBRIS TO FDF	LARGE DEBRIS FROM EXCAVATION	SOLIDS TO DRYER	MATERIAL TO SHREDDER	DEBRIS TO BLENDING
AVERAGE CONDITION															
H_2O LB/HR													18,400		
SOIL/PARTICULATE LB/HR													25,300		
ORGANICS LB/HR													2,300		
TOTAL MASS FLOW LB/HR													46,000		
VOLUMETRIC FLOW ACFM (GPM) [YD^2]															
TEMPERATURE °F	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	60		
PRESSURE IN. W.C. (PSI)													ATM		
ENTHALPY MM BTU/HR															

NOTES:

1. QUANTITY VARIES BY PHASE - SEE EXCAVATION PLAN.
2. STREAM 115 FEEDS TWO THERMAL DRYER UNITS (TDU) EQUALLY DISTRIBUTED AS STREAM 116 ON D-20-10-001 AND D-20-10-002.
3. ALTERNATE PATH FOR WET MATERIALS.

FOR INFORMATION ONLY
NOT FOR CONSTRUCTION

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	6/25/98	JWH	JAN	GHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE
AREA 15
PROCESS FLOW DIAGRAM
MATERIAL HANDLING

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY	DDP	CHECKED BY	JAN		REVISION
DRAWN BY	JWH	APPROVED BY	GHH		0
DATE	12/31/97	DWG. SCALE	NONE		
IT PROJECT NO.	773481	DRAWING NO.	D-15-10-001		

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DRAWING NUMBER D-20-10-001

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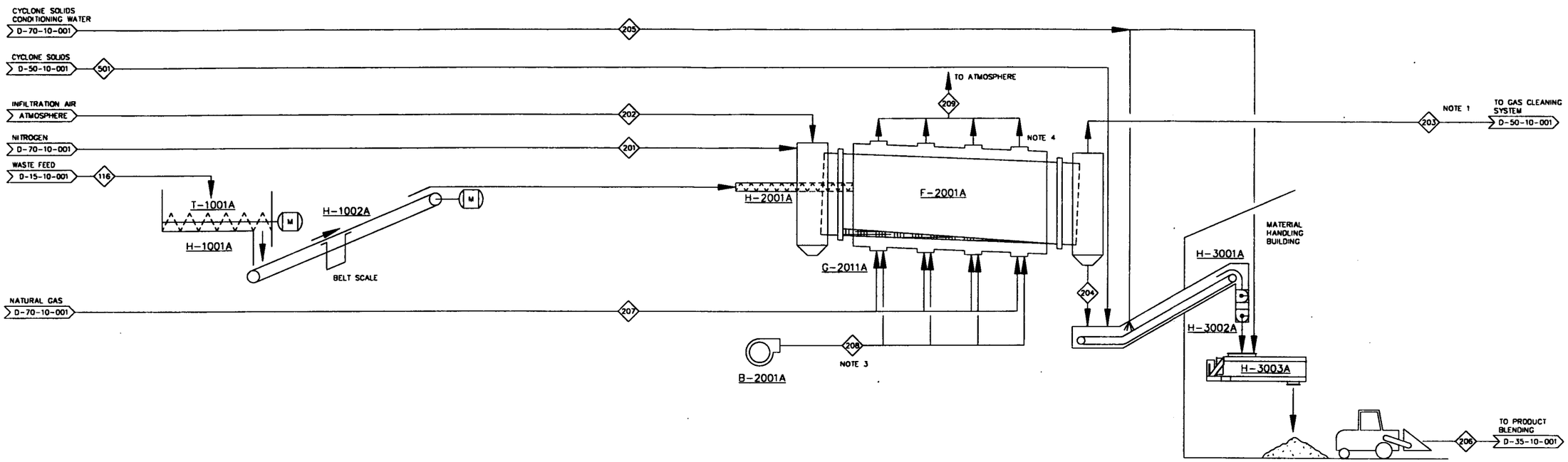

T-1001A	LIVE BOTTOM HOPPER
H-1001A	MASS FLOW SCREW FEEDER
H-1002A	BELT FEED CONVEYOR
H-2001A	FEED DUAL SCREW
B-2001A	COMBUSTION AIR FAN
G-2011A	DRYER BURNERS NOTE 3
F-2001A	ROTARY DRYER
H-3001A	DRAG FLIGHT CONVEYOR
H-3002A	DOUBLE DUMP VALVE
H-3003A	PUGMILL

STREAM NO. / COMPONENT		116	201	202	203	204	205	206	207 (NOTE 3)	208 (NOTE 3)	209	501
		SOLIDS FEED TO DRYER	NITROGEN	AIR LEAKAGE	DRYER EXHAUST GAS	DRYER SOLIDS	CYCLONE SOLIDS CONDITIONING WATER	DRYER RESIDUALS TO PRODUCT BLENDING	DRYER BURNER FUEL	DRYER BURNER COMBUSTION AIR	DRYER SHELL EXHAUST GAS	CYCLONE SOLIDS PER UNIT
CARBON	LB/HR								751			
HYDROGEN	LB/HR								245			
CO2	LB/HR										2,753	
O2	LB/HR			78	78					4,738	790	
N2	LB/HR		760	259	1,020				30	15,730	15,760	
H2O	LB/HR	9,200		3	7,825	1,378	85	1,447		159	2,352	
SOIL/PARTICULATE	LB/HR	12,650			1,379	11,271		11,892				620
ORGANICS	LB/HR	1,150			18	1,132		1,132				
TOTAL MASS FLOW	LB/HR	23,000	760	340	10,319	13,781	85	14,470	1,026	20,628	21,654	620
VOLUMETRIC FLOW	ACFM		175	76	4,685					4,335	17,660	
LIQUID FLOW	GPM						0.2					
TEMPERATURE	°F	70	70	70	350	175	60	175	70	70	1400	345
PRESSURE	IN. W.C.GA.(PSIG)	0.0	0.0	0.0	-1.0	0.0	(45)	0.0	(10)	28.0	0.0	0.0
ENTHALPY	MM BTU/HR	0.13	0.00	0.00	9.44	0.52		0.54	22.38	0.22	10.77	0.04

1. DRYER OFF-GAS FLOW AND TEMPERATURE MAY VARY DURING OPERATION. FLOWS AND TEMPERATURES PROVIDED SHOULD BE CONSIDERED TO BE AVERAGE. SPIKES OF ±100° F AND ±20% OF FLOW WILL BE COMMON DURING ACTUAL OPERATION.
2. THE FLOWS ARE BASED ON NORMAL AVERAGE AT 100% OPERATING FACTOR.
3. TOTAL TO FOUR ZONES (TOTAL OF SIXTEEN BURNERS)
4. DRYER FURNACE EXHAUSTS THROUGH FOUR VENTS TO ATMOSPHERE
5. ALL FLOWS ARE FOR SINGLE DRYER

FOR INFORMATION ONLY
NOT FOR CONSTRUCTION

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/26/98	JRH	JAN	GHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: AREAS 10, 20 & 30
WASTE FEED, ROTARY DRYER
& PRODUCT HANDLING
PROCESS FLOW DIAGRAMS

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY	PA	CHECKED BY	JAN		REVISION
DRAWN BY	SLT	APPROVED BY	GHH		0
DATE	4/22/98	DWG. SCALE	NONE		
IT PROJECT NO.	773481	DRAWING NO.	D-20-10-001		

000104

DRAWING NUMBER D-20-10-002

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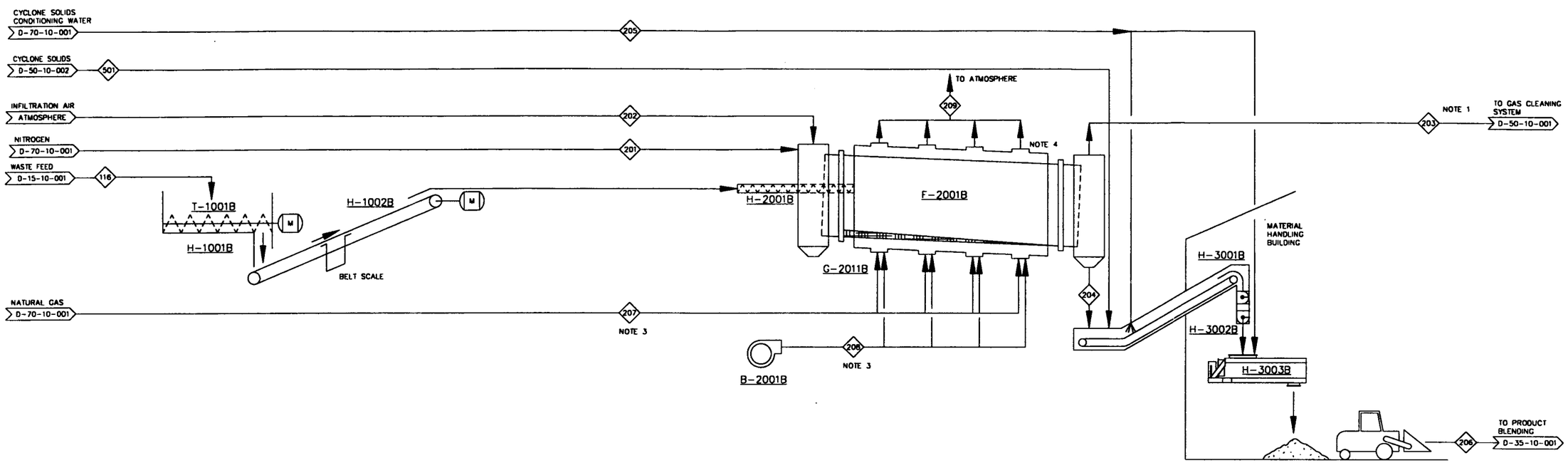

T-1001B	H-1001B	H-1002B	H-2001B	B-2001B	G-2011B	F-2001B	H-3001B	H-3002B	H-3003B
LIVE BOTTOM HOPPER	MASS FLOW SCREW FEEDER	BELT FEED CONVEYOR	FEED DUAL SCREW	COMBUSTION AIR FAN	DRYER BURNERS NOTE 3	ROTARY DRYER	DRAG FLIGHT CONVEYOR	DOUBLE DUMP VALVE	PUGMILL

STREAM NO. / COMPONENT		116	201	202	203	204	205	206	207 (NOTE 3)	208 (NOTE 3)	209	501
		SOLIDS FEED TO DRYER	NITROGEN	AIR LEAKAGE	DRYER EXHAUST GAS	DRYER SOLIDS	CYCLONE SOLIDS CONDITIONING WATER	DRYER RESIDUALS TO PRODUCT BLENDING	DRYER BURNER FUEL	DRYER BURNER COMBUSTION AIR	DRYER SHELL EXHAUST GAS	CYCLONE SOLIDS PER UNIT
CARBON	LB/HR								751			
HYDROGEN	LB/HR								245			
CO2	LB/HR										2,753	
O2	LB/HR			78	78					4,738	790	
N2	LB/HR		760	259	1,020				30	15,730	15,760	
H2O	LB/HR	9,200		3	7,825	1,378	85	1,447		159	2,352	
SOIL/PARTICULATE	LB/HR	12,850			1,379	11,271		11,892				620
ORGANICS	LB/HR	1,150			18	1,132		1,132				
TOTAL MASS FLOW	LB/HR	23,000	760	340	10,319	13,781	85	14,470	1,026	20,628	21,654	620
VOLUMETRIC FLOW	ACFM		175	76	4,685					4,335	17,660	
LIQUID FLOW	GPM						0.2					
TEMPERATURE	°F	70	70	70	350	175	60	175	70	70	1400	345
PRESSURE	IN. W.C.GA.(PSIG)	0.0	0.0	0.0	-1.0	0.0	(45)	0.0	(10)	28.0	0.0	0.0
ENTHALPY	MM BTU/HR	0.13	0.00	0.00	9.44	0.52		0.54	22.38	0.22	10.77	0.04

1. DRYER OFF-GAS FLOW AND TEMPERATURE MAY VARY DURING OPERATION. FLOWS AND TEMPERATURES PROVIDED SHOULD BE CONSIDERED TO BE AVERAGE. SPIKES OF ±100° F AND ±20% OF FLOW WILL BE COMMON DURING ACTUAL OPERATION.
2. THE FLOWS ARE BASED ON NORMAL AVERAGE AT 100% OPERATING FACTOR.
3. TOTAL TO FOUR ZONES (TOTAL OF SIXTEEN BURNERS)
4. DRYER FURNACE EXHAUSTS THROUGH FOUR VENTS TO ATMOSPHERE
5. ALL FLOWS ARE FOR SINGLE DRYER.

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	JMH	JAN	GHH	FINAL RFD PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FOF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: AREAS 10, 20 & 30 WASTE FEED, ROTARY DRYER & PRODUCT HANDLING PROCESS FLOW DIAGRAMS

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PA	CHECKED BY	JAN		REVISION
DRAWN BY	SLT	APPROVED BY	GHH		0
DATE	4/22/98	DWG. SCALE	NONE		
IT PROJECT NO.	773481	DRAWING NO	D-20-10-002		

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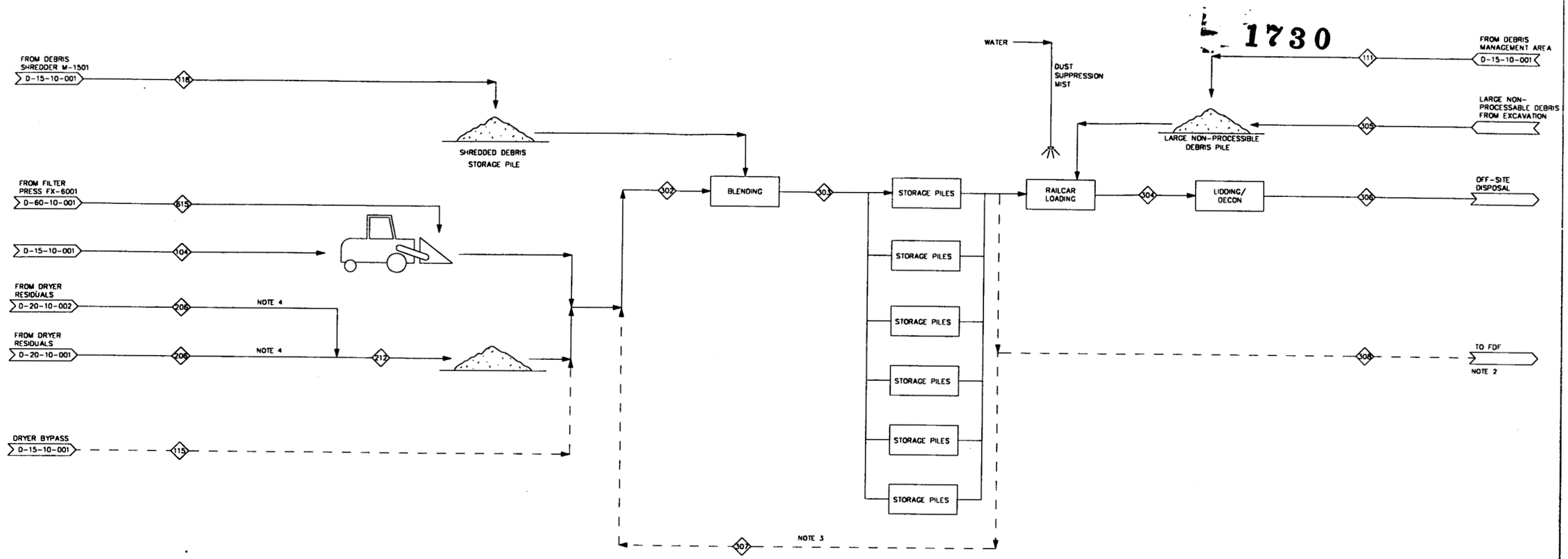
000105

DRAWING NUMBER D-35-10-001



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000106

STREAM NO. / COMPONENT		104	111	115	118	212	302	303	304	305	306	615
		NOTE 1	NOTE 1									
		NON-DRIED WASTE FOR BLENDING	LARGE NON-PRESSABLE WASTE FROM WASTE PROCESSING	DRYER BYPASS MATERIAL	SHREDDED MATERIAL	DRIED WASTE	WASTE TO BLENDING	BLENDED WASTE	RAILCAR LOADOUT	NON-PROCESSABLE WASTE FROM EXCAVATION	WASTE TO PCDF	FILTER CAKE
AVERAGE CONDITION												
H_2O	LB/HR					2,894						1,592
SOIL/PARTICULATE	LB/HR					23,784						1,592
ORGANICS	LB/HR					2,264						1.5
TOTAL MASS FLOW	LB/HR					28,940						3,185
VOLUMETRIC FLOW	ACFM (GPM)											
TEMPERATURE	°F	AMB		AMB		175						135
PRESSURE	IN. W.C. (PSI)											
ENTHALPY	MM BTU/HR											
CARS/DAY	AUG/MAX								6/8		6/8	

NOTES:

1. VARIES WITH PHASE - SEE EXCAVATION PLAN.
2. IN THE UNLIKELY EVENT THAT SAMPLING AND ANALYSIS INDICATES RCRA CHARACTERISTIC WASTE IT WILL BE TURNED OVER TO FDF.
3. IN THE UNLIKELY EVENT THAT SAMPLING AND ANALYSIS INDICATES WASTE IN A STORAGE BIN DOES NOT MEET CDF WAC FOR MOISTURE OR RADIONUCLIDES IT WILL BE REBLENDED.
4. STREAM 206 FROM EACH DRYER ARE COMBINED AS STREAM 212.

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	JMH	JAN	GHH	FINAL RO PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

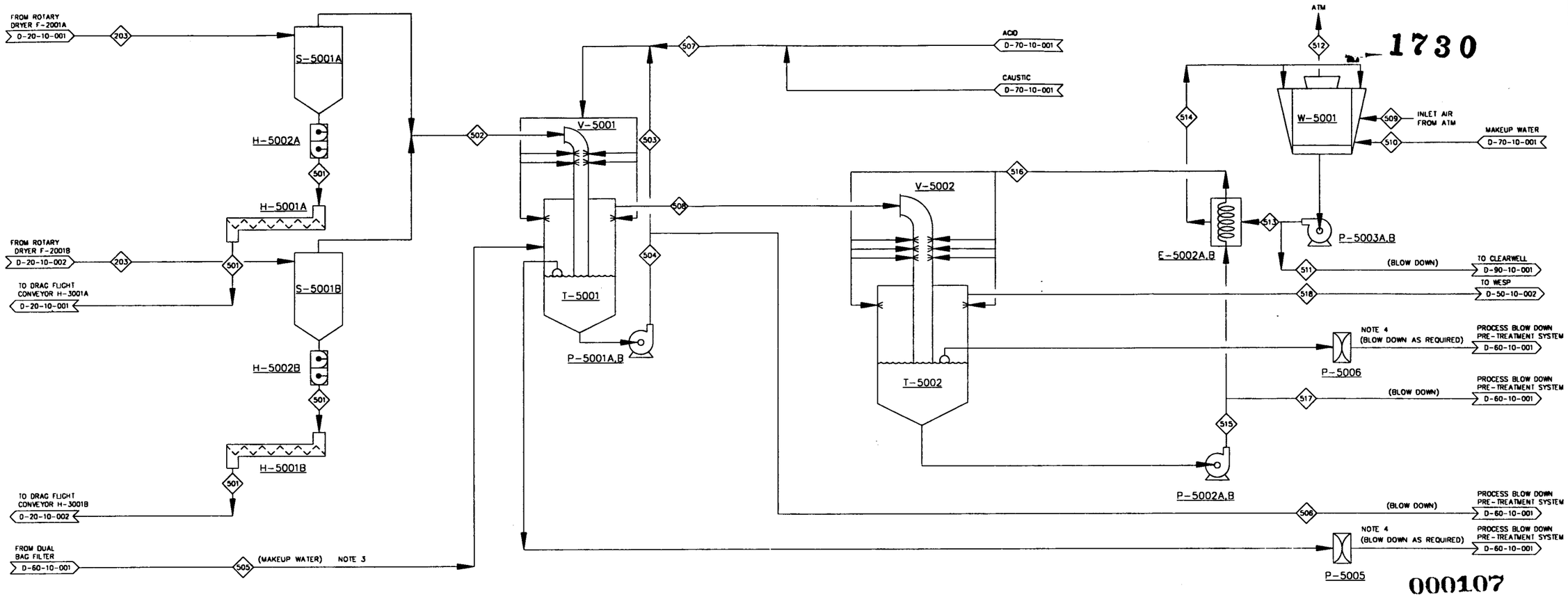
PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE
AREA 35
PROCESS FLOW DIAGRAM
RAILCAR LOADING/LIDDING

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY		CHECKED BY	JAN		REVISION
DRAWN BY	JMH	APPROVED BY	GHH		0
DATE	12/31/97	DWG. SCALE	NONE		
IT PROJECT NO.	773481	DRAWING NO.	D-35-10-001		

DRAWING NUMBER D-50-10-001



000107

H-5002A,B	S-5001A,B	H-5001A,B	V-5001	T-5001	P-5001A,B	V-5002	T-5002	E-5002A,B	P-5002A,B	P-5003A,B	W-5001	P-5005	P-5006
DOUBLE DUMP VALVES	CYCLONE SEPARATOR	CYCLONE SOLIDS TRANSFER SCREWS	SCRUBBER	SCRUBBER SUMP TANK	SCRUBBER RECIRC. PUMP	SUBCOOL QUENCH	QUENCH SUMP TANK	QUENCH HEAT EXCHANGERS	SUBCOOL QUENCH RECIRC. PUMPS	COOLING TOWER RECIRC. PUMPS	COOLING TOWER	SCRUBBER ORGANICS PUMP	QUENCH ORGANIC PUMP

STREAM NO.		501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518
COMPONENT		CYCLONE SOLIDS PER UNIT	COMBINED CYCLONE EXHAUST GAS	SCRUBBER RECYCLE FLOW INLET	SCRUBBER RECYCLE FLOW OUTLET	SCRUBBER MAKEUP WATER	SCRUBBER BLOWDOWN	SCRUBBER CHEMICAL INJECTION	SCRUBBER EXHAUST GAS	INLET COOLING AIR	COOLING TOWER MAKEUP WATER	COOLING TOWER BLOWDOWN	COOLING TOWER EXHAUST GAS	COOLING TOWER RECYCLE OUTLET	COOLING TOWER RECYCLE INLET	SUBCOOLING QUENCH RECYCLE OUTLET	SUBCOOLING QUENCH RECYCLE INLET	SUBCOOLING QUENCH BLOWDOWN	SUBCOOLING QUENCH EXHAUST GAS
CARBON	LB/HR																		
HYDROGEN	LB/HR																		
CO2	LB/HR																		
O2	LB/HR		156						156	109,081			109,081						156
N2	LB/HR		2,039						2,039	362,112			362,112						2,039
H2O	LB/HR		15,649	75,000	100,350	25,000	25,350		15,299	9,176	18,089	5,000	22,245	900,000	900,000	815,198	800,000	15,198	101
SOIL/PARTICULATE	LB/HR	620	1,517	4,039	5,404		1,365		152							7,729	7,585	144	8
ORGANICS	LB/HR		37						37							790	775	15	22
TOTAL MASS FLOW	LB/HR	620	19,398	79,039	105,754	25,000	26,715	INTERMITTENT	17,683	480,368	18,089	5,000	493,437	900,000	900,000	823,716	808,359	15,357	2,326
VOLUMETRIC FLOW	ACFM		9,382						7,667	111,699			120,388						590
LIQUID FLOW	GPM			158	212	50	53				36	10		1,800	1,800	1,647	1,617	31	
TEMPERATURE	°F	345	345	207	207	150	207	60	207	85	60	85	103	85	103	110	90	110	100
PRESSURE	IN. W.C.GA. (PSIG)	0.0	-4.0	(35)	(45)	(45)	(45)	(40)	-7.0	0.0	(30)	(30)	0.0	(35)	(5)	(45)	(39)	(45)	-9.0
ENTHALPY	MM BTU/HR	0.04	18.75	11.15	14.91	2.25	3.77		17.23	12.63		0.13	28.84	22.50	38.83	41.17	24.07	0.77	0.13

NOTES:
1. THE FLOWS ARE BASED ON NORMAL, AVERAGE AT 100% OPERATING FACTOR.
2. WTS (WATER TREATMENT SYSTEM.)
3. PROCESS MAKEUP WATER IS TREATED RECYCLE FROM PROCESS BLOWDOWN PRETREATMENT SYSTEM.
4. INTERMITTENT BLOWDOWN RATE IS A NOMINAL 15-20 GPM.

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NOT FOR CONSTRUCTION

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	JRH	JAN	CHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

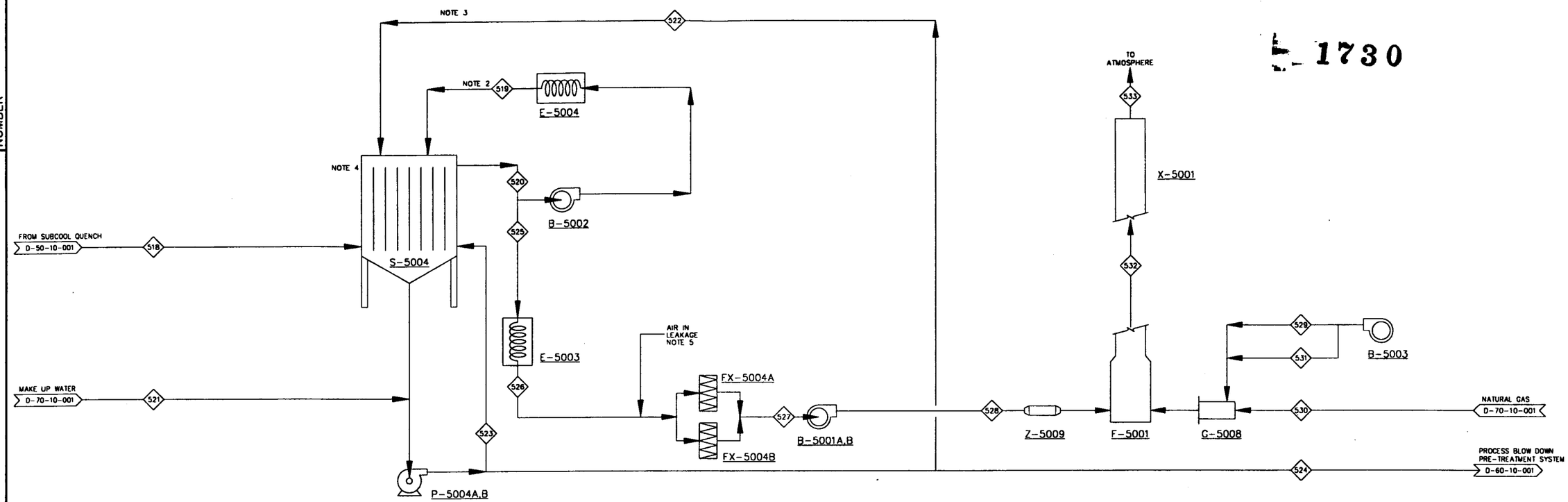
PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE
AREA 50
GAS CLEANING SYSTEM
PROCESS FLOW DIAGRAM

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PA	CHECKED BY	JAN		REVISION
DRAWN BY	SLT	APPROVED BY	CHH		0
DATE	4/22/98	DWG. SCALE	NONE		
IT PROJECT NO.	773481	DRAWING NO.	D-50-10-001		

DRAWING NUMBER D-50-10-002



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000108

S-5004 WET ELECTROSTATIC PRECIPITATOR	**E-5003** OFF-GAS REHEATER	**P-5004A,B** WESP RECYCLE PUMPS	**FX-5004A,B** HEPA UNITS 1 & 2	**E-5004** PURGE GAS HEATER	**B-5002** PURGE GAS BLOWER	**B-5001A,B** INDUCED AIR FANS	**Z-5009** FLAME ARRESTER
G-5008 THERMAL OXIDIZER BURNER	**F-5001** THERMAL OXIDIZER NOTE 6	**X-5001** VENT STACK	**B-5003** COMBUSTION AIR BLOWER				

STREAM NO. / COMPONENT		518 SUBCOOLING QUENCH EXHAUST GAS	519 WESP INSULATOR PURGE GAS	520 WESP OUTLET GAS	521 WESP MAKEUP WATER	522 WESP WASH RECYCLE	523 WESP SPRAY HEADER	524 WESP BLOWDOWN	525 REHEATER INLET GAS	526 REHEATER OUTLET GAS	527 HEPA FILTER OUTLET GAS	528 ID FAN OUTLET GAS	529 T.O. VOLATILES COMBUSTION AIR	530 T.O. BURNER AUXILIARY FUEL	531 T.O. BURNER COMBUSTION AIR	532 T.O. EXHAUST GAS	533 STACK EXHAUST GAS
CARBON	LB/HR													80			
HYDROGEN	LB/HR													26			
CO2	LB/HR															364	364
O2	LB/HR	156	344	500					156	156	208	208	109		504	329	329
N2	LB/HR	2,039	4,483	6,522					2,039	2,039	2,212	2,212	363	3	1,673	4,251	4,251
H2O	LB/HR	101	221	322	1,000		25,000	1,000	101	101	101	101	4		17	378	378
SOIL/PARTICULATE	LB/HR	8	0.0	0.024				7.6	0.008	0.008	0.000004	0.000004				0.008	0.008
ORGANICS	LB/HR	22	49	71					22	22	22	22				1.1	1.1
TOTAL MASS FLOW	LB/HR	2,326	5,096	7,415	1,000	INTERMITTENT	25,000	1,008	2,318	2,318	2,543	2,543	475	109	2,194	5,323	5,323
VOLUMETRIC FLOW	ACFM	590	1,381	1,916					599	621	687	660	105		461	4,785	4,796
LIQUID FLOW	GPM				2		50	2									
TEMPERATURE	°F	100	150	108	60		108	108	108	128	128	128	70	70	70	1,600	1,600
PRESSURE	IN. W.C.GA. (PSIG)	-9.0	0.0	-9.5	(45)	(40)	(50)	(40)	-9.5	-10.0	-15.0	1.0	8.0	(15)	28.0	1.0	0.0
ENTHALPY	MM BTU/HR	0.13	0.35	0.44				0.05	0.14	0.15	0.15	0.15	0.01	2.38	0.02	2.69	2.69

NOTES:
1. THE FLOWS ARE BASED ON NORMAL, AVERAGE AT 100% OPERATING FACTOR.
2. PURGE GAS TO WESP IS AT THE RATE OF 300 SCFM/INSULATOR (1200 SCFM, TOTAL)
3. 100 GPM OF WASH WATER TO WESP AS REQUIRED.
4. 50,000 BTU/HR WESP SURFACE HEAT LOSS.
5. STREAM 527 INCLUDES AIR INLEAKAGE OF 50 SCFM.
6. T.O. (THERMAL OXIDIZER).

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	JNH	JAN	CHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: AREA 50 GAS CLEANING SYSTEM PROCESS FLOW DIAGRAM

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY	PA	CHECKED BY	JAN		REVISION
DRAWN BY	SLT	APPROVED BY	CHH		0
DATE	4/22/98	DWG. SCALE	NONE		
IT PROJECT NO.	773481	DRAWING NO.	D-50-10-002		

DRAWING NUMBER D-60-10-001

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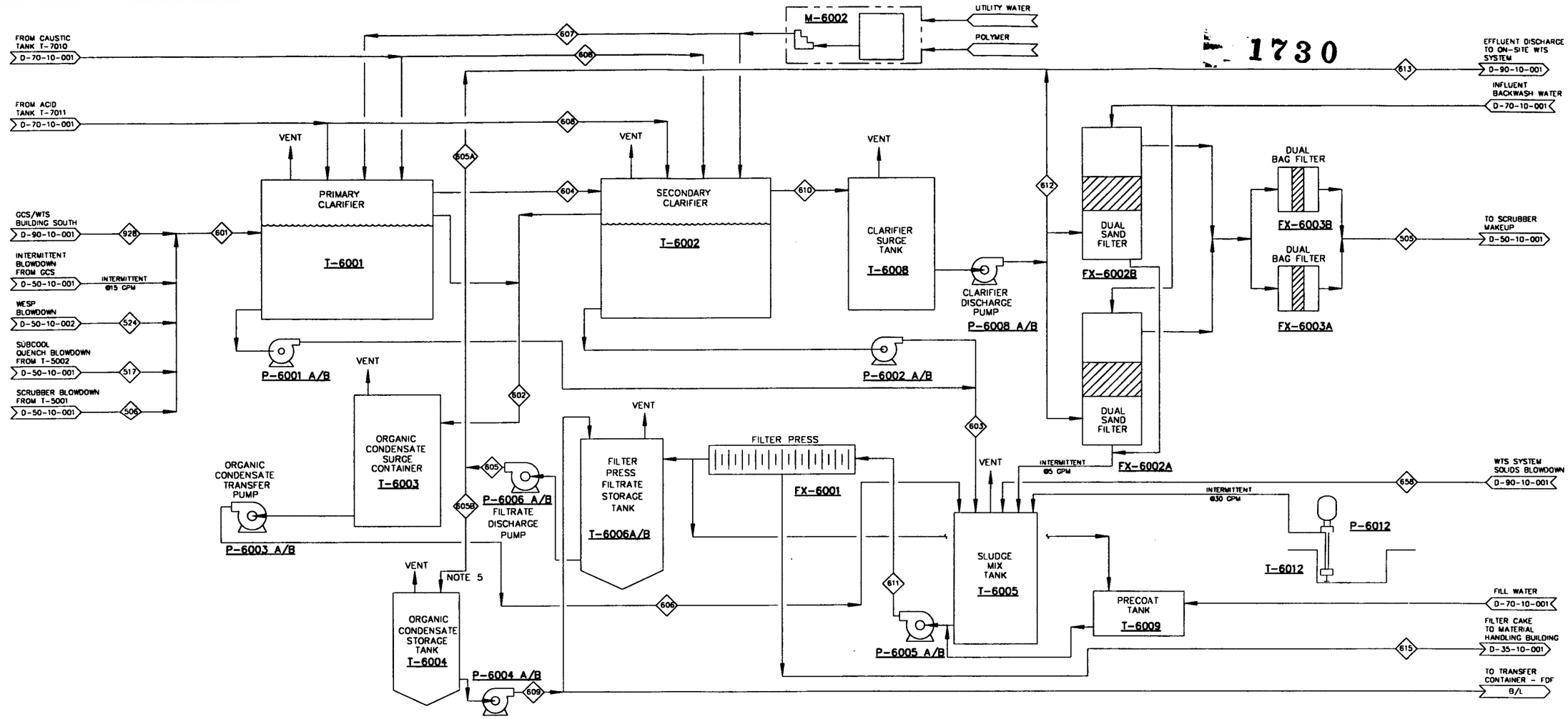

	T-6001	P-6001A/B	P-6003A/B	T-6004	P-6006A/B	T-6003	P-6004A/B	T-6006A/B	T-6002	M-6002	FX-6001	P-6002A/B	P-6005A/B	T-6005	T-6008	T-6009	P-6008A/B	P-6012	T-6012	FX-6002A,B	FX-6003A,B
	PRIMARY CLARIFIER 12,000 GAL.	PRIMARY CLARIFIER SLUDGE PUMP	ORGANIC CONDENSATE TRANSFER PUMP	ORGANIC CONDENSATE STORAGE TANK 750 GAL.	FILTRATE DISCHARGE PUMP	ORGANIC CONDENSATE SURGE CONTAINER 300 GAL.	ORGANIC CONDENSATE DISCHARGE PUMP	FILTER PRESS FILTRATE STORAGE TANK, 12,500 GAL.	SECONDARY CLARIFIER 12,000 GAL.	POLYBLEND UNIT	FILTER PRESS 100 CU. FT.	SECONDARY CLARIFIER SLUDGE PUMP	FILTER PRESS SLUDGE PUMP	SLUDGE MIX TANK 20,000 GAL.	CLARIFIER SURGE TANK 3000 GAL.	PRECOAT TANK 1200 GALLON	CLARIFIER DISCHARGE PUMP	SUMP PUMP	PRESS AREA SUMP	EFFLUENT DUAL SAND FILTERS	DUAL BAG FILTERS

STREAM NO.		505	506	517	524	601	602	603	604	605	605A	605B	606	607	608	609	610	611	612	613	615	658
		SCRUBBER MAKEUP WATER	SCRUBBER BLOWDOWN	SUBCOOLING QUENCH BLOWDOWN	WESP BLOWDOWN	TOTAL BLOWDOWN FLOW TO CLARIFIER	COMBINED CLARIFIER SKIMMER FLOW	COMBINED CLARIFIER BLOWDOWN FLOW	PRIMARY CLARIFIER EFFLUENT	FILTRATE STORAGE DISCHARGE	FILTRATE TO ON-SITE WTS	ORGANIC CONDENSATE DECANT	ORGANIC CONDENSATE TRANSFER	LIQUID POLYMER	ACID OR CAUSTIC FLOW	ORGANIC STREAM FOR DISPOSAL	SECONDARY CLARIFIER EFFLUENT	SLUDGE TO FILTER PRESS	EFFLUENT TO ON-SITE WTS	EFFLUENT DISCHARGE TO WTS	FILTER CAKE	WTS BLOWDOWN
COMPONENT																						
H2O	LB/HR	25,000	25,350	15,198	1,000	41,548	2,500	7,500	36,554	17,807	17,807		2,500	6			31,554	19,662	6,554	24,362	1,855	9,662
SUSPENDED SOLIDS	LB/HR		1,365	144	8	1,517		1,517	758									1,855			1,855	338
DISSOLVED SOLIDS	LB/HR																					
ORGANICS	LB/HR			14.7		14.7	13.2	1.5	7.4	13.2		13.2	13.2			13.2		14.7			1.5	
LIQUID POLYMER	LB/HR													0.03								
ACID/CAUSTIC	LB/HR																					
TOTAL MASS FLOW	LB/HR	25,000	26,715	15,357	1,008	43,080	2,513	9,018	37,320	17,821	17,807	13.2	2,513	6	NOTE 7	13.2	31,554	21,531	6,554	24,362	3,711	10,000
LIQUID FLOW	GPM	50	53	31	2	86	5	18	75	36	36	0.03	5	0		0.03	63	43	13	49		20
TEMPERATURE	°F	150	207	110	108	169	160	160	160	104	104	104	100	60	60	70	150	104	150	116	104	60
PRESSURE	PSIG	45	45	45	40	10	5	60	2	60	60	60	45	35		45	2	150	60	60		
ENTHALPY	MM BTU/HR	2.25	3.77	0.77	0.05	4.58	0.25	0.79	3.67	0.79	0.79	0.00	0.10			0.00	2.84	0.89	0.59	1.38		

000109

NOTES:

1. COMBINED CLARIFIER REMOVAL EFFICIENCY: SOLIDS 100%.
2. 90% ORGANICS IN THE CLARIFIER SKIM FLOW AND 10% ORGANICS IN THE CLARIFIER SOLIDS ASSUMED.
3. THE PROCESS BLOWDOWN SYSTEM IS SIZED FOR 100 GPM.
4. DUAL SAND FILTER (FX-6002A/B) AND DUAL BAG FILTER (FX-6003A/B) ARE CONFIGURED AS INLINE SPARES.
5. INTERMITTENT DECANTING AS REQUIRED
6. HEAD SPACE VENT (TYPICAL)
7. INTERMITTENT

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REV	DATE	BY	CHK'D	APR'D	DESCRIPTION
0	8/25/98	JRH	JAN	GHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: AREA 60 PROCESS BLOWDOWN PRE-TREATMENT SYSTEM PROCESS FLOW DIAGRAM

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY	PA & GM	CHECKED BY	JAN		REVISION
DRAWN BY	SLT	APPROVED BY	GHH		0
DATE	4/22/98	DWG. SCALE	NONE		
IT PROJECT NO.	773481	DRAWING NO.	D-60-10-001		

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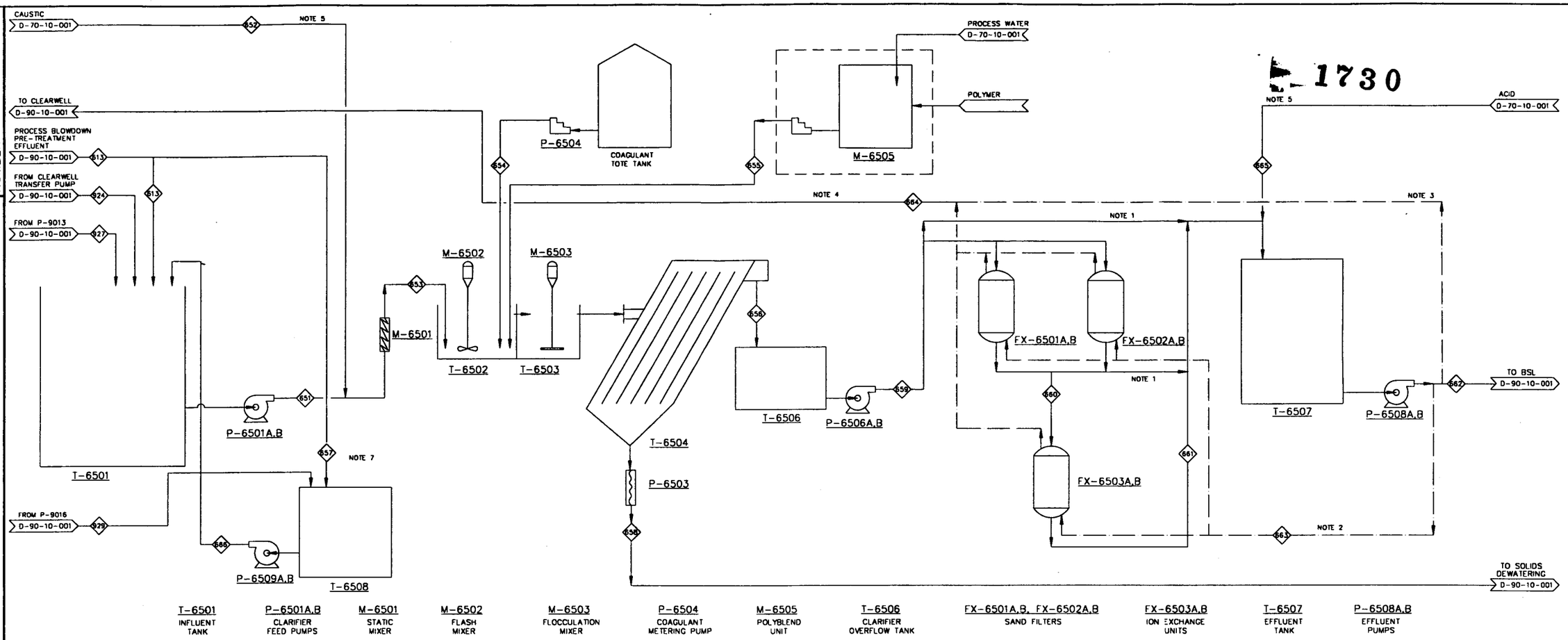
DRAWING NUMBER D-65-10-001



T-6501 INFLUENT TANK

P-6501A,B CLARIFIER FEED PUMPS

M-6501 STATIC MIXER

M-6502 FLASH MIXER

T-6502 FLASH MIX TANK

P-6509A,B TEMPORARY HOLDING TANK TRANSFER PUMPS

M-6503 FLOCCULATION MIXER

T-6503 FLOCCULATION TANK

T-6504 INCLINED PLATE CLARIFIER

P-6503 CLARIFIER SLUDGE PUMP

P-6504 COAGULANT METERING PUMP

T-6508 TEMPORARY HOLDING TANK

M-6505 POLYBLEND UNIT

T-6506 CLARIFIER OVERFLOW TANK

P-6506A,B FILTER FEED PUMPS

FX-6501A,B, FX-6502A,B SAND FILTERS

FX-6503A,B ION EXCHANGE UNITS

T-6507 EFFLUENT TANK

P-6508A,B EFFLUENT PUMPS

STREAM NO.		613	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	924	927	929
COMPONENT		PROCESS BLOWDOWN PRE-TREATMENT EFFLUENT	WTS INFLUENT	CAUSTIC FEED	CLARIFIER INFLUENT	COAGULANT FEED	POLYMER FEED	CLARIFIER OVERFLOW	EMERGENCY OVERFLOW	WTS SLUDGE DISCHARGE	SAND FILTER FEED	ION EXCHANGE FEED	ION EXCHANGE EFFLUENT	WTS EFFLUENT	BACKWASH FEED	WTS BACKWASH	ACID FEED	TEMPORARY HOLDING TANK EFFLUENT	CLEARWELL TRANSFER PUMP	GCS/WTS SUMP (NORTH)	GCS/WTS SUMP (WEST)
TOTAL SUSPENDED SOLIDS	mg/L	0	2,279	0	2,279	0	0	15	0	35,000	15	0	0	0	0	185	0	0	3,000	0	0
WATER	LB/HR	16,463	68,469	0	68,469	86	9	64,133	0	4,430	64,133	64,133	64,133	58,920	5,213	5,213	0	0	52,006	0	0
SOLID/PARTICULATE	LB/HR		156	0	156	0	0	1	0	155	1	0	0	0	0	1	0	0	156	0	0
TOTAL MASS FLOW	LB/HR	16,463	68,625	0	68,625	86	9	64,134	0	4,585	64,134	64,133	64,133	58,920	5,213	5,214	0	0	52,162	0	0
VOLUMETRIC FLOW (NOTE 6)	GPM	33	240	0	240	0.3	0.03	240	0	200	250	250	250	260	500	500	0	0	200	0	0
AVERAGE VOLUMETRIC FLOW	GPD	47,520	197,160	0	197,160	246	25	184,534	0	12,747	184,534	184,534	184,534	169,534	15,000	15,000	0	0	149,640	0	0
TEMPERATURE	°F	150	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB	AMB

000110

NOTE:

1. WATER CAN BYPASS SAND FILTER AND ION EXCHANGE UNIT OR ONLY THE ION EXCHANGE DEPENDING ON WATER QUALITY.
2. TREATED EFFLUENT CAN BE USED AS BACKWASH WATER.
3. TREATED WATER CAN BE RECYCLED TO THE CLEARWELL IF IT DOES NOT MEET THE WAC FOR DISCHARGE TO THE BSL.
4. PRIMARILY BACKWASH WATER. RECYCLED EFFLUENT WATER ONLY AS NECESSARY.
5. USED FOR pH CONTROL AS NEEDED.
6. INTERMITTENT FLOW RATE. ALL OTHER RATES ARE 24-HOUR AVERAGES.
7. FLOW FROM AREA 60 TO T-6508 WOULD OCCUR ONLY IN THE EVENT OF WTS SHUTDOWN

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	JMH	JAN	GHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

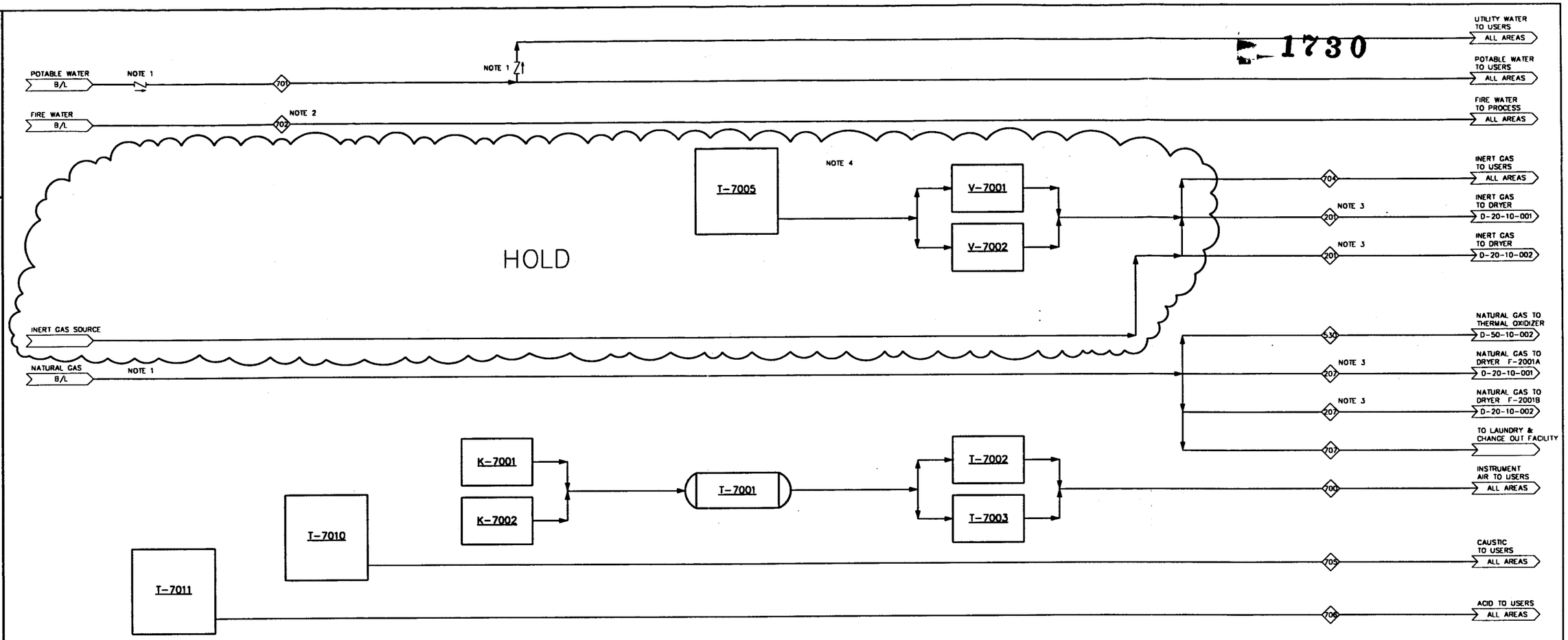
TITLE: AREA 65 WASTEWATER TREATMENT SYSTEM (WTS) PROCESS FLOW DIAGRAM

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY	PMS	CHECKED BY	JAN		REVISION
DRAWN BY	CSJ	APPROVED BY	GHH		0
DATE	11/24/97	DWG. SCALE	NONE		
IT PROJECT NO.	773481	DRAWING NO.	D-65-10-001		

DRAWING NUMBER D-70-10-001

1730



T-7005	NITROGEN STORAGE TANK
V-7001	LIQUID NITROGEN VAPORIZER
V-7002	LIQUID NITROGEN VAPORIZER
T-7011	ACID TANK
T-7010	CAUSTIC TANK
K-7001	AIR COMPRESSOR SYSTEM
K-7002	AIR COMPRESSOR SYSTEM
T-7001	INSTRUMENT AIR RECEIVER
T-7002	INSTRUMENT AIR DRYER
T-7003	INSTRUMENT AIR DRYER

000111

STREAM NO. / COMPONENT		201	207	530	700	701	702	704	705	706	707
		INERT GAS	NATURAL GAS TO DRYERS	NATURAL GAS TO THER. OXIDIZER	COMPRSSED AIR	WATER	FIRE WATER	INERT GAS	CAUSTIC	ACID	NATURAL GAS TO LAUNDRY & CHANGE OUT FACILITY
AVERAGE											
CAUSTIC	LB/HR								500		
ACID	LB/HR									500	
H_2O	LB/HR					45,036	100,000				
AIR	LB/HR				1,690						
NITROGEN	LB/HR	760						150			
NATURAL GAS	LB/HR		1,026	109							10
TOTAL MASS FLOW	LB/HR	760	1,026	109	1,690	45,036	1,164,000	150	500	500	10
VOLUMETRIC FLOW	SCFM (OPM)	175	404	43	320	(90)	(1,600)	35	(1)	(1)	4
TEMPERATURE	°F	70	70	70	70	70	70	70	70	70	70
PRESSURE	IN. W.C. (PSI)	(40)	(15)	(15)	(125)	(45)	(50)	(40)	(50)	(50)	(15)
MAXIMUM											
H_2O	LB/HR					60,048	1,164,000				
AIR	LB/HR				1,900						
NITROGEN	LB/HR	1,000						1,500			
NATURAL GAS	LB/HR		1,300	109							10

NOTES:

1. BACKFLOW PREVENTER
2. EMERGENCY FLOW ONLY.
3. AMOUNTS REQUIRED FOR EACH DRYER.
4. NITROGEN MAY BE USED AS AN ALTERNATE TO OTHER INERT GAS SOURCE.
5. NATURAL GAS PRESSURE AT TIE POINT 47 PSIG.

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	JRH	JAN	GHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE
AREA 70
PROCESS FLOW DIAGRAM
UTILITIES

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY	TGB	CHECKED BY	JAN	REVISION
DRAWN BY	JRH	APPROVED BY	GHH	0
DATE	12/31/97	DWG. SCALE	NONE	
IT PROJECT NO.	773481	DRAWING NO.	D-70-10-001	

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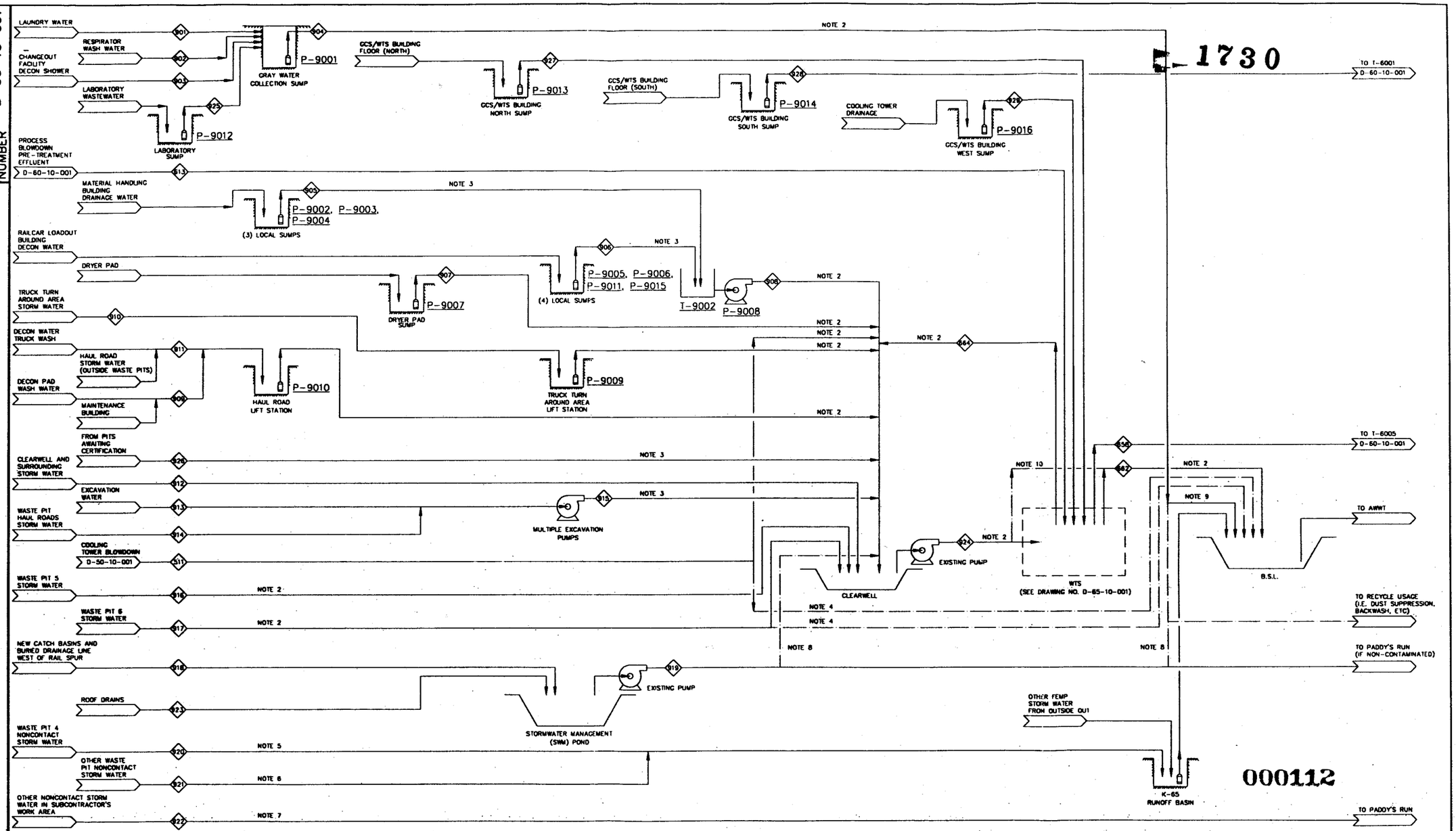
DRAWING NUMBER D-90-10-001



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000112

STREAM NUMBER (NOTE. 1)	511	613	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	658	662	664
	COOLING TOWER BLOWDOWN	PROCESS BLOWDOWN PRE-TREATMENT EFFLUENT	LAUNDRY WATER	RESPIRATOR WASH WATER	DECON SHOWER	GRAY WATER SUMP	MATERIAL HANDLING BLDG SUMPS	RAILCARD LOADOUT BLDG SUMPS	DRYER PAD SUMP	MHBCT TRANSFER PUMP	DECON PAD WATER	TRUCK TURN AROUND AREA SUMP	TRUCK WASH SUMP	CLEARWELL STORM WATER	EXCAVATION WATER	HAUL ROAD STORM WATER	EXCAVATION PUMPS	WASTE PIT 5 STORM WATER	WASTE PIT 6 STORM WATER	SWM POND COLLECTION BASINS	SWM POND EFFLUENT	WASTE PIT 4 NONCONTACT STORM WATER	OTHER WASTE PIT NONCONTACT STORM WATER	NONCONTACT STORM WATER OUTSIDE PITS	ROOF DRAINS	CLEARWELL TRANSFER PUMP	LABORATORY WASTEWATER	FROM PITS AWAITING CERTIFICATION	GCS/WTS BUILDING (NORTH)	GCS/WTS BUILDING (SOUTH)	COOLING TOWER DRAINAGE	WATER IN WTS SLUDGE DISCHARGE	WTS EFFLUENT	WTS BACKWASH

P-9001	GRAY WATER PUMP
P-9002, 9003, 9004	MATERIAL HANDLING BUILDING (MHB) SUMP PUMPS
P-9005, 9006	RAILCAR LOADOUT BUILDING (RLB) SUMP PUMPS (NORTH AND SOUTH)
P-9015	RAILCAR LOADOUT BUILDING WASH WATER SUMP PUMP
P-9011	RAILCAR LOADOUT BUILDING (RLB) DECON SUMP PUMP
P-9012	LABORATORY SUMP PUMP
P-9007	DRYER PAD SUMP PUMP
T-9002	MHB COLLECTION TANK (MHBCT)
P-9008	MHBCT TRANSFER PUMP
P-9009	TRUCK TURN AROUND AREA SUMP PUMP
P-9010	TRUCK WASH SUMP PUMP
P-9013	GCS/WTS BUILDING SUMP PUMP (NORTH)
P-9014	GCS/WTS BUILDING SUMP PUMP (SOUTH)
P-9016	GCS/WTS BUILDING SUMP PUMP (WEST)

NOTES:

1. STREAM DESCRIPTIONS ARE GIVEN ON DWG. D-90-11-002, BY PHASE.
2. BURIED LINE.
3. SHOWN AS A SINGLE STREAM FOR CALCULATION PURPOSES. ACTUAL FIELD CONDITIONS MAY REQUIRE SEVERAL SEPARATE STREAMS.
4. STREAM CAN GO TO THE BSL IF IT MEETS THE WAC FOR DISCHARGE TO THE BSL.
5. COLLECTION TRENCH AROUND PIT AND THROUGH EXISTING CULVERTS.
6. EXISTING TRENCHES AND CULVERTS.
7. DRAINAGE SWALES AROUND NORTH AND SOUTH SIDE OF BSL; AND AREA NORTH OF PIT 6 AND SWM POND.
8. STREAM CAN GO TO BSL OR CLEARWELL IF IT DOES NOT MEET CRITERIA FOR NPDES DISCHARGE.
9. EXISTING BURIED LINE FROM SWM POND TO BSL.
10. EXISTING BURIED LINE FROM CLEARWELL TO BSL.

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	JMH	JAN	GHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP).

TITLE: AREA 90 SITE WATER BALANCE PROCESS FLOW DIAGRAM

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY	P. STEARNS	CHECKED BY	JAN	REVISION
DRAWN BY	RJC	APPROVED BY	GHH	0
DATE	17 DECEMBER '97	DWG. SCALE	NO SCALE	
IT PROJECT NO.	773481	DRAWING NO.	D-90-10-001	

DRAWING NUMBER D-90-10-002

1730

NO.	DESCRIPTION	UNITS	PH. 1	PH. 2	PH. 3	PH. 4	PH. 5	PH. 6	PH. 7	PH. 8	PH. 9	PH. 10	PH. 11	PH. 12	PH. 13	PH. 14	PH. 15	PH. 16	PH. 17	PH. 18	PH. 19
511	COOLING TOWER BLOWDOWN	gpd	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400
613	PROCESS BLOWDOWN PRE-TREATMENT	gpd	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520
901	LAUNDRY WATER	gpd	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
902	RESPIRATOR WASH WATER	gpd	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
903	DECON SHOWERS	gpd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
904	GWCT TRANSFER PUMP	gpd	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950
905	MATERIAL HANDLING BLDG SUMPS	gpd	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
906	RAILCAR LOADOUT BLDG SUMPS	gpd	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
907	DRYER PAD SUMP	gpd	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
908	MHBCT TRANSFER PUMP	gpd	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428
909	DECON PAD WATER	gpd	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
910	TRUCK TURN-AROUND AREA STORM WATER	gpd	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
911	TRUCK WASH SUMP	gpd	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
912	CLEARWELL STORM WATER	gpd	7,266	4,181	4,181	4,181	4,181	4,181	3,136	1,941	1,941	1,941	1,941	1,941	1,941	1,941	1,941	1,941	1,941	0	0
913	EXCAVATION WATER	gpd	20,578	28,037	29,030	70,344	92,405	97,488	98,410	124,114	125,597	109,195	112,406	56,189	63,230	109,598	122,659	114,984	19,930	15,336	0
914	WASTE PIT HAUL ROAD STORM WATER	gpd	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060
915	EXCAVATION PUMPS	gpd	22,638	30,097	31,090	72,404	94,465	99,548	100,470	126,174	127,657	111,255	114,466	58,249	65,290	111,658	124,719	117,044	21,990	17,396	2,060
916	WASTE PIT 5 STORM WATER	gpd	11,169	11,169	11,169	11,169	11,169	11,169	11,169	11,169	8,153	6,242	5,794	4,569	4,241	2,598	2,568	1,672	0	0	0
917	WASTE PIT 6 STORM WATER	gpd	2,210	2,210	2,210	2,210	2,210	2,210	2,210	0	0	0	0	0	0	0	0	0	0	0	0
918	SWM POND COLLECTION BASINS	gpd	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160
919	SWM POND EFFLUENT	gpd	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051
920	WASTE PIT 4 N.C. STORM WATER	gpd	4,480	4,480	4,480	4,480	2,598	2,598	2,538	2,538	2,538	2,538	2,538	2,329	2,329	0	0	0	0	0	0
921	OTHER WASTE PIT N.C. STORM WATER	gpd	19,791	11,199	8,959	6,719	2,240	1,493	1,493	1,493	1,493	1,493	1,493	0	0	0	0	0	0	0	0
922	NONCONTACT STORM WATER OUTSIDE PITS	gpd	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290
923	ROOF DRAINS	gpd	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891
924	CLEARWELL TRANSFER PUMP	gpd	78,829	83,203	84,197	125,510	156,974	152,654	152,531	181,785	180,252	177,376	180,139	157,286	141,607	195,160	173,602	165,030	163,215	147,766	146,052
925	LABORATORY WASTEWATER	gpd	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
926	WATER FROM PITS AWAITING CERTIFICATION	gpd	0	0	0	0	9,403	0	0	6,955	6,955	22,392	22,392	56,981	34,589	43,416	8,827	8,827	103,738	94,824	108,446
927	GCS/WTS BUILDING NORTH SUMP	gpd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
928	GCS/WTS BUILDING SOUTH SUMP	gpd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
929	GCS/WTS BUILDING WEST SUMP	gpd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
658	WATER IN WTS SLUDGE DISCHARGE	gpd	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747
662	WTS EFFLUENT	gpd	98,602	102,976	103,969	145,283	176,747	172,427	172,304	201,558	200,024	197,149	199,912	177,059	161,380	214,932	193,374	184,803	182,987	167,539	165,825
664	WTS BACKWASH	gpd	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000

112 1/2

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	JWH	JAN	GHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: AREA 90 SITE WATER BALANCE PROCESS STREAM TABLE

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PMS	CHECKED BY	JAN	REVISION
DRAWN BY	JWH	APPROVED BY	GHH	0
DATE	7/8/98	DWG. SCALE	NO SCALE	
IT PROJECT NO.	773481	DRAWING NO.	D-90-10-002	

1780

Waste Pits Remedial Action Project
(WPRAP)
Site Plans

***

PREPARED
for
Fluor Daniel Fernald, Inc.
Fernald, Ohio

FDF Subcontract No. 98SC000001

***

PREPARED
by

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 773481

***

Revision 0
Issue Date: August 25, 1998

000113

Drawing List

E-1730

Drawing No.	Rev. No.	Description
M-00-02-001	0	Overall Site Facilities Map
M-00-02-002	0	Site Facilities Layout

000114

1730

Appendix III

Substantive Permitting Requirements and ARARs (Applicable Requirements, Relevant and Appropriate Requirements)

000117

TABLE 7-1a. LOCATION-SPECIFIC ARARS
(APPLICABLE REQUIREMENTS; RELEVANT AND APPROPRIATE REQUIREMENTS)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Wildlife Protection	16 USC 1531 et. seq., and 50 CFR 17.21, 17.31, 17.61, 17.71, 17.94, 50 CFR 402, and Endangered Species Act All federal agencies must insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of the constituent elements essential to the conservation of a listed species within a defined critical habitat. Additional requirements apply if it is determined that a proposed activity could adversely affect these species or their habitat.	In 1994, updated surveys at the FEMP determined the presence of summer habitat for the federally-listed endangered Indiana bat along Paddys Run including areas adjacent to OU1. This area is not critical habitat. Consultation with U.S. Fish and Wildlife Service will determine restorative measures that may need to be taken during and after remedial actions. If any endangered or threatened species are encountered, the additional requirements of the referenced regulation would be applicable. Efforts will be made during remediation to preserve riparian vegetation, habitat for the Indiana bat, to the maximum practicable extent. (**NOTE:** Mitigatory requirements will be determined and implemented by others on a site-wide basis.)	This area is not critical habitat. If any endangered/threatened species are encountered, the requirement of the referenced regulations will be applied.	N/A
Wildlife Protection	ORC 1531.25, 1518.02, and 1501: 18-1, Ohio Endangered Species Regulations No person shall take or possess any native species of wild animal, or any eggs, or offspring thereof, that is endangered with state-wide extinction.	Updated surveys in 1993 and 1994 found state-listed threatened Sloan's crayfish populations in sections of Paddys Run, including sections directly adjacent to OU1 area. Wastewater controls will be designed to minimize negative impacts on Paddys Run, to the maximum practicable extent during and after remedial activities. Process wastewater will not be discharged to Paddys Run from any OU1 operation. Storm water flows from the new facilities area, for storms greater than the 25 year, 24 hour will discharge to Paddys Run. (**NOTE:** Mitigatory requirements will be determined and implemented by others on a site-wide basis.)	Process and pit excavation wastewater will not be discharged directly to Paddys Run. Clean water from roofs and storm water flows from the new facilities area for storms greater than the 25-yr, 24-hr storm will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0

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TABLE 7-1a. LOCATION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Wildlife Protection	16 USC 66 *et seq.*, Fish and Wildlife Coordination Act Requires consultation with other state agencies for any activities which might affect any body of water for the purpose of conserving fish and wildlife resources.	Remedial activities at OU1 may have the potential to affect wildlife and fish in Paddys Run. Wastewater controls will be designed to minimize negative impacts on Paddys Run, to the maximum practicable extent during and after remedial activities. Process wastewater will not be discharged to Paddys Run from any OU1 operation. Stormwater flows from the new facilities area, for storms greater than the 25 year, 24 hour will discharge to Paddys Run.	Process wastewater will not be discharged directly to Paddys Run. Clean water from roofs and stormwater flows from the new facilities area, for storms greater than the 25-yr 24-hr storms, will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0
Historic Preservation	16 USC 469, Archaeological and Historic Preservation Act Requires preservation of artifacts and data associated with archaeological finds.	Historical data and artifacts are not expected to be discovered or destroyed during remedial activities at OU1. Nevertheless, the requirements of the law are applicable.	Discovery/destruction of historical data and artifacts is not anticipated during remedial activities at OU1. Should they be encountered, the affected portion of the work area will be managed in compliance with the FEMP Cultural Resource Policy.	N/A
Historic Preservation	16 USC 470 *et seq.*, National Historic Preservation Act DOE must take into account the effect of an undertaking on historic properties and accord the Advisory Council on Historic Preservation a reasonable opportunity to comment. Historic properties are described as any prehistoric or historic district, building, site, structure, or object included in, or eligible for inclusion in the National Register of Historic Places. This term includes artifacts, records, and remains that are related to and located within such properties. Historic properties that are substantially altered or demolished must be recorded for future use and reference.	Areas adjacent to OU1 boundaries will be surveyed pursuant to the programmatic agreement by the DOE, the Advisory Council on Historic Preservation, and the Ohio Historic Preservation Office. The programmatic agreement will stipulates what actions are required for compliance with the National Historic Preservation Act. Historic sites listed or eligible for listing in the *National Register of Historic Places* are not present within OU1 nor is it expected that any will be. Nevertheless, the requirements of the law are applicable.	Historic sites listed/eligible for listing are not present within OU1, nor are any anticipated. Should they be encountered, the affected portion of the work area will be managed in compliance with the FEMP Cultural Resource Policy.	N/A

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TABLE 7-1a. LOCATION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Historic Preservation	16 USC 470 (aa) - 470 (11), Archaeological Resources Protection Act Requires permit for removal of any archaeological resources from federal lands.	OU1 is located on federal land. Although archeological resources are not expected on the site, the requirements of the law remain applicable to OU1 remedial activities.	Due to significant recent filling and earthwork at OU1, archeological resources are not anticipated on the site. Should they be encountered, the affected portion of the work area will be managed in compliance with the FEMP Cultural Resource Policy.	N/A
Historic Preservation	16 USC 431-433 and USC 461-467, Antiquities Act and Historic Sites Act. Requires that no person may appropriate, excavate, injure or destroy any historical or prehistoric ruin or monument or any object or antiquity situated or controlled by the U.S. Government without an applicable permit. Also requires the identification and preservation of cultural resources on federal lands.	Although OU1 is not expected to contain cultural resources or natural landmarks of significance, it is located on federal land and the law is applicable should any cultural resources be discovered during remedial actions on site.	OU1 is not expected to contain cultural resources or natural landmarks of significance. Should they be encountered, the affected portion of the work area will be managed in compliance with the FEMP Cultural Resource Policy.	N/A
Historic Preservation	25 USC 3001, Native American Graves Protection and Repatriation Act Provides for return of human remains and cultural objects from Native American graves to affiliated tribes.	Although OU1 does not contain known American Indian burial grounds, this law would apply should graves and human remains be discovered during excavation of the waste pits.	OU1 does not contain known American Indian burial grounds. Should they be encountered, the affected portion of the work area will be managed in compliance with the FEMP Cultural Resource Policy.	N/A
Historic Preservation	42 USC 1996, American Indian Religious Freedom Act Provides for tribal access by native peoples to grave sites and sites of cultural, symbolic, or religious significance.	Although no sites of this nature have been identified at OU1, the law is applicable to federal lands and activities.	Grave sites and sites of cultural, symbolic or religious significance are not known on the OU1 site. Should they be encountered, the affected portion of the work area will be managed in compliance with the FEMP Cultural Resource Policy.	N/A
Historic Preservation	Executive Order 11593, Protection and Enhancement of Cultural Environment. Requires an inventory of site for potential historic places for eligibility in the *National Register of Historic Places*.	The requirement is applicable to activities at OU1. An updated inventory will be completed prior to remedial action. It is not expected that any sites of this nature will be identified at OU1.	No potential historic sites have been identified on the OU1 site. Should they be encountered, the affected portion of the work area will be managed in compliance with the FEMP Cultural Resource Policy.	N/A

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TABLE 7-1a. LOCATION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Siting	<u>10 CFR 1022, Protection of Wetlands and Floodplain Management</u> 10 CFR 1022 contains the DOE regulation implementing Executive Orders 11990 and 11988. Executive Order 11990 requires that Federal agencies take action to avoid adversely impacting wetlands wherever possible, to minimize wetlands destruction, to preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of the Executive Order. Executive Order 11988 requires Federal agencies undertaking actions within a floodplain to evaluate the potential the action has for adverse impact on the floodplain. If it is determined that adverse impacts could occur, the effects of the action must be minimized to the extent practical.	Approximately 36 acres of jurisdictional wetlands were identified on the site as the result of the 1993 wetland delineation, 4.96 acres of which were identified within OU1. It has been determined that OU1 remediation efforts will result in an unavoidable impact to the entire 4.96 acres. Impacts to wetlands outside of the subcontractor's work area will be minimized during remedial activities by avoiding these areas to the maximum extent possible. OU1 is in the immediate vicinity of the Paddys Run Floodplain. Remediation activities will be undertaken while minimizing impacts to the floodplain primarily through minimizing activities within the floodplain which would cause substantial adverse changes to the floodplain. (**NOTE:** Mitigatory requirements relative to wetlands impacts and the final topography (and its impact on the floodplain) will be assessed by others on a site-wide basis. The final grading plan will be reflective of these efforts.)	Mitigatory strategies relative to wetland impacts and the final topography (and its impact on the Paddys Run floodplain) will be assessed by FDF on a sitewide basis. The final grading plan will be reflective of the results of this assessment.	Final site grading plan

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TABLE 7-1a. LOCATION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Construction	33 CFR 330, Nationwide Permit Program (33 CFR 323 and OAC 3745-32) The Army Corps of Engineers authorizes discharges of dredge or fill material into wetlands and waters of the United States under its Nationwide Permit or Individual Permit Programs. Section 401 State Water Quality Certification is also required for these types of discharges. Approximately 4.96 acres of jurisdictional wetlands will be impacted as a result of the OU1 Remedial Action and will be subjected to the substantive requirements of these regulations. **See Table 7-2d for a detailed discussion relative to the substantive requirements of Nationwide Permit 26.**	Discharges of dredged and fill material associated with the OU1 remedial action will be conducted in accordance with the substantive requirements of Nationwide Permit 26 - Headwaters and Isolated Waters Discharges and its corresponding Section 401 State Water Quality Certification. **(NOTE:** Wetland mitigatory requirements for OU1 impacts will be addressed by others under a site-wide wetland mitigation plan.) **See Table 7-2d for additional details.**	Compliance strategy is addressed in substantive permitting requirements. (see Table 7-2)	See Table 7-2

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TABLE 7-1b. CHEMICAL-SPECIFIC ARARS

(APPLICABLE REQUIREMENTS; RELEVANT AND APPROPRIATE REQUIREMENTS; TBCs)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Surface Water Discharges 0321730	OAC 3745-1 Ohio Water Quality Standards It is the purpose of these Water Quality Standards to establish minimum water quality requirements for all surface waters of the State, thereby protecting public health and welfare; and to enhance, improve, and maintain water quality as provided under the laws of the State of Ohio, and ORC 6111.041, the Federal Clean Water Act, 33 U.S.C. Section 1251 *et seq.* Whenever two or more use designations apply to the same surface water, the more stringent criteria of each use designation will apply.	OU1 remediation activities will not result in the direct discharge of wastewater to a water of the State. Wastewater generated by OU1 remediation activities will be pretreated and discharged to the existing FEMP wastewater treatment system where it will be combined with other site wastewater for treatment. Treated wastewaters will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative water quality standards promulgated in OAC 3745-1.	Process and pit excavation wastewater will not be directly discharged to a water of the state. These wastewaters will be discharged to the existing FEMP wastewater treatment system, in compliance with the BSL WAC, where they will be combined with other site wastewater for treatment. Treated wastewater will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative quality standards promulgated in OAC 3745-1. Clean water from roofs and storm water flows from the new facilities area for storms greater than the 25-yr, 24-hr storm will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0 000123

TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Surface Water Discharges	OAC 3745-01-04 Criteria Applicable to All Waters The following general water quality criteria shall apply to all surface waters of the State including mixing zones. To every extent practical and possible as determined by the director, these waters shall be: (A) Free from suspended solids or other substances that enter the waters as a result of human activity and that will settle to form putrescent or otherwise objectionable sludge deposits, or that will adversely affect aquatic life; (B) Free from floating debris, oil, scum and other floating materials entering the waters as a result of human activity in amounts sufficient to be unsightly or cause degradation; (C) Free from materials entering the waters as a result of human activity producing color, odor or other conditions in such a degree as to create a nuisance; (D) Free from substances entering the waters as a result of human activity in concentrations that are toxic or harmful to human, animal or aquatic life and/or are rapidly lethal in the mixing zone; (E) Free from nutrients entering the waters as a result of human activity in concentrations that create nuisance growths of aquatic weeds and algae.	OU1 remediation activities will not result in the direct discharge of wastewater to a water of the State. Wastewater generated by OU1 remediation activities will be pretreated and discharged to the existing FEMP wastewater treatment system where it will be combined with other site wastewaters for treatment. Treated wastewaters will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative water quality standards promulgated in OAC 3745-1.	Process and pit excavation wastewater will not be directly discharged to a water of the state. These wastewaters will be discharged to the existing FEMP wastewater treatment system, in compliance with the BSL WAC, where they will be combined with other site wastewater for treatment. Treated wastewater will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative quality standards promulgated in OAC 3745-1. Clean water from roofs and storm water flows from the new facilities area for storms greater than the 25-yr, 24-hr storm will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0

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TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Surface Water Discharges	OAC 3745-1-07, Table 7-1 Numerical and Narrative Criteria for Aquatic Life Habitat and Water Supply Use Designation Surface Waters in the State of Ohio must comply with the maximum concentrations of each contaminant of concern listed in Table I-5 and I-6 in Attachment I for inside and outside the mixing zones of the receiving water to protect warm water aquatic habitats.	OU1 remediation activities will not result in the direct discharge of wastewater to a water of the State. Wastewater generated by OU1 remediation activities will be pretreated and discharged to the existing FEMP wastewater treatment system where it will be combined with other site wastewaters for treatment. Treated wastewaters will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative water quality standards promulgated in OAC 3745-1.	Process and pit excavation wastewater will not be directly discharged to a water of the state. These wastewaters will be discharged to the existing FEMP wastewater treatment system, in compliance with the BSL WAC, where they will be combined with other site wastewater for treatment. Treated wastewater will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative quality standards promulgated in OAC 3745-1. Clean water from roofs and storm water flows from the new facilities area for storms greater than the 25-yr, 24-hr storm will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0

TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Surface Water Discharges	OAC 3745-1-07, Table 7-10, Outside Mixing Zone Maximum Criteria for Water Hardness Dependent Parameters in Warm Water Habitats Table I-7 in Attachment I contains the numerical limits on cadmium, copper, chromium, lead, and silver.	OU1 remediation activities will not result in the direct discharge of wastewater to a water of the State. Wastewater generated by OU1 remediation activities will be pretreated and discharged to the existing FEMP wastewater treatment system where it will be combined with other site wastewaters for treatment. Treated wastewaters will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative water quality standards promulgated in OAC 3745-1.	Process and pit excavation wastewater will not be directly discharged to a water of the state. These wastewaters will be discharged to the existing FEMP wastewater treatment system, in compliance with the BSL WAC, where they will be combined with other site wastewater for treatment. Treated wastewater will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative quality standards promulgated in OAC 3745-1. Clean water from roofs and storm water flows from the new facilities area for storms greater than the 25-yr, 24-hr storm will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0

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TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Surface Water Discharges	OAC 3745-1-07, Table 7-11 Outside Mixing Zone 30-Day Average Criteria for Water Hardness Dependent Parameters in Warm Water Habitats Table I-8 in Attachment I contains the average numerical limits for cadmium, copper, chromium, lead, and silver.	OU1 remediation activities will not result in the direct discharge of wastewater to a water of the State. Wastewater generated by OU1 remediation activities will be pretreated and discharged to the existing FEMP wastewater treatment system where it will be combined with other site wastewaters for treatment. Treated wastewaters will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative water quality standards promulgated in OAC 3745-1.	Process and pit excavation wastewater will not be directly discharged to a water of the state. These wastewaters will be discharged to the existing FEMP wastewater treatment system, in compliance with the BSL WAC, where they will be combined with other site wastewater for treatment. Treated wastewater will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative quality standards promulgated in OAC 3745-1. Clean water from building roofs and stormwater flows from the new facilities area, for storms greater than the 25-yr 24-hr storm, will be discharged directly to Paddys Run. Work will control contamination in areas subject to the stormwater discharge. Additional discharges of stormwater from the Storm Water Management (SWM) Pond may occur if monitoring shows the water meets the NPDES requirements.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0

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TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Surface Water Discharges	OAC Table 7-12 Inside Mixing Zone Maximum Criteria for Water Hardness Dependent Criteria in Warm Water Habitats Table I-8 in Attachment I contains numerical limits for cadmium, copper, chromium, lead, and silver.	OU1 remediation activities will not result in the direct discharge of wastewater to a water of the State. Wastewater generated by OU1 remediation activities will be pretreated and discharged to the existing FEMP wastewater treatment system where it will be combined with other site wastewaters for treatment. Treated wastewaters will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative water quality standards promulgated in OAC 3745-1.	Process and pit excavation wastewater will not be directly discharged to a water of the state. These wastewaters will be discharged to the existing FEMP wastewater treatment system, in compliance with the BSL WAC, where they will be combined with other site wastewater for treatment. Treated wastewater will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative quality standards promulgated in OAC 3745-1. Clean water from roofs and storm water flows from the new facilities area for storms greater than the 25-yr, 24-hr storm will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0

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TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Surface Water Discharges 1730	OAC 3745-1-07 Outside Mixing Zone Maximum Criteria for pH dependent Parameters in warm water Aquatic Habitats Table I-10 in Attachment I contains the numerical limits for pentachlorophenol. OAC 3745-1-07 Inside the Mixing Zone Maximum Criteria for pH dependent Parameters in warm water Aquatic Habitats Table I-11 in Attachment I contains the numerical limits for pentachlorophenol.	OU1 remediation activities will not result in the direct discharge of wastewater to a water of the State. Wastewater generated by OU1 remediation activities will be pretreated and discharged to the existing FEMP wastewater treatment system where it will be combined with other site wastewaters for treatment. Treated wastewaters will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative water quality standards promulgated in OAC 3745-1.	Process and pit excavation wastewater will not be directly discharged to a water of the state. These wastewaters will be discharged to the existing FEMP wastewater treatment system, in compliance with the BSL WAC, where they will be combined with other site wastewater for treatment. Treated wastewater will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative quality standards promulgated in OAC 3745-1. Clean water from roofs and storm water flows from the new facilities area for storms greater than the 25-yr, 24-hr storm will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0 020000

TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Surface Water Discharges	OAC 3745-1-07 Lower Miami River Temperature Criteria in Fahrenheit and degrees (Celsius) Table I-12 in Attachment I contains the acceptable monthly temperatures for water discharged to the Lower Great Miami River.	OU1 remediation activities will not result in the direct discharge of wastewater to a water of the State. Wastewater generated by OU1 remediation activities will be pretreated and discharged to the existing FEMP wastewater treatment system where it will be combined with other site wastewaters for treatment. Treated wastewaters will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative water quality standards promulgated in OAC 3745-1.	Process and pit excavation wastewater will not be directly discharged to a water of the state. These wastewaters will be discharged to the existing FEMP wastewater treatment system, in compliance with the BSL WAC, where they will be combined with other site wastewater for treatment. Treated wastewater will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative quality standards promulgated in OAC 3745-1. Clean water from roofs and storm water flows from the new facilities area for storms greater than the 25-yr, 24-hr storm will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0
Air Discharges	OAC 3745-17-07 Particulate Matter Standards Visible particulate emissions from any stack may exceed twenty per cent opacity, as a six minute average, for not more than six consecutive minutes in any sixty minutes, but shall not exceed sixty per cent opacity, as a six-minute average, at any time. **See Table 7-2.a for a detailed discussion relative to substantive requirements.**	The State standard for particulate emissions is an ARAR because it places a time limit on particulate emissions that may work in tandem with the Federal annual average. **See Table 7-2.a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2

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TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	To-Be-Considered Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Radiation	DOE Order 5400.5 Radiation Protection of the Public and the Environment To prevent buildup of radionuclide concentrations in sediment, liquid process waste streams containing radioactive material in settleable solids may be released to natural waterways if the concentration of radioactive material in the solids present in the waste stream do not exceed 5 pCi/g above background levels of settle-able solids of alpha-emitting radionuclides or 50 pCi/g above background level of settle-able solids for beta-gamma-emitting radionuclides. To protect native animal aquatic organisms, the absorbed dose to these organisms shall not exceed 1 rad per day from exposure to the radioactive material in liquid wastes discharged to material waterways.	OU1 remediation activities will not result in the direct discharge of wastewater to a water of the State. Wastewater generated by OU1 remediation activities will be pretreated and discharged to the existing FEMP wastewater treatment system where it will be combined with other site wastewaters for treatment. Treated wastewaters will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative water quality standards promulgated in OAC 3745-1.	Process and pit excavation wastewater will not be directly discharged to a water of the state. These wastewaters will be discharged to the existing FEMP wastewater treatment system, incompliance with the BSL WAC, where they will be combined with other site wastewater for treatment. Treated wastewater will be discharged in accordance with the requirements of the FEMP NPDES permit and applicable numeric and narrative quality standards promulgated in OAC 3745-1. Clean water from roofs and storm water flows from the new facilities area for storms greater than the 25-yr, 24-hr storm will be discharged to Paddys Run under the NPDES permit. Discharges of stormwater from the Storm Water Management (SWM) Pond will be included in the NPDES permit modification.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0
Radiation	DOE Order 5400.5 Radiation Protection of the Public and Environment DOE Order 5400.5 requires compliance with 40 CFR Part 61, Subpart H criterion of 10 mrem/year effective dose equivalent and monitoring of point-source emissions. **See Table 7-1a for a detailed discussion relative to substantive requirements.**	**See Table 7-2.a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 3-2)	See Table 7-2

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TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	To-Be-Considered Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Radiation	DOE Order 5400.5 Residual plus natural dose limit for public exposure to residual radioactive material are 100 mrem effective dose equivalent per year. Guidelines for residual concentrations of radionuclides in soil shall be derived from the basic dose limits by means of an environment pathway analysis using specific property data where available. Procedures for these derivations are given in DOE/CH-8901. Residual concentrations of radioactive material in soils are defined as those in excess of background concentrations averaged over an area of 100 square meters. Control and Stabilization and Administrative Control features shall be designed to provide to the extent reasonably achievable, an effective life of 50 years with a minimum life of at least 25 years. Groundwater shall be protected in accordance with legally applicable Federal and State standards.	All waste pit material will be removed from OU1. The only residual material will be soil that meets the Final Remediation Levels established by the OU5 remedial action. The Final Remediation Levels have been developed in accordance with this requirement. Compliance will be demonstrated on a sitewide basis following remediation of the entire site by the Soil Characterization & Excavation Project. Some material from OU1 will be placed into the On-Site Disposal Facility. The disposal facility will be designed to meet this requirement and demonstration of compliance will be performed by the On-Site Disposal Cell Project.	All waste pit material will be removed from OU1. The only residual material will be soil that meets the established FRLs established by FEMP in accordance with this requirement. Sitewide compliance will be demonstrated by FEMP. Some residual contaminated soils from OU1 may be placed into the OSDF. This determination will be made in accordance with the final site grading plan. The excavation of waste pit material will be executed to minimize and control releases to groundwater by reasonably maintaining the pits in a pumped-down condition after removal of liners and prior to confirmation that removal meets the established FRLs.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.1, 3.2; Sampling and Analysis Plan Sections 1.2.1, 2.1; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0, 7.0

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TABLE 7-1b. CHEMICAL-SPECIFIC ARARS (Continued)

Category	To-Be-Considered Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Soil Remediation	40 CFR 761.125 Requirements for PCB Spill Cleanup PCBs at concentrations greater than 50 ppm are subject to decontamination TSCA requirements in 40 CFR 761.120(b). PCB containers containing non-liquid PCBs, such as contaminated soil, rags, and debris designated for disposal may be stored temporarily (up to 30 days from the date of removal) in an area that does not comply with the storage building requirements at 40 CFR 761.65 (b). 40 CFR 761.125© Soils in non-restricted access areas contaminated by a PCB spill will be decontaminated to 50 ppm PCB by weight, provided that the soil is excavated to a minimum depth of 10 inches. The excavated soils will be replaced with clean soils, i.e., containing <1 ppm PCB, and the spill site will be restored (e.g., replacement of turf) [40 CFR 761.125(c)(4)(v)]. For soils in restricted access areas, decontaminate to 25 ppm PCB by weight [40 CFR 761.125(c)(3)(v)].	Concentrations of PCBs at OU1 are expected to be less than 50 ppm. This regulation would then be considered guidance to be considered.	Concentrations of PCBs at OU1 are expected to be less than 50 ppm. Should regulated PCB levels be encountered, the material will be segregated and managed as non-typical waste.	Sampling and Analysis Plan Sections 1.2.1,2.1

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TABLE 7-1c. ACTION-SPECIFIC ARARS
(APPLICABLE REQUIREMENTS; RELEVANT AND APPROPRIATE REQUIREMENTS; TBCs)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Radon	40 CFR Part 61, Subpart Q Emission of radon-222 from DOE interim and storage facilities is limited to 20 pCi/m^2/s on an average over the entire source. **See Table 7-2.a for a detailed discussion relative to substantive requirements.**	**See Table 7-2.a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2
Stormwater Control	40 CFR 122.26 (OAC 3745-38) Discharge of Storm Water Runoff Stormwater runoff from landfills, construction sites, and industrial activities must be monitored and controlled. A Storm Water Pollution Prevention Plan (SWPPP) is required for construction activities which result in a total land disturbance of 5 or more acres.	Remedial activities will comply with an approved FEMP SWPPP which will include specific inspection and monitoring criteria applicable to all site projects. Guidelines set forth in Rainwater and Land Development, Ohio's Standard for Stormwater Management Stream Protection, 1996, will be followed.	Routine inspections of the OU1 stormwater management features will be performed and documented throughout the OU1 remedial activities. A monitoring program will be established for the SWM Pond consistent with its requirements of the SWPPP, to allow discharge of non-contaminated stormwater directly to Paddy's Run. Existing procedures will be used as appropriate to monitor and control stormwater runoff.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0
Well Abandonment	OAC 3745-9-10 Ohio Water Well Standards Abandonment of Test Holes and Wells	These requirements for closure of test holes and wells at the FEMP are implemented through existing site procedures.	The closure of test holes and wells at OU1 will be implemented through the existing FEMP site procedures.	N/A
Hazardous Waste	ORC 3734.02(H) Digging Where Hazardous or Solid Waste was Located Filling, grading, excavating, building, drilling, or mining on land where hazardous waste or solid waste facility was operated is prohibited without prior approval from the Director of the Ohio EPA.	This requirement needs no further discussion relative to attainment, since Ohio EPA concurrence on the OU1 ROD has met the intent of this requirement.	Ohio EPA concurrence on the OU1 ROD has met the intent of this requirement.	N/A
Hazardous Waste	OAC 3745-56-51, 54 and 58; Waste Piles These requirements specify design and operating requirements, monitoring and inspection, closure and post-closure care. **See Table 7-2c for a detailed discussion relative to specific substantive requirements.**	The requirements for hazardous waste piles are potentially applicable only to waste excavated from Pits 4 and 5. **See Table 7-2c for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2

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TABLE 7-1c. ACTION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Air Discharges	OAC 3745-15-07(A) Ohio Air Pollution Control Regulations Describes forms of air pollution nuisances and prohibits their emission or escape. **See Table 7-2.a for a detailed discussion relative to substantive requirements.**	Both excavation and waste treatment processes have the potential to generate prohibited fugitive emissions. **See Table 7-1a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2
Fugitive Dust	OAC 3745-17-08 Control of Fugitive Dust Requires the minimization or elimination of visible emissions of fugitive dust generated during grading, loading, or construction operations and other practices which emit fugitive dust. **See Table 7-2.a for a detailed discussion relative to substantive requirements.**	The implementation of remedial action alternatives will require the movement of dirt and other material likely to result in fugitive dust emissions. **See Table 7-2.a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2
Air Discharges	OAC 3745-21-02© and -03(D) Ambient air quality standards and guidelines and methods of ambient air quality measurements (for non-methane hydrocarbons). Mean ambient concentration of non-methane hydrocarbons not to exceed 160 μg/cubic meters (0.24 ppm as carbon) between 6 and 9 a.m.; methods for determining ambient concentration of non-methane hydrocarbons. **See Table 7-2.a for a detailed discussion relative to substantive requirements.**	During drying, hydrocarbon soil contaminants may be evolved with the steam. An uncontrolled release could lead to a violation of this standard. Air emissions will be determined during design and appropriate design measures will be included to insure compliance with this requirement. **See Table 7-2.a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2

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TABLE 7-1c. ACTION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Air Discharges	OAC 3745-21-07 (G)(2) Control of emissions of organic material from stationary sources. Emissions of photochemical reactive material from processes, including drying, not to exceed 40 lbs/day, with a peak of 8 lbs/hour. **See Table 7-2.a for a detailed discussion relative to substantive requirements.**	Data from the OU1 Remedial Investigation Report indicate that VOCs do not need to be controlled because of their low concentrations. Although the concentration of organic material in the pit waste is expected to be low, the volume of the waste to be treated could result in sufficient emissions for this standard to be violated if emissions are uncontrolled. Note that it is current Ohio EPA policy to consider all VOCs to be photochemical reactive materials. **See Table 7-2.a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2
Air Discharges	OAC 3745-31-05(A)(3) Permit to Install The director shall issue a permit to install if he determines that the installation or modification and operation of the air contaminant source will employ the best available technology. **See Table 7-2.a for a detailed discussion relative to substantive requirements.**	Although an administrative Permit to Install is not required for alternatives involving treatment, the substantive requirements of this section must be met by employing Best Available Technology (BAT) for treating particulate and off-gas emissions. **See Table 7-2.a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2
NEPA	10 CFR 1021.2 DOE actions must be subjected to NEPA evaluation as outlined by CEQ regulations in 40 CFR 1500-1508.	On June 13, 1994, the DOE issued a revised policy statement on NEPA. The new policy allows DOE, at CERCLA sites, to rely on the CERCLA process to satisfy the procedural aspects of NEPA. NEPA values have been incorporated into the Final Operable Unit 1 Feasibility Study Report.	NEPA values have been incorporated into the Final OU1 Feasibility Study Report.	N/A

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TABLE 7-1c. ACTION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Air Discharges	40 CFR 61.670 Subpart OOO Stack emissions from affected facilities shall not: • Contain particulate matter in excess of 0.05 g/dscm; or • Exhibit greater than 7 percent opacity, unless the stack emissions are discharged from an affected facility using a wet scrubbing control device. **See Table 7-2.a for a detailed discussion relative to substantive requirements.**	These standards are relevant and appropriate to OU1 remedial activities since they specify requirements for crusher and conveyor systems. The standards will be considered when determining BAT requirements for these systems in accordance with OAC 3745-31-05(A)(3). **See Table 7-2.a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2
BMP Program	40 CFR 125.100 and 125.104 Discharge of Treatment System Effluent Best Management Practices Development and implement a BMP program to prevent the release of toxic or hazardous pollutants to waters of the U.S. Development and implementation of a sitewide BMP Program is also required as a condition of the FEMP NPDES Permit.	As of September 27, 1995 [the issuance date of the current site NPDES permit (Ohio EPA Permit No. 1IO00004*ED)] activities at the Fernald Site are no longer subject to the provisions of the site BMP Plan or 40 CFR 125.100 and 125.104. Although no longer subject to the provisions of these requirements, discharges of stormwater and process wastewater must be managed in accordance with all applicable site procedures, the FEMP SWPPP and SPCCC Plans, and the current NPDES permit to mitigate potential releases of hazardous pollutants to waters of the U.S.	No action is required.	N/A
Solid Waste	40 CFR 241 Subpart B (OAC 3745-27), RCRA Subtitle D On-Property Solid Nonhazardous Waste Management Facilities Design standards are presented in the following citations: 241.200-2, 241.201-2, 241.202-2, 241.203-2, 241.204-2, 241.205-2, 241.206-2, 241.207-2, 241.208-2, 241.209-2, and 241.210-2.	Land disposal of solid waste will not occur in OU1. Solid waste from OU1 destined for on-site disposal will be sent to the On-Site Disposal Facility. The OU1 selected remedy involves handling residual contaminated soils and oversized materials in accordance with the OU5 and OU3 RODs, respectively. The OU1 design will necessarily reflect any requirements developed through the On-Site Disposal Facility design, relative to activities resulting in the placement of OU1 materials in the On-Site Disposal Facility.	Land disposal of solid waste will not occur in OU1.	Operation & Maintenance Plan Sections 2.1, 3.2; Sampling and Analysis Plan Sections 1.2.1, 2.1.

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TABLE 7-1c. ACTION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Hazardous Waste	40 CFR 262.11 (OAC 3745-52-11) Hazardous Waste Determinations Any generator of waste must determine whether or not the waste is hazardous. **See Table 7-2c for a detailed discussion relative to substantive requirements.**	Excavation, size reduction, homogenization, blending, and drying of pit wastes are process activities which result in generation of a single waste stream. The newly generated waste is the waste stream that will be shipped off-site for disposal and represents the waste that must comply with regulatory requirements and disposal facility waste acceptance criteria. As documented in the OU1 Feasibility Study, Proposed Plan, and Record of Decision, this waste stream does not contain RCRA listed wastes; and in accordance with US EPA guidance for Superfund sites and 40 CFR 262.11 (c), the waste will be sampled for RCRA characteristics only. The methods that will be used to demonstrate compliance with regulatory criteria and WAC will be included in the Sampling and Analysis Plan developed to support the implementation of off-site shipping/ disposal. **See Table 7-2c for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2
Hazardous Waste	Closure 40 CFR 264, Subpart G (OAC 3745-55-(11-16)) Operator must close facility in a manner that: • Minimizes the need for further maintenance • Minimizes post-closure escape of hazardous constituents • Complies with specific unit type closure requirements **See Table 7-2c for a detailed discussion relative to substantive requirements.**	As documented in the Draft Director's Findings and Orders between Ohio EPA and DOE, demonstration of compliance with substantive closure and post-closure requirements for hazardous waste management units will be documented in remedial design and remedial action deliverables. DOE will provide a cross-reference to Ohio EPA that will contain an index to closure and post-closure requirements within the RD/RA deliverables. The RD/RA deliverables will be submitted for review in accordance with the Amended Consent Agreement. **See Table 7-2c for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2

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TABLE 7-1c. ACTION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Air Discharges	40 CFR 264.1030 - 264.1036, Subpart AA Air Emission Standards for Process Vents • Reduce total organic emissions below 1.4 kg/h (3 lb/h) and 2.8 Mg/yr (3.1 tons/yr) • Control device (condenser and absorber) must recover organic vapors with an efficiency of 95 percent or greater. **See Table 7-2.a for a detailed discussion relative to substantive requirements.**	No regulations have been promulgated for process vents associated with thermal drying; however, 40 CFR 264.1030 - .0136 will be relevant and appropriate but not applicable to air emission standards for process vents associated with thermal drying. **See Table 7-2.a for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2
Hazardous Waste	Post-Closure 40 CFR 264 Subpart G 40 CFR 264.117 (OAC 3745-55-17) 40 CFR 264.119 (OAC 3745-55-19) Post-closure care and use of property for a period as necessary to protect human health and the environment including: • Access controls • Monitoring Post-closure notices must include deed notation/use restriction. **See Table 7-2c for a detailed discussion relative to substantive requirements.**	As documented in the Draft Director's Findings and Orders between Ohio EPA and DOE, demonstration of compliance with substantive closure and post-closure requirements for hazardous waste management units will be documented in remedial design and remedial action deliverables. DOE will provide a cross-reference to Ohio EPA that will contain an index to closure and post-closure requirements within the RD/RA deliverables. The RD/RA deliverables will be submitted for review in accordance with the Amended Consent Agreement. **See Table 7-2c for additional details.**	Compliance strategy is addressed in Substantive Permitting requirements (see Table 7-2)	See Table 7-2

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TABLE 7-1c. ACTION-SPECIFIC ARARS (Continued)

Category	Applicable Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Monitoring	OAC 3745-57-91 and 92, Miscellaneous Methods of Waste Treatment Parts 91 and 92 include requirements for miscellaneous units environmental performance standards and monitoring, analysis, inspection, response, reporting, and corrective action.	This ARAR will be met by the implementation of activities associated with other ARARs that are protective of human health and the environment. Releases to the environment will be controlled using appropriate ventilation (for air emissions) and a stormwater/wastewater collection system (for water discharges).	Releases to the environment will be controlled using appropriate ventilation (for air emissions) and a stormwater/wastewater collection system (for water discharges).	Operations Environmental Control Plan Section 5.0, 6.0, 7.0; Operation & Maintenance Plan Sections 2.4, 2.6, 3.3.1, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3, 1.2.4,2.2, 2.3, 2.4; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0; Performance Test Criteria 2.0
CAMUs	Corrective Action for SWMUs 40 CFR Subpart S 40 CFR 264.552,.553 Corrective Action Management Units (CAMUs) might be designed at the site as areas where remediation wastes (solid, hazardous, or contaminated media and debris) might be placed during the process of remediation. Temporary units (TUs) consisting of tanks and container storage units might be used to store and treat hazardous waste during the process of corrective action.	As an ARAR, the CAMU designation does not apply to waste disposed off-site; however, it does apply to waste that is managed on-site. OU1 pit wastes will be disposed of at an off-site facility and therefore, must meet all regulatory and disposal facility requirements. CAMUs can apply to residual soils remaining on site. As such, residual OU1 soils will be managed in accordance with the OU5 ROD which designates the FEMP site as a CAMU.	Residual OU1 soils will be managed in accordance with the OU5 ROD which designates the FEMP site as a CAMU.	Operation & Maintenance Plan Sections 2.1, 3.2; Sampling and Analysis Plan Sections 1.2.1, 2.1.

Category	To-Be-Considered Requirements	Requirements Assessment	Compliance Strategy	Index to Design
	DOE Order 5400.1 @ p. iv - 1 Since each DOE facility is unique, the need and level of effort for monitoring programs shall be determined by the appropriate field organization on a case-by-case basis.	OU1 is part of a DOE facility and is subject to these orders. The existing FEMP sitewide monitoring program will be supplemented, as necessary, to address the OU1 remediation facilities. Any additional monitoring will be reflected in the Sampling and Analysis Plan.	Additional monitoring activities will be reflected in the Sampling and Analysis Plan.	Operation & Maintenance Plan Sections 3.3.1; Sampling and Analysis Plan Sections 1.0, 2.0; Performance Test Criteria 2.0

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TABLE 7-1c. ACTION-SPECIFIC ARARS (Continued)

Category	To-Be-Considered Requirements	Requirements Assessment	Compliance Strategy	Index to Design
	DOE Order 5400.1 @ iv - 9, 10 Groundwater that is or could be affected by DOE activities shall be monitored to determine and document the effects of operations on groundwater quality and quantity and to demonstrate compliance with DOE requirements and applicable Federal, State, and local laws and regulations.	As discussed in Subsection 4.4.1 of the OU1 Remedial Design Work Plan, the existing FEMP groundwater monitoring program will be used for assessing potential impacts to the groundwater due to planned OU1 remediation activities.	The existing FEMP groundwater monitoring program will be used for assessing potential impacts to the groundwater due to planned OU1 remediation activities	N/A
	DOE Order 5820.2A @ 1 Radioactive Waste Management DOE 5820.2A III.3h Management of Low-Level Waste, Long-Term Storage Radioactive and mixed wastes shall be managed in a manner that assures protection of the health and safety of the public, DOE and contractor employees, and the environment. 5820.2A III.3h requires achieving performance objectives of DOE. 5820.2A III.3a requires records and documentation be kept for storage of low-level waste and permits the storage of waste until disposal by approved methods.	The treatment and storage of OU1 radioactive wastes, and the other pollutants or hazardous substances they contain, will be accomplished in a manner that complies with all applicable Federal, State and local environmental, safety, and health laws and regulations, and DOE requirements.	The treatment and storage of OU1 radioactive wastes, and the other pollutants or hazardous substances they contain, will be accomplished in a manner that complies with all applicable Federal, State, and local environmental, safety, and health law and regulations, and DOE requirements.	Operations Environmental Control Plan Section 6.0, 7.0; Operation & Maintenance Plan Sections 2.0, 3.0, 4.0, 5.0; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0; Performance Test Criteria 2.0

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TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		Substantive Air Permits - Dryer		
Permits to Install New Sources of Emissions OAC 3745-31-05(A)	The director shall issue a permit to install if he determines that the installation or modification and operation of an air contaminant source will: • Not prevent or interfere with the attainment or maintenance of applicable ambient air quality standards; • Not result in a violation of any applicable air pollution control laws; and • Employ best available technology to control emissions.	Permits to Install would be required for facilities such as a fueling station, rotary dryer, and gas furnace in absence of the CERCLA 121 (e) permitting exemption. These sources will be installed such that they do not interfere with the attainment or maintenance of any applicable air quality standards or cause a violation of applicable air control laws. BAT will be employed to control both point source and fugitive emissions associated with the project. BAT for particulate radionuclides emissions shall be HEPA Filtration with differential pressure gauge and low differential pressure alarm to be installed on the dryer off-gas system.	Permits to install would be required for the rotary dryer, natural gas furnace and fueling station(s), in the absence of the CERCLA 121(e) permitting exemption. These sources will be installed such that they do not interfere with the attainment or maintenance of any applicable air quality standards or cause a violation of applicable air control laws. BAT will be employed to control both point source; and fugitive emissions associated with the project. BAT for organic emission is a carbon filter or thermal oxidation. BAT for particulate radionuclides emissions shall be HEPA Filtration with differential pressure gauge and low differential pressure alarm to be installed on the rotary dryer off-gas system.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0

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TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Substantive Air Permits - Rotary Dryer				
Particulate Matter Standards OAC 3745-17-07	Visible particulate emissions from any stack may exceed twenty percent opacity, as a six minute average, for not more than six consecutive minutes in any sixty minutes, but shall not exceed sixty percent opacity, as a six minute average, at any time.	BAT shall mean that visible emissions of particulate shall not exceed zero (0%) percent opacity from the discharge stack of any control device associated with this source excluding water vapor.	Visible emissions of the particulate from the rotary dryer stack will not exceed 0 percent opacity through the use of HEPA filtration with differential pressure gauges and low differential pressure alarm. Fugitive dust emissions, primarily from excavation, hauling, and processing soils will be mitigated by the use of the following, as appropriate, when visible dust is present: - Water or other dust suppression chemicals - Periodic application of water or other suitable dust suppressing chemicals is required on all dirt or gravel roads, parking lots, or other surfaces that can cause fugitive emissions. - Maintaining roadways in clean conditions - Covering open bodied vehicles when transporting materials likely to become airborne. Reasonably available control measures shall include: use of water or other suitable dust suppression chemicals for the control of fugitive dust, conducting shredding and screening operations in a processing building, covering of open bodied vehicles when transporting materials likely to become airborne, appropriate maintenance of roadways and work areas to control dust and the visual monitoring for visible dust. For materials stored or exposed for extended periods, more stringent BAT controls will be applied, including application of PolyShell or other crusting agents, or by maintaining the waste surface in a moist condition thereby eliminating the potential for airborne emissions.	Operations Environmental Control Plan Section 5.0, 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.2.6

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TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		Substantive Air Permits - Rotary Dryer		
National Emission Standards for Hazardous Air Pollutants (NESHAP) - 40 CFR Part 61, Subpart H - Emissions of Radionuclides Other Than Radon From DOE Facilities 40 CFR 61.90 and 40 CFR 61.96(b) and 40 CFR 61.92 (DOE 5400.5) and 40 CFR 61.93(b)	An application for approval does not have to be filed for radionuclide sources if the effective dose equivalent caused by all emissions from the new construction or modification is less than 0.1 mrem per year. Radiological emissions (except radon-222 and radon-220) to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive an effective dose equivalent of 10 mrem in any one year. Continuous emission monitoring is required for stacks and vents that have the potential, under normal operating conditions, but without emission control release radionuclides in sufficient quantities to cause any member of the general public to receive an effective dose equivalent of 0.1 mrem/year or greater.	HEPA filtration is BAT for radionuclide emissions and shall be installed to minimize radiological emissions to the ambient air and the contribution to the effective dose equivalent to any member of the public from the dryer stack. If determined to be necessary, based on modeling of radionuclide emissions to the site boundary, a continuous stack monitor shall be operated when radionuclide emissions are exhausted through the stack. The monitoring system shall have an isokinetic sampler designed and built in accordance with 40 CFR 61.93. The sampler shall include a radiation monitor with a high radiation alarm.	HEPA filtration is BAT for radionuclide emissions and shall be installed to minimize radiological emissions to the ambient air and the contribution to the effective dose equivalent to any member of the public from the rotary dryer stack. Radon emission from the rotary dryer or other point sources will meet a stack limit based on a maximum allowable off-site impact of 0.5 pCi/L annual average above background. Air emissions data and design assumptions will be provided to FDF for incorporation into the site-wide air model for calculation of stack limits. An independent performance test firm shall be retained to verify BAT is being met for emissions. To confirm operation of the CEM, sampling will be done during the performance test using Method 114. The monitoring system shall have an isokinetic sampler design and built in accordance with 40 CFR 61.93. The sampler shall include a radiation monitor with a high radiation alarm. A continuous air monitoring system will be provided to monitor the rotary dryer process off-gas downstream of the HEPA filters. The continuous air monitoring system will have the capability to discriminate radon.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0

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TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		Substantive Air Permits - Rotary Dryer		
Radon Emissions 40 CFR 192, Subpart A	Radon emissions from the dryer or other point sources shall meet a stack limit based on a maximum allowable off-site impact of 0.5 pCi/l annual average for each point source. This limit is based on 40 CFR 192, Subpart A. Although this limit is not directly applicable to point sources, applying to the impact from restored sites and not sites under remediation, it is being identified as a relevant and appropriate limit. To calculate the stack limit for a point source, EPA-approved dispersion modeling shall be used.		Radon emissions from the rotary dryer or other point sources shall meet stack limits based on a maximum allowable off-site impact of 0.5 pCi/L annual average above background. Design data shall be provided to FDF for determination of the emissions limit using the FEMP site-wide model. A continuous air monitoring system will be provided to monitor the rotary dryer process off-gas downstream of the HEPA filters. The continuous air monitoring system will have the capability to discriminate radon.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
Ohio EPA Air Toxics Policy	The current PTI regulations provide the Director of Ohio EPA with a mechanism to require the evaluation of toxic air contaminants from new sources. The Ohio EPA Air Toxics Policy provides a mechanism for calculating the Maximum Acceptable Ground-Level Concentration (MAGLC) for a toxic substance. This value at the site boundary will be modeled to the stack to determine a stack limit. All toxic compounds that will exceed the stack limit shall be controlled administratively or by BAT to lower emissions to below the calculated stack limit.	For toxic compound emissions that were calculated to exceed the established stack limit, administrative controls shall be implemented or emissions shall be controlled by implementing BAT for toxic emissions. BAT for toxic emissions shall be throughput/materials restrictions or carbon beds for organic, caustic scrubbers for acidic fumes, or condenser for organic and acidic fumes. Performance of these control measures will be verified through performance testing during initial operation.	Administrative controls will be implemented or emissions will be controlled by implementing BAT for toxic emissions that are calculated to exceed stack limits. BAT for toxic emissions will be throughput/materials restriction, carbon beds, or thermal oxidation for organic vapors, caustic addition for acidic fumes, and condensation for organic and acidic fumes. Performance of these control measures will be verified through performance testing during initial operation.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
Air Emission Standards for Process Vents 40 CFR 264.1030-264.1036	No regulations have been promulgated for process vents associated with thermal drying, however, 40 CFR 264.1030-1036 will be relevant and appropriate but not applicable to air emission standards for process vents associated with thermal drying.	To control organic emissions, BAT shall be implemented. BAT for organic emissions shall be either carbon beds or condensers or administrative controls.	Pressure relief disks or panels will be used on the process equipment as there is a potential for combustible atmospheres to exist during upset conditions. Inert gas blanketing will be used to minimize the potential for the development of combustible atmospheres. BAT for organic emissions will be condensation followed by carbon beds or thermal oxidation.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0

TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		Substantive Air Permits - Rotary Dryer		
Radon Emissions 40 CFR 192, Subpart A	Radon emissions from the dryer or other point sources shall meet a stack limit based on a maximum allowable off-site impact of 0.5 pCi/l annual average for each point source. This limit is based on 40 CFR 192, Subpart A. Although this limit is not directly applicable to point sources, applying to the impact from restored sites and not sites under remediation, it is being identified as a relevant and appropriate limit. To calculate the stack limit for a point source, EPA-approved dispersion modeling shall be used.		Radon emissions from the rotary dryer or other point sources shall meet stack limits based on a maximum allowable off-site impact of 0.5 pCi/L annual average above background. Design data shall be provided to FDF for determination of the emissions limit using the FEMP site-wide model. A continuous air monitoring system will be provided to monitor the rotary dryer process off-gas downstream of the HEPA filters. The continuous air monitoring system will have the capability to discriminate radon.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
Ohio EPA Air Toxics Policy	The current PTI regulations provide the Director of Ohio EPA with a mechanism to require the evaluation of toxic air contaminants from new sources. The Ohio EPA Air Toxics Policy provides a mechanism for calculating the Maximum Acceptable Ground-Level Concentration (MAGLC) for a toxic substance. This value at the site boundary will be modeled to the stack to determine a stack limit. All toxic compounds that will exceed the stack limit shall be controlled administratively or by BAT to lower emissions to below the calculated stack limit.	For toxic compound emissions that were calculated to exceed the established stack limit, administrative controls shall be implemented or emissions shall be controlled by implementing BAT for toxic emissions. BAT for toxic emissions shall be throughput/materials restrictions or carbon beds for organic, caustic scrubbers for acidic fumes, or condenser for organic and acidic fumes. Performance of these control measures will be verified through performance testing during initial operation.	Administrative controls will be implemented or emissions will be controlled by implementing BAT for toxic emissions that are calculated to exceed stack limits. BAT for toxic emissions will be throughput/materials restriction, carbon beds, or thermal oxidation for organic vapors, caustic addition for acidic fumes, and condensation for organic and acidic fumes. Performance of these control measures will be verified through performance testing during initial operation.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
Air Emission Standards for Process Vents 40 CFR 264.1030-264.1036	No regulations have been promulgated for process vents associated with thermal drying, however, 40 CFR 264.1030-1036 will be relevant and appropriate but not applicable to air emission standards for process vents associated with thermal drying.	To control organic emissions, BAT shall be implemented. BAT for organic emissions shall be either carbon beds or condensers or administrative controls.	Pressure relief disks or panels will be used on the process equipment as there is a potential for combustible atmospheres to exist during upset conditions. Inert gas blanketing will be used to minimize the potential for the development of combustible atmospheres. BAT for organic emissions will be condensation followed by carbon beds or thermal oxidation.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0

TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		Substantive Air Permits - Rotary Dryer		
Air Quality Standards 40 CFR 60.670 Subpart OOO	Stack emissions from affected facilities shall not: contain particulate matter in excess of 0.05 g/dscm; or exhibit greater than 7 percent opacity, unless the stack emissions are discharged from an affected facility using a wet scrubbing control device. These standards are relevant and appropriate since shredder and conveyor systems were identified in the Operable Unit 1 FS.	Shredder and conveyor systems will be enclosed with dust suppression system to meet this requirement. BAT for particulate radionuclides emissions shall be HEPA Filtration with differential pressure gauge and low differential pressure alarm to be installed on the dryer off-gas system.	Conveyor systems installed outdoors will be covered type with water spray dust suppression system to control airborne dust at the outfeed. Shredder and conveyor systems installed inside buildings need not be covered and will have water spray dust suppression systems to control airborne dust at the outfeed. A wet scrubbing system has been utilized. BAT for particulate radionuclides emissions shall be HEPA Filtration with differential pressure gauge and low differential pressure alarm to be installed on the rotary dryer off-gas system.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
Air Quality Standards OAC 3745-21-07(G)(2)	Emissions of photochemical reactive material from processes, including drying, not to exceed 40 lbs/day, with a peak of 8 lbs/hour.	BAT shall be implemented to control organic emissions. BAT for organic emissions shall be either administrative controls or installing carbon beds or a condenser.	BAT shall be implemented to control organic emissions. BAT for organic emissions on the rotary dryer shall be vapor condensation combined with carbon beds or thermal oxidation. BAT for other processes shall be application of administrative controls.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
Air Quality Standards OAC 3745-21-02(C) and OAC 3745-21-03(D)	This requirement covers ambient air quality standards, guidelines, and methods of ambient air quality measurements for non-methane hydrocarbons. Mean ambient concentration of non-methane hydrocarbons not to exceed 160 micrograms/cubic meters (0.24 ppm as carbon) between 6 and 9 a.m.; methods for determining ambient concentration of non-methane hydrocarbons.	During drying, hydrocarbon soil contaminants may be evolved with the steam. An uncontrolled release could lead to a violation of this standard. BAT shall be implemented to control non-methane hydrocarbon emissions. BAT to reduce non-methane hydrocarbon emissions shall be either administrative controls or installing carbon beds or a condenser. Compliance to this standard shall be demonstrated using EPA-approved air modeling.	BAT shall be implemented to control organic emissions. BAT for organic emissions on the rotary dryer shall be vapor condensation combined with carbon beds or thermal oxidation. BAT for other processes shall be application of administrative controls. Compliance to this standard shall be demonstrated using the FEMP site-wide air model based upon design assumptions and data from the performance test.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
General Provisions on Air Pollution Control OAC 3745-15-07(A)	Emission of any substance into the air in such a manner or in such amounts as to endanger the health, safety or welfare of the public, or cause unreasonable injury or damage to property, is hereby found and declared a public nuisance. It shall be unlawful for any person to cause, permit, or maintain any such public nuisance.	Potential emissions from the dryer shall be evaluated during the design phase. Emissions shall be controlled using BAT either administratively or installing BAT control equipment.	Potential emissions from the rotary dryer will be evaluated during the design phase. Using the FDF site-wide dispersion model emissions will be controlled using BAT either administratively and/or installing BAT control equipment. Fugitive emissions will be controlled using BAT. See OAC 3745-17-07(B) and OAC 3745-17-8(B).	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0

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TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		Substantive Air Permits - Rotary Dryer		
Air Quality Standards 40 CFR 60.670 Subpart OOO	Stack emissions from affected facilities shall not: contain particulate matter in excess of 0.05 g/dscm; or exhibit greater than 7 percent opacity, unless the stack emissions are discharged from an affected facility using a wet scrubbing control device. These standards are relevant and appropriate since shredder and conveyor systems were identified in the Operable Unit 1 FS.	Shredder and conveyor systems will be enclosed with dust suppression system to meet this requirement. BAT for particulate radionuclides emissions shall be HEPA Filtration with differential pressure gauge and low differential pressure alarm to be installed on the dryer off-gas system.	Conveyor systems installed outdoors will be covered type with water spray dust suppression system to control airborne dust at the outfeed. Shredder and conveyor systems installed inside buildings need not be covered and will have water spray dust suppression systems to control airborne dust at the outfeed. A wet scrubbing system has been utilized. BAT for particulate radionuclides emissions shall be HEPA Filtration with differential pressure gauge and low differential pressure alarm to be installed on the rotary dryer off-gas system.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
Air Quality Standards OAC 3745-21-07(G)(2)	Emissions of photochemical reactive material from processes, including drying, not to exceed 40 lbs/day, with a peak of 8 lbs/hour.	BAT shall be implemented to control organic emissions. BAT for organic emissions shall be either administrative controls or installing carbon beds or a condenser.	BAT shall be implemented to control organic emissions. BAT for organic emissions on the rotary dryer shall be vapor condensation combined with carbon beds or thermal oxidation. BAT for other processes shall be application of administrative controls.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
Air Quality Standards OAC 3745-21-02(C) and OAC 3745-21-03(D)	This requirement covers ambient air quality standards, guidelines, and methods of ambient air quality measurements for non-methane hydrocarbons. Mean ambient concentration of non-methane hydrocarbons not to exceed 160 micrograms/cubic meters (0.24 ppm as carbon) between 6 and 9 a.m.; methods for determining ambient concentration of non-methane hydrocarbons.	During drying, hydrocarbon soil contaminants may be evolved with the steam. An uncontrolled release could lead to a violation of this standard. BAT shall be implemented to control non-methane hydrocarbon emissions. BAT to reduce non-methane hydrocarbon emissions shall be either administrative controls or installing carbon beds or a condenser. Compliance to this standard shall be demonstrated using EPA-approved air modeling.	BAT shall be implemented to control organic emissions. BAT for organic emissions on the rotary dryer shall be vapor condensation combined with carbon beds or thermal oxidation. BAT for other processes shall be application of administrative controls. Compliance to this standard shall be demonstrated using the FEMP site-wide air model based upon design assumptions and data from the performance test.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
General Provisions on Air Pollution Control OAC 3745-15-07(A)	Emission of any substance into the air in such a manner or in such amounts as to endanger the health, safety or welfare of the public, or cause unreasonable injury or damage to property, is hereby found and declared a public nuisance. It shall be unlawful for any person to cause, permit, or maintain any such public nuisance.	Potential emissions from the dryer shall be evaluated during the design phase. Emissions shall be controlled using BAT either administratively or installing BAT control equipment.	Potential emissions from the rotary dryer will be evaluated during the design phase. Using the FDF site-wide dispersion model emissions will be controlled using BAT either administratively and/or installing BAT control equipment. Fugitive emissions will be controlled using BAT. See OAC 3745-17-07(B) and OAC 3745-17-8(B).	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0

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TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Nitrogen Oxide Standards OAC 3745-23-06(B)	Except as otherwise provided in these regulations, all stationary nitrogen oxide emission sources shall minimize nitrogen oxide emission by use of the latest available control techniques and operating practices in accordance with best current technology.	To minimize nitrogen oxide emissions, the dryer shall be equipped with low NOx burners which is considered BAT for gas-fired burners.	To minimize nitrogen oxide emissions the rotary dryer will be equipped with low NOx burners which is considered BAT for gas burners.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.3, 2.4; Sampling and Analysis Plan 1.2.4, 2.3; Performance Test Criteria 2.0
Excavated Working Materials - Materials Being Excavated, Transported, Stored, or Blended				
Permits to Install New Sources of Emissions OAC 3745-31-05(A)	The director shall issue a permit to install if he determines that the installation or modification and operation of an air contaminant source will: · Not prevent or interfere with the attainment or maintenance of applicable ambient air quality standards; • Not result in a violation of any applicable air pollution control laws; and • Employ best available technology to control emissions.	Permits to Install would be required for facilities such as a fueling station, rotary dryer, and gas furnace in absence of the CERCLA 121 (e) permitting exemption. These sources will be installed such that they do not interfere with the attainment or maintenance of any applicable air quality standards or cause a violation of applicable air control laws. BAT will be employed to control both point source and fugitive emissions associated with the project.	Permits to install would be required for the rotary dryer, natural gas furnace and fueling station(s), in the absence of the CERCLA 121(e) permitting exemption. Sources will be installed such that they do not interfere with the attainment or maintenance of any applicable air quality standards or cause a violation of applicable air control laws. BAT will be employed to control both point source and fugitive emissions associated with the project.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
Radon Emissions	Radon emissions from excavated working materials are intermittent fugitive sources and will be controlled by implementing BAT with no numerical emission rate limit. This policy is described in greater detail in Section J.4.2.2.3 of this Attachment.	BAT control for radon emissions from excavated working materials can be, but is not limited to, applying water or a dust suppressant over the residues, or work practices to minimize handling, disturbances or time exposed. For storage piles that will be stored for an extended period of time, more stringent BAT controls shall be implemented such as applying tarps or building a ventilated temporary structure with controls such as carbon beds.	BAT control for radon emissions from excavated working materials shall include, but not be limited to, applying water or a dust suppressant over the residues, or work practices to minimize handling, disturbances, or time exposed. For storage piles needed for an extended period of time, more stringent BAT controls shall be implemented such as applying polyshell or equal.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0
General Provisions on Air Pollution Control OAC 3745-15-07 (A)	Emission of any substance into the air in such a manner or in such amounts as to endanger the health, safety or welfare of the public, or cause unreasonable injury or damage to property, is hereby found and declared a public nuisance. It shall be unlawful for any person to cause, permit, or maintain any such public nuisance.	Fugitive emissions shall be controlled using BAT. See OAC 3745-17-07(B) and OAC 3745-17-8 (B).	Fugitive emissions shall be controlled using BAT including, as is deemed necessary, the application PolyShell, a plastic and fly ash mixture, or equivalent material, to exposed pit surfaces to control dust and erosion and to minimize water run-on. Water or other dust suppressants will be applied as deemed necessary during operations.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0

TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Excavated Working Materials - Materials Being Excavated, Transported, Stored, or Blended				
Particulate Matter Standards OAC 3745-17-07(B) and OAC 3745-17-8 (B) 1730	Visible particulate emissions from any fugitive dust source shall not exceed twenty percent opacity as a three-minute average except: a) There shall be no visible particulate emissions from any paved roadway or parking area except for a period of time not to exceed six minutes during any sixty-minute observation period. b) There shall be no visible particulate emissions from any unpaved roadway or parking area except for a period of time not to exceed thirteen minutes during any sixty-minute observation period. c) There shall be no visible particulate emissions from any material storage piles except for a period of time not to exceed thirteen minutes during any sixty-minute observation period.	No person shall cause or permit any fugitive dust source to be operated; or any materials to be handled, transported, or stored; or a building or its appurtenances or a road to be used, without taking or installing reasonably available control measures to prevent fugitive dust from becoming airborne. Such reasonably available control measures shall include, but not limited to, one or more of the following which are appropriate to minimize or eliminate visible particulate emissions of fugitive dust: 1) The use of water or other suitable dust suppression chemicals for the control of fugitive dust from demolition of existing buildings or structures, constructions operations, the grading of roads or clearing land; 2) The periodic application of asphalt, water, or other suitable dust suppression chemicals on dirt or gravel roads and parking lots, and other surfaces which can cause emissions of fugitive dust; suitable coverings; 3) The periodic application of water or other suitable dust suppression chemicals, the installation of storage silos, bins, or other enclosed structures, or the use of canvas or other suitable coverings, for all materials stockpiles and stockpiling operations; 4) The covering, at all times, of open bodied vehicles when transporting materials likely to become airborne; 5) The paving of roadways and the maintaining of roadways in a clean condition. Fugitive sources can also be controlled through work practices such as minimize handling, disturbances, or time exposed to the residues. Note 1: The presence of visible dust indicates the need for implementation of the above, as applicable. Note 2: For contingency materials that will be stored for an extended period of time, more stringent BAT controls shall be implemented such as applying tarps or building a ventilated temporary structure with BAT controls such as HEPA filtration.	Fugitive dust emissions, primarily from excavation, hauling, and processing soils will be mitigated by the use of the following, as appropriate, when visible dust is present: - Water or other dust suppression chemicals - Periodic application of water, or other suitable dust suppressing chemicals as required on all dirt or gravel roads, parking lots, or other surfaces that can cause fugitive emissions. - Maintaining roadways in clean conditions - Providing a structure for the waste feed and treated material storage areas with a passive ventilation system. - Covering at all times open bodied vehicles when transporting materials likely to become airborne. Reasonably available control measures shall include, as is deemed necessary, the following: use of water or other suitable dust suppression chemicals for the control of fugitive dust, providing a structure for the shredding and screening operations, covering of open bodied vehicles when transporting materials likely to become airborne, appropriate maintenance of roadways and work areas to control dust and the visual monitoring for visible dust. For materials stored or exposed for extended periods, more stringent BAT controls will be applied, including application of PolyShell or equal. * It should be noted that this ARAR was identified in the OU1 ROD, and the discussion of the requirements of this ARAR is correctly represented in this table. However, it should also be noted that the project will comply with the Ohio EPA approved FEMP Site Wide Dust Control Policy.	Operations Environmental Control Plan Section 5.0, 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0 000148

TABLE 7-2a. SUBSTANTIVE PERMITTING REQUIREMENTS FOR AIR CONTAMINANT SOURCES (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		Waste Pits		
National Emission standards for Air Pollutants (NESHAP) - 40 CFR 61, Subpart Q - Emissions of Radon From Department of Energy Facilities	No source at a DOE facility shall emit more than 20 pCi/m^2/sec of radon-222 as an average for the entire source, into the air. Source means any building, structure, pile, impoundment or area used for interim storage or disposal that is or contains waste material containing radium in sufficient concentration to emit radon-222 in excess of this standard prior to remedial action.		BAT control for radon emissions from the waste pits will include, but is not limited to, applying water or dust suppressant over the residues, or work practices to minimize handling, disturbances or time exposed.	Operations Environmental Control Plan Section 6.0; Operation & Maintenance Plan Sections 2.4, 3.3.1; Sampling and Analysis Plan 1.2.4, 2.3, 2.4; Performance Test Criteria 2.0

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TABLE 7-2b. NPDES PERMITTING REQUIREMENTS

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		Ohio EPA Permit No. 1IO00004*ED		
Ohio EPA NPDES Permit No. 1IO00004*ED	Wastewater discharges associate with the Operable Unit 1 remedial action must be treated to ensure compliance with the terms and conditions of the FEMP NPDES permit. DOE is required to notify Ohio EPA of any activities or changes at the site which have the potential to significantly alter the character of the wastewater streams being discharged under its existing NPDES permit. A NPDES permit modification is required if the discharge is deemed significant enough to cause a change in the character of the wastewater stream. The existing NPDES permit must also be modified to reflect the addition on any new point source discharges of process wastewaters or storm waters. Construction related storm water runoff must be managed in accordance with the requirements of the existing FEMP NPDES permit and Stormwater Pollution Prevention Plan.	Wastewater discharges associated with the Operable Unit 1 remedial action will be treated to ensure compliance with NPDES permit requirements. The existing NPDES permit will be modified and/or renewed to reflect process wastewater discharges and to incorporate the addition of the new industrial storm water outfall to Paddy's Run Creek. Construction related storm water runoff will continue to be managed in accordance with the requirements of the existing FEMP NPDES permit and Stormwater Pollution Prevention Plan.	Wastewater discharges associated with the OU1 remedial action will be treated to ensure compliance with the NPDES permit requirements. IT will provide FDF with the data necessary to modify the existing NPDES permit to reflect process wastewater discharges and any changes to storm water outfalls to Paddy's Run Creek. Construction related storm water run-off will continue to be managed in accordance with the requirements of the existing FEMP NPDES permit and Stormwater Pollution Prevention Plan.	Operations Environmental Control Plan Section 7.0; Operation & Maintenance Plan Sections 2.6, 3.3.11; Sampling and Analysis Plan Sections 1.2.2,1.2.3,2.2; Storm Water / Wastewater Management Plan Sections 3.0, 4.0, 5.0

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TABLE 7-2c. RCRA SUBSTANTIVE PERMITTING REQUIREMENTS

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		RCRA Substantive Permitting Requirements		
Hazardous Waste Determinations 40 CFR 262.11 (OAC 3745-52-11)	Generators of wastes must determine whether or not these wastes are hazardous in accordance with the requirements of this rule.	Excavation, size reduction, homogenization, blending, and drying of pit wastes will result in the production of a single waste stream that will subsequently be shipped off-site by railcar for disposal at a commercially permit disposal facility. Representative samples from each railcar will be sampled to ensure they meet regulatory and disposal facility waste acceptance criteria. As documented in the Operable Unit 1 FS/PP and ROD, this waste stream does not contain RCRA listed wastes and therefore, samples will be analyzed for RCRA characteristics only in accordance with the requirements of 40 CFR 262.11 and OAC 3745-52-11. If analytical results indicate the waste exhibits RCRA hazardous characteristics, the material will be staged and packaged by the subcontractor for turn-over to Fluor Daniel Fernald, Inc. who in turn will perform any additional characterization, packaging, etc. necessary for shipment and disposal as hazardous waste.	Representative samples of waste material will be collected and analyzed prior to railcar loadout to ensure compliance with the CDF WAC. Details of waste sampling activities will be given in the Sampling and Analysis Plan.	Operation & Maintenance Plan Sections 2.1, 3.2, 5.0; Sampling and Analysis Plan 1.2.1, 2.1;
Preparing and Transporting Hazardous Waste Off-site. 40 CFR 262.20 through 262.33 and 40 CFR 263.20 (OAC 3745-52-20 through 33 and OAC 3745-52-40 and OAC 3745-52-42)	Any generator who transports hazardous waste for off-site treatment, storage, or disposal must originate and follow-up the manifest for off-site shipments. Pre-transporting requirements include appropriate packaging, labeling, marking, and placarding.	If analytical results indicate the waste exhibits RCRA hazardous characteristics, the material will be staged and packaged by the subcontractor for turn-over to Fluor Daniel Fernald, Inc. who in turn will perform any additional characterization, packaging, etc. necessary for shipment to a permitted commercial disposal facility for treatment and disposal as hazardous waste in accordance with the provisions of these regulations.	Hazardous waste, if encountered, will be turned over to FDF for handling and disposition.	Operation & Maintenance Plan Sections 2.1, 2.5, 2.7, 5.0

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TABLE 7-2c. RCRA SUBSTANTIVE PERMITTING REQUIREMENTS (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
RCRA Substantive Permitting Requirements				
Closure 40 CFR 264, Subpart G (OAC 3745-55-11 through 16) 1730	Owner and/or operators must close facilities in a manner that: • Minimizes the need for further maintenance • Minimizes post-closure escape of hazardous constituents • Complies with specific unit type closure requirements	Hazardous waste management units located within the Operable Unit 1 boundary will be closed in accordance with the substantive provisions of these requirements during the Operable Unit 1 remedial process. As documented in the Director's Final Findings and Orders between DOE and Ohio EPA, demonstration of compliance with substantive closure and post-closure requirements for hazardous waste management units will be documented in the various remedial design and remedial action documents developed for this project.	Hazardous waste management units located within the OU1 boundary will be closed in accordance with the substantive provisions of these requirements during the OU1 remedial process. As documented in the Director's Final Findings and Orders between DOE and Ohio EPA, demonstration of compliance with substantive closure and post-closure requirements for hazardous waste management units will be documented in the various remedial design and remedial action documents developed for this project	N/A 000152
Post-Closure 40 CFR 264 Subpart G 40 CFR 264.117 and 40 CFR 264.119 (OAC 3745-55-17 and OAC 3745-55-19)	Post-closure care and use of property for a period as necessary to protect human health and the environment including: • Access controls • Monitoring Post-closure notices must include deed notation/use restriction.	Post-closure care will be provided in accordance with the substantive provisions of these requirements during the Operable Unit 1 remedial process. As documented in the Director's Final Findings and Orders between DOE and Ohio EPA, demonstration of compliance with substantive closure and post-closure requirements for hazardous waste management units will be documented in the various remedial design and remedial action documents developed for this project.	Post-closure care will be provided in accordance with the substantive provisions of these requirements during the OU1 remedial process. As documented in the Director's Final Findings and Orders between DOE and the Ohio EPA, demonstration of compliance with substantive closure and post-closure requirements for hazardous waste management units will be documented in the various remedial design and remedial action documents developed for this project.	N/A

TABLE 7-2c. RCRA SUBSTANTIVE PERMITTING REQUIREMENTS (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
		RCRA Substantive Permitting Requirements		
Waste Piles OAC 3745-56-51, 54, and 58	These requirements specify design and operating requirements, monitoring, and inspection, closure and post-closure care. Specific substantive requirements include: • Run-on/run-off control systems must be designed and installed to prevent flow onto or runoff from the active pile during peak flows from a 25-year, 24-hour storm event. • Collection and hold facilities associated with run-on/run-off control systems must be emptied after storms. • Piles must be covered or otherwise managed to prevent wind dispersion. • Waste piles must be inspected weekly and after storms to ensure the integrity of run-on and run-off controls. • At closure, owners must remove or decontaminate all waste residues, contaminated system components, contaminated subsoils and structures, and equipment contaminated with waste and leachate, and manage as hazardous waste.	Waste piles generated during the course of the project will be managed in accordance with the substantive provisions of these requirements. Upon completion of remedial activities, the processing facility will be remediated to remove all processing facilities and residual contamination consistent with established remedial levels.	Outdoor stockpiles will be utilized during the pre-operational phase of the project. Stockpile Run-on/run-off controls will be designed and installed in compliance with the requirements of the FDF Stormwater Pollution Prevention Plan (SWPPP). No outdoor waste stockpiles, outside of the waste pit area, are anticipated during the operation of the facility. During facility operation, waste stockpiles will be located inside the facility buildings. Buildings will have roofs, partial side walls, perimeter curbs, floor sumps, and areas sloped to manage drainage. These building features will control runon/runoff for the indoor stockpiles. Stockpile run-on/run-off collection and hold facilities will be managed in compliance with the requirements of the SWPPP. Indoor stockpiles will managed to prevent wind dispersion using building structures with roof and partial side walls. Outdoor stockpiles, if any, will be managed to prevent wind dispersion using applicable covers or by application of dust suppressants. Routine inspections of OU1 Stockpiles will be performed at least weekly and documented throughout the OU1 remedial activities. Stockpiles inside the facility buildings will be visually monitored by the personnel working in the buildings and/or remotely by video camera. At closure, the facility will be decontaminated and dismantled per the D&D Implementation Plan in accordance with the Director's Final Findings and Orders between DOE and the Ohio EPA.	RA Documents: Operations Environmental Control Plan Section 4.0, 7.0; Operation & Maintenance Plan Sections 2.1, 2.5, 2.7, 3.3.13; Storm Water / Wastewater Management Plan 3.0, 5.7 Other Documents: D&D Implementation Plan.

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TABLE 7-2d. CWA SECTION 404 AND 401 SUBSTANTIVE WETLAND PERMITTING REQUIREMENTS

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Nationwide Permit 26 - Substantive Permitting Requirements				
Nationwide Permits 33 CFR Part 330, Appendix A	Discharges of dredged and fill material associated with the Operable Unit 1 remedial action shall not exceed 10 acres or more of total disturbance.	Discharges of dredged or fill material associated with the Operable Unit 1 remedial action total approximately 4.96 acres.	N/A	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	No activity may cause more than a minimal adverse effect on navigation.	Discharges will be conducted within isolated and headwater wetlands and therefore, will have no adverse impacts on navigation.	N/A	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.	Fill material will be maintained and stabilized upon completion of remedial activities. Public access to the Operable Unit 1 area of the site is restricted to site personnel, via the existing site security system.	N/A	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	Appropriate erosion control and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil or other fills must be permanently stabilized at the earliest practicable date.	Appropriate erosion control and siltation devices will be installed and maintained to minimize solids loadings to wetlands and Paddys Run. Erosion and siltation control devices will be design in accordance with the applicable requirements of USDA's Water Management and Sedimentation Control Manual for Urbanizing Areas and the provisions of the current FEMP Stormwater Pollution Prevention Plan.	Appropriate erosion control and siltation devices will be installed per the provisions of the current FEMP Stormwater Pollution Prevention Plan and ODNR Rainwater and Land Development guidance.	Operations Environmental Control Plan Section 4.0, 7.3, 7.4; Storm Water / Wastewater Management Plan 6.0
Nationwide Permits 33 CFR Part 330, Appendix A	No activity may substantially disrupt the movement of those species of aquatic life indigenous to the water body, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.	Discharges of dredge and fill material will be conducted with headwater and isolated wetland systems and therefore, will not substantially disrupt the movement of any indigenous aquatic species.	N/A	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	Heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance.	Appropriate measures will be taken to ensure impacts from heavy equipment operating in wetlands outside of the subcontractor's work area will be avoided or minimized to the maximum extent practicable.	Mats or other appropriate measures will be utilized to minimize soil disturbance due to heavy equipment operation in wetlands areas.	Operations and Maintenance Plan Section 1.2.
Nationwide Permits 33 CFR Part 330, Appendix A	No activity is authorized under any Nationwide Permit which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified in the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species.	No known federally listed or proposed threatened or endangered species will be impacted by dredge and fill activities conducted in support of the Operable Unit 1 remedial action.	N/A	N/A

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TABLE 7-2d. CWA SECTION 404 AND 401 SUBSTANTIVE WETLAND PERMITTING REQUIREMENTS (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Nationwide Permit 26 - Substantive Permitting Requirements				
Nationwide Permits 33 CFR Part 330, Appendix A	No activity which may adversely affect historic properties listed, or eligible for listing, in the National Register of Historic properties is authorized.	No known listed or potential eligible historic properties will be impacted by the Operable Unit 1 remedial action.	N/A	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	A wetland delineation is required to define the areal extent of impacts to wetland areas. Wetland delineations must be prepared in accordance with the current method required by the ACOE.	A site-wide jurisdictional wetland delineation was conducted using the ACOE 1987 Wetland Delineation manual and was subsequently approved by the ACOE in 1993. This delineation has served as the basis for defining wetland impacts associated with remedial activities at the FEMP site.	N/A	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.	No known public water supply intake structures existing within a 1000 foot radius of proposed Operable Unit 1 discharges.	N/A	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	No discharge of dredged or fill material may consist of unsuitable material (e.g. trash, debris, car bodies, etc.) and material discharged must be free from toxic pollutants in toxic amount (see section 307 of the Clean Water Act).	Fill material associated with Operable Unit 1 fill activities will consist of suitable material. Clean backfill will be used during stabilization of the Operable Unit 1 area upon completion of remedial activities.	Imported construction fill material, if required, will be obtained from FDF approved sources.	Operations and Maintenance Plan Section 1.2.
Nationwide Permits 33 CFR Part 330, Appendix A	Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site. A compensatory mitigation plan defining the manner in which adverse impacts will be compensated for may be required.	Although DOE has avoided and minimized impacts to wetlands and waters of the United States through the remedial design process, approximately 4.96 acres of unavoidable adverse wetland impacts will be associated with the Operable Unit 1 remedial action. Impacts to these areas will be mitigated at a 1 to 1.5 acre ration in accordance with the Site-wide Wetland Mitigation Plan currently being prepared under the Operable Unit 5 Remedial Design process.	Approximately 4.96 acres of unavoidable adverse wetland impacts will be associated with the OU1 remedial action. Impacts to these areas will be mitigated at a 1 to 1.5 acre ratio in accordance with the Site-wide Wetland Mitigation Plan currently being prepared under the OU5 Remedial Design process.	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of waters unless the primary purpose of the fill is to impound waters.	Fluor Daniel Fernald, Inc. has determined that discharges associated with the Operable Unit 1 remedial action will not adversely affect normal or anticipated high flows within those drainage basins which are contained within the Operable Unit 1 boundary.	N/A	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	If the discharge creates an impoundment of water, adverse impact on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.	Fluor Daniel Fernald, Inc. has determined that discharges of dredged or fill material associated with the Operable Unit 1 remedial action will not result in the impoundment of water within wetland areas located within the Operable Unit 1 boundary.	N/A	N/A

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TABLE 7-2d. CWA SECTION 404 AND 401 SUBSTANTIVE WETLAND PERMITTING REQUIREMENTS (CONTINUED)

Citation	Substantive Permitting Requirements	Requirements Assessment	Compliance Strategy	Index to Design
Nationwide Permit 26 - Substantive Permitting Requirements				
Nationwide Permits 33 CFR Part 330, Appendix A	Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.	Fluor Daniel Fernald, Inc. has determined that proposed discharges of dredge and fill material will not occur with migratory waterfowl breeding areas.	N/A	N/A
Nationwide Permits 33 CFR Part 330, Appendix A	Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.	Temporary fills will be removed upon completion of remedial activities and the Operable Unit 1 will be stabilized in accordance with the requirements of the grading plan prepared as part of this design package.	N/A	N/A
Section 401 State Water Quality Certification - Substantive Permitting Requirements				
Section 401 Water Quality Certifications OAC 3745-32	Discharges of dredged or fill material are limited to a total disturbance of five (5) acres or less.	While Nationwide Permit 26 allows for a maximum disturbance of 10 acres, Ohio EPA has restricted the total allowable acreage authorized under the Nationwide Permit to 5 acres under its corresponding Section 401 State Water Quality Certification. The Operable Unit 1 remedial action will result in a total impact of 4.96 acres and therefore, this impact is in compliance with this substantive requirement.	While Nationwide Permit 26 allows for a maximum disturbance of 10 acres, Ohio EPA has restricted the total allowable acreage authorized under the Nationwide Permit to 5 acres under its corresponding Section 401 State Water Quality Certification. The OU1 remedial action will result in a total impact of 4.96 acres and therefore, this impact is in compliance with this substantive requirement.	Operation & Maintenance Plan Sections 2.1, 3.2
	Discharges of dredged or fill material are precluded from occurring in special aquatic sites such as bogs and fens.	The wetland systems located within the Operable Unit 1 boundary do not meet the technical definition of bogs or fens as established in the 401 State Water Quality Certification.	N/A	N/A

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Appendix IV
O&M Plan for Existing Facilities

O&M Plan for Existing Facilities document previously submitted in Volume 3 of 3 of the Remedial Design (RD) Package

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Waste Pits Remedial Action Project (WPRAP) OPERATION AND MAINTENANCE PLAN FOR EXISTING FACILITIES

***

PREPARED
for
Fluor Daniel Fernald, Inc.
Fernald, Ohio

FDF Subcontract No. 98SC000001

***

PREPARED
by
IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 773481

***

Revision No.: 0
Issue Date: August 25,1998

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Record of Issue/Revisions

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Date	Rev. No.	Description of Revision
01/09/98	A	Original Issue of Draft
02/13/98	B	Draft Issue for EPA Review
03/27/98	C	Draft Issue for FDF Review
N/A	D	Not Issued
6/5/98	E	Draft Issue for EPA Review
8/25/98	0	Final

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Appendix	Title
A	Fluor Daniel Fernald, Inc. Procedure EW-1015, Inspection of Hazardous Waste Management Units
B	S&WP Division Procedure 43-C-601, Inspection/Operation of Surface Impoundments
C	S&WP Division Procedure 43-C-412, Management of Water Cover for Waste Pit No. 6
D	S&WP Division Procedure 43-C-340, K-65 Area Operator Round Sheet, Page 12 of 13.

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List of Acronyms/Abbreviations

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AASHTO	American Association of State Highway Transportation Officials
ABMA	American Bearing Manufacturers Association
ACGIH	American Conference of Government Industrial Hygienists
ACI	American Concrete Institute
ACM	Asbestos Containing Material
ACOE	United States Army Corps of Engineers
AFBMA	Anti-Friction Bearing Manufacturers Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
ALARA	As Low As Reasonably Achievable
ALTER	Accelerated Life Testing and Environmental Research Facility
AMCA	Air Movement and Control Association
ANS	American Nuclear Society
ANSI	American National Standards Institute
APC	Air Pollution Control
API	American Petroleum Institute
ARAR	Applicable or Relevant and Appropriate Requirement.
ARI	American Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
AWWT	Advanced Wastewater Treatment
BAT	Best Available Technology
BSL	Biodenitrification Surge Lagoon
CAM	Continuous Air Monitor
CBR	California Bearing Ratio
CDF	Commercial Disposal Facility
CEM	Continuous Emissions Monitor
CEMA	Conveyor Equipment Manufacturers Association
CERCLA	Comprehensive, Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Constituent of Concern
CPT	Cone Penetrometer Test
CRSI	Concrete Reinforcing Steel Institute
CRU	CERCLA/RCRA Unit
CWA	Clean Water Act of 1977, as amended
D&D	Decontamination and Dismantlement
DAC	Derived Air Concentration
DCD	Design Criteria Document

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DEEP	Dewatering Excavation Evaluation Program
DOE	United States Department of Energy
DOE-NV	United States Department of Energy - Nevada Office of Operations
DOT	United States Department of Transportation
EJMA	Expansion Joint Manufacturers Association
ERDA	Energy Research and Development Administration
F	Fahrenheit
FDF	Fluor Daniel Fernald, Inc.
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
FFCA	Federal Facilities Compliance Agreement
fpm	feet per minute
FS	Feasibility Study
FSAR	Final Safety Analysis Report
ft^2	square foot (feet)
GCS	Gas Cleaning System
GFCI	Ground Fault Circuit Interrupter
GLC	Ground Level Concentration
gpm	gallons per minute
HEPA	High Efficiency Particulate Air (filter)
hr	hour
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineers Society
ID	Induced Draft
IPC	Inclined Plate Clarifier
ISA	International Society for Measurement and Control
IT	IT Corporation
kg	kilogram
kV	kilovolt
kVA	kilovolt-ampere
kW	kilowatt
lb	pound
LLRW	Low Level Radioactive Wastes
m^2	square meter
MAGLC	Maximum Allowable Ground Level Concentration
MAWC	Maximum Average Waste Concentration
MBMA	Metal Building Manufacturers Association
MCC	Motor Control Center
MEI	Maximally Exposed Individual
MHB	Material Handling Building
µCi/cc	microcurie per cubic centimeter
mrem	millirem
MSS	Manufacturers Standardization Society
NAD	North American Datum
NEC	National Electric Code

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NEMA	National Electrical Manufacturers Association
NESHAP	National Emission Standards for Hazardous Air Pollutants
NETA	National Electrical Testing Association
NFC	National Fuel Code
NFPA	National Fire Protection Association
NP	Nonplastic
NPDES	National Pollutant Discharge Elimination System
NPH	Natural Phenomenal Hazard
NTS	Nevada Test Site
OAC	Ohio Administrative Code
OBBC	Ohio Basic Building Code
ODOT	Ohio Department of Transportation
OEPA	Ohio Environmental Protection Agency
OSDF	On Site Disposal Facility
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PC	Performance Category
PCB	Polychlorinated Biphenyl
pcf	pounds per cubic foot
pCi/L	picoCuries per liter
PFD	Process Flow Diagram
PID	Photoionizing Detector
PLC	Programmable Logic Controller
PPE	Personal Protective Equipment
psf	pounds per square foot
psi	pounds per square inch
psig	pounds per square inch gauge
PTI	Permit to Install
PTO	Permit to Operate
PVC	Polyvinyl Chloride
QAP	Quality Assurance Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
RLB	Railcar Loadout Building
ROD	Record of Decision
SAE	Society of Automotive Engineers
SCS	Soil Conservation Service
scfm	standard cubic feet per minute
SDI	Steel Deck Institute
sec	second
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPT	Standard Penetration Test
SSC	Structure, System and Component
STD	Standard (DOE)

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SWM	Solid Waste Management
SWPPP	FERMCO Storm Water Pollution Prevention Plan
TBC	To Be Considered
TBP	Tributyl Phosphate
TEMA	Tubular Exchanger Manufacturers Association
TOC	Total Organic Carbon
TSDF	Waste Treatment, Storage or Disposal Facility
UBC	Uniform Building Code
UCRL	University of California Research Laboratory
UL	Underwriters Laboratory
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency (EPA)
V	Volt
WAC	Waste Acceptance Criteria
WESP	Wet Electrostatic Precipitator
WPRAP	Waste Pits Remedial Action Project
WTS	IT Corporation Wastewater Treatment System
yd^3	cubic yard
yr	year

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1.0 Purpose

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This Operation and Maintenance Plan describes the responsibilities of IT Corporation (IT) for the continued inspection, operation, and maintenance of existing facilities as shown in Figure 1-1, including the storm water management system, roads (not including haul road) and fences, changeout facility, and the waste pits to be remedied under the Waste Pits Remedial Action Project (WPRAP) at the U.S. Department of Energy's (DOE) Fernald Environmental Management Project (FEMP). This plan will go into effect upon Fluor Daniel Fernald, Inc. (FDF) Authorization to Mobilize. Management of storm water system, roadways, fences, and changeout facilities within the IT work area will continue under this plan throughout the duration of the project. Management of Waste Pit Nos. 4, 5, 6, and the Clearwell will continue under this plan until such time as excavation activities begin for the respective pit. Pit activities will be performed under the excavation plan during the remediation of these pits.

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2.0 Scope

This plan applies to the ongoing periodic inspection of the Waste Pit No. 4 and Waste Pit No. 5 Hazardous Waste Management Units (HWMU), the Clearwell, the management of the water cover on Waste Pit No. 5 and Waste Pit No. 6, storm water management from IT's process facility location, maintenance of the roads (not including the haul road) and fences within IT's work area, and housekeeping at the changeout facility.

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3.0 References

This section identifies the applicable portions of existing site plans and procedures which will be referenced as part of this plan.

3.1 Fluor Daniel Fernald, Inc. Procedure EW-1015 Sections

- 1.0 - Purpose
- 2.0 - Scope
- 3.0 - References
- 4.1 - Inspection Supervisors
  Note: The IT Construction Manager will serve as the Inspection Supervisor and forward Inspection Logs to the FDF Project Director for processing within FDF.
- 4.3 - HWMU Inspectors
- 5.0 - General
- 6.0 - Prerequisites
- 7.1 (2) - Providing Inspection Documents (Inspection Supervisor)
- 7.2 - Completing and Routing the Applicable HWMU Inspection Log (Inspection Supervisor and HWMU Inspector)
- 7.7 - Inspecting Surface Impoundments
- 7.9 - Inspecting Landfills
- 8.0 - Records
- 9.0 - Drivers
- 10.0 - Definitions
- Table 1 - HWMU Identification

3.2 S&WP Division Procedure 43-C-601, Revision 1 dated October 10, 1997 Sections

- 1.0 - Purpose
- 2.0 - Scope

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- 3.0 - Applicable Documents
- 4.0 - Definitions
- 5.2 - Responsibilities (Supervisor)
  Note: The IT Construction Manager will serve as the Inspection Supervisor and forward logs to the FDF Project Director for processing within FDF.
- 5.3 - Responsibilities (Operators)
- 6.0 - General
- 7.0 - Health and Safety Requirements
- 8.0 - Procedure
- 8.1 - Waste Pit No. 5 Operation
- 8.2 - Pit No. 3 Clearwell Operation

3.3 S&WP Division Procedure 43-C-412, Revision 1 dated October 10, 1997

Note: The IT Construction Manager will serve as the Inspection Supervisor and forward logs to the FDF Project Director for processing within FDF.

3.4 Fluor Daniel Fernald, Inc. Storm Water Pollution Prevention Plan, Fernald Environmental Management Project, RM-0039

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4.0 Procedure

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4.1 Waste Pit No. 4

4.1.1 Inspection

As identified in Table 1 of FDF Procedure EW-1015 , provided as Appendix A to this plan, IT shall perform monthly inspections of Waste Pit No. 4. Observations from each inspection shall be recorded in a Waste Pit No. 4 Inspection Record, appearing as Figure 4-1. The inspection record shall identify actions taken to correct unacceptable items found during the inspection and/or provide a plan for undertaking such corrective actions. Completed inspection records will be turned in to the IT Quality Assurance Manager for distribution and filing at the end of the work shift during which the inspection was performed.

4.1.2 Maintenance

IT shall undertake maintenance (e.g., repair tears in the cover panels, replace missing postings, repair openings in the seams, etc.) as needed to rectify any unacceptable findings from the inspection. Any items deemed unacceptable during the inspection which pose an imminent hazard, or where a hazard has already occurred shall be immediately corrected by IT. IT shall make efforts to correct any other deficiencies within five working days of the inspection. Repairs to the membrane shall utilize manufacturer's recommended procedures for the original, or equivalent, materials. Additional procedures related to the maintenance of the existing facilities may be used by IT to perform these activities.

4.1.3 Records

A copy of each Inspection Log shall be maintained by the IT Quality Assurance Manager in the IT project files. The original will be transmitted by the IT Quality Assurance Manager to the FDF Project Director or his designee within five working days of the inspection.

4.2 Waste Pit No. 5

4.2.1 Inspection

As identified in Table 1 of FDF Procedure EW-1015, provided as Appendix A to this plan, IT shall perform monthly and daily inspections of Waste Pit No. 5. Observations from each inspection shall be recorded in a Waste Pit No. 5 Inspection Record, appearing as Figure 4-2 (monthly inspections), and in a Surface Impoundment Daily Freeboard Inspection Log, appearing as Figure 4-3 (daily inspections). The inspection record shall identify actions taken to correct unacceptable items found during the inspection and/or provide a plan for undertaking such corrective actions. Completed logs will be turned in to the IT Quality Assurance Manager for distribution and filing at the end of the work shift during which the inspection was performed.

4.2.2 Maintenance

IT shall undertake maintenance (e.g., sufficiency of freeboard, repair the dike/liner, replace missing postings, correct the cause of sudden drops in the level of contents, etc.) as needed to rectify any unacceptable findings from the inspection. Any items deemed unacceptable during the inspection which pose an imminent hazard, or where a hazard has already occurred shall be immediately corrected by IT. IT shall make efforts to correct any other deficiencies within five working days of

the inspection. Additional procedures related to the maintenance of the existing facilities may be used by IT to perform these activities.

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In order to maintain the water cover, water resulting from the excavation of the waste pits, water collected in the Storm Water Management (SWM) Pond, or FEMP fire water may be pumped to Waste Pit No. 5. The addition of these waters to Waste Pit No. 5 constitutes a request to the Ohio EPA in accordance with the 1988 Consent Decree. This request is discussed in detail in Section 2.8 of the "Description of the Operation and Processes" presented in the Plant Facilities Engineering Package.

4.2.3 Records

A copy of each Inspection Log shall be maintained by the IT Quality Assurance Manager in the IT project files. The original will be transmitted by the IT Quality Assurance Manager to the FDF Project Director or his designee within five working days of the inspection.

4.2.4 Operations

As identified in Section 8.1 of S&WP Division Procedure 43-C-601, attached to this plan as Appendix B, IT shall inspect Waste Pit No. 5 twice each shift (approximately every four [4] hours) and perform operations to control freeboard as necessary. IT shall record the performance in a Waste Pits Area Shift Inspection Log, appearing as Figure 4-4. IT shall perform operations in accordance with Section 8.2 of Appendix B.

4.3 Waste Pit No. 6

4.3.1 Inspection

As identified in Section 8.3 of S&WP Division Procedure 43-C-412, attached to this plan as Appendix C, IT shall perform weekly inspections of Waste Pit No. 6. IT shall record the observations from each inspection in a Daily/Weekly Inspection Checklist, appearing as Figure 4-5. The Inspection Log shall record actions taken to correct unacceptable items found during the inspection, and/or provide a plan for undertaking such actions. Completed Inspection Logs will be turned in to the IT Quality Assurance Manager for distribution and filing at the end of the work shift during which the inspection was performed.

4.3.2 Maintenance

IT shall undertake maintenance (e.g., sufficiency of freeboard, repair the dike/liner, replace missing postings, correct the cause of sudden drops in level of contents, etc.) as needed to rectify any unacceptable findings from the inspection. Any items deemed unacceptable during the inspection which pose an imminent hazard, or where a hazard has already occurred shall be immediately corrected by IT. IT shall make efforts to correct any other deficiencies within five working days of the inspection. Additional procedures related to the maintenance of the existing facilities may be used by IT to perform these activities.

In order to maintain the water cover, water collected in the SWM Pond or FEMP fire water may be pumped to Waste Pit No. 6. The addition of these waters to Waste Pit No. 6 constitutes a request to the Ohio EPA in accordance with the 1988 Consent Decree. This request is discussed in detail

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in Section 2.8 of the "Description of the Operation and Processes" presented in the Plant Facilities Engineering Package.

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4.3.3 Records

Records required by the State and Federal Governments shall be maintained in the project files by IT and the necessary number of copies transmitted to the FDF Project Director or his designee.

4.3.4 Operations

As identified in S&WP Division Procedure 43-C-412, attached to this plan as Appendix C, IT shall perform operations at Waste Pit No. 6 twice each shift (approximately every four [4] hours). As required, water may be added to or removed from Waste Pit No. 6 to manage the water cover. When pumping, a sample of the effluent water will be obtained for analysis. IT shall record the analytical results and operating information on a Waste Pits Area Shift Inspection Log (Figure 4-4). The Inspection Log shall record actions taken to correct unacceptable items found during the inspection and/or provide a plan for undertaking such actions.

4.4 Clearwell

4.4.1 Inspection

As identified in Section 8.2 of S&WP Division Procedure 43-C-601, attached to this plan as Appendix B, IT will measure freeboard in the Clearwell twice each shift (approximately every four [4] hours). Observations will be recorded in a Waste Pits Area Shift Inspection Log (Figure 4-4). IT will perform a general area inspection on a weekly basis and record observations on a Daily/Weekly Inspection Checklist (Figure 4-5). The Inspection Log shall identify actions to be taken to correct unacceptable items found during the inspection and/or provide a plan for undertaking such corrective actions. Completed Inspection Logs will be turned in to the IT Quality Assurance Manager for distribution and filing at the end of the work shift during which the inspection was performed.

4.4.2 Maintenance

IT shall undertake maintenance (e.g., sufficiency of freeboard, replace missing postings, correct the cause of buildup of sediments, etc.) as needed to rectify any unacceptable findings from the inspection. Additional procedures related to the maintenance of the existing facilities may be used by IT to perform these activities.

4.4.3 Records

A copy of each log shall be maintained by the IT Quality Assurance Manager in the IT project files. The original will be transmitted by the IT Quality Assurance Manager to the FDF Project Director or his designee within five working days of the inspection.

4.4.4 Operations

As identified in Section 8.2 of S&WP Division Procedure 43-C-601, attached to this plan as Appendix B, IT shall perform operations to control freeboard as necessary. IT shall record the performance in a Waste Pits Area Shift Inspection Log (Figure 4-4). IT shall perform operations in accordance with Section 8.2 of Appendix B.

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4.5 Storm Water Management System

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4.5.1 Inspection

IT shall perform inspections of the SWM Pond and two retention basins (also referred to as SWM Ponds) provided for the collection of rain water from IT's process facility location, as shown on Figure 1-1. The frequency of inspection will be once per week and will be increased to once per shift during storm events as defined by the FDF Storm Water Pollution Prevention Plan (SWPPP). Observations from each inspection shall include the general condition of the area, the condition of the liner, the diked areas of the ponds, and evidence of sediment accumulation. Observations shall be recorded in a Daily/Weekly Inspection Checklist, provided as Figure 4-5 to this plan. The checklist shall identify actions taken to correct unacceptable items found during the inspection and/or provide a plan for undertaking such corrective actions. Completed checklists will be turned in to the IT Quality Assurance Manager for distribution and filing at the end of the work shift during which the inspection was performed.

4.5.2 Maintenance

IT shall undertake maintenance (e.g., repair the dike/liner, remove accumulated sediment, etc.) as needed to rectify any unacceptable findings from the inspection. IT will maintain the integrity of the liner, diked areas of the ponds, and drainage paths to the ponds and repair any damage/deterioration in a timely manner. Additional procedures related to the maintenance of the existing facilities may be used by IT to perform these activities.

4.5.3 Records

A copy of each checklist shall be maintained by the IT Quality Assurance Manager in the IT project files. The original will be transmitted by the IT Quality Assurance Manager to the FDF Project Director or his designee within five working days of the inspection.

4.6 Roads and Fences

4.6.1 Inspection

IT shall perform weekly inspections of the roads (not including the haul road) and fences within IT's work area as shown on Figure 1-1. Particular attention will be paid to safety-related items, e.g., radiation control boundaries, signs, postings, etc. Observations from each inspection of the roadways shall include evidence of erosion on or along the sides of the roads, buildup of ice or snow creating potentially hazardous conditions, water ponding on the roadways, and the general condition of the area. Observations from each inspection of the fencing shall include the condition of the fenceposts, fabric, and gates; that locks are in place and locked (if necessary); and that required signs are present and not damaged. Observations shall be recorded on a Daily/Weekly Inspection Checklist provided as Figure 4-5 to this plan. The checklist shall identify actions taken to correct unacceptable items found during the inspection and/or provide a plan for undertaking such corrective actions. Completed checklists will be turned in to the IT Quality Assurance Manager for distribution and filing at the end of the work shift during which the inspection was performed.

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4.6.2 Maintenance

IT shall undertake maintenance (e.g., eliminate erosion or water ponding on the roads, repair damage to fence posts or fabric, etc.) as needed to rectify any unacceptable findings from the inspection. IT will maintain the integrity of the roadways and fencing and repair any damage/deterioration in a timely manner. Additional procedures related to the maintenance of the existing facilities may be used by IT to perform these activities.

4.6.3 Records

A copy of each checklist shall be maintained by the IT Quality Assurance Manager in the IT project files. The original will be transmitted by the IT Quality Assurance Manager to the FDF Project Director or his designee within five working days of the inspection.

4.7 Changeout Facility

IT will be responsible for housekeeping services at the changeout facility. Housekeeping services will include general janitorial services, providing an adequate supply of soap and fresh towels for the showers, and the laundering of used towels. Janitorial services will be performed on a daily basis. The supplies of towels and soap for the showers will be checked once a shift and the supplies replenished as necessary.

000175

5.0 Government Furnished Property

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Certain government-owned properties are being furnished to IT for operation and maintenance under this plan. These government-owned properties include existing improvements within the IT work area (e.g., change trailer). These government-owned properties will be managed in accordance with applicable FEMP requirements.

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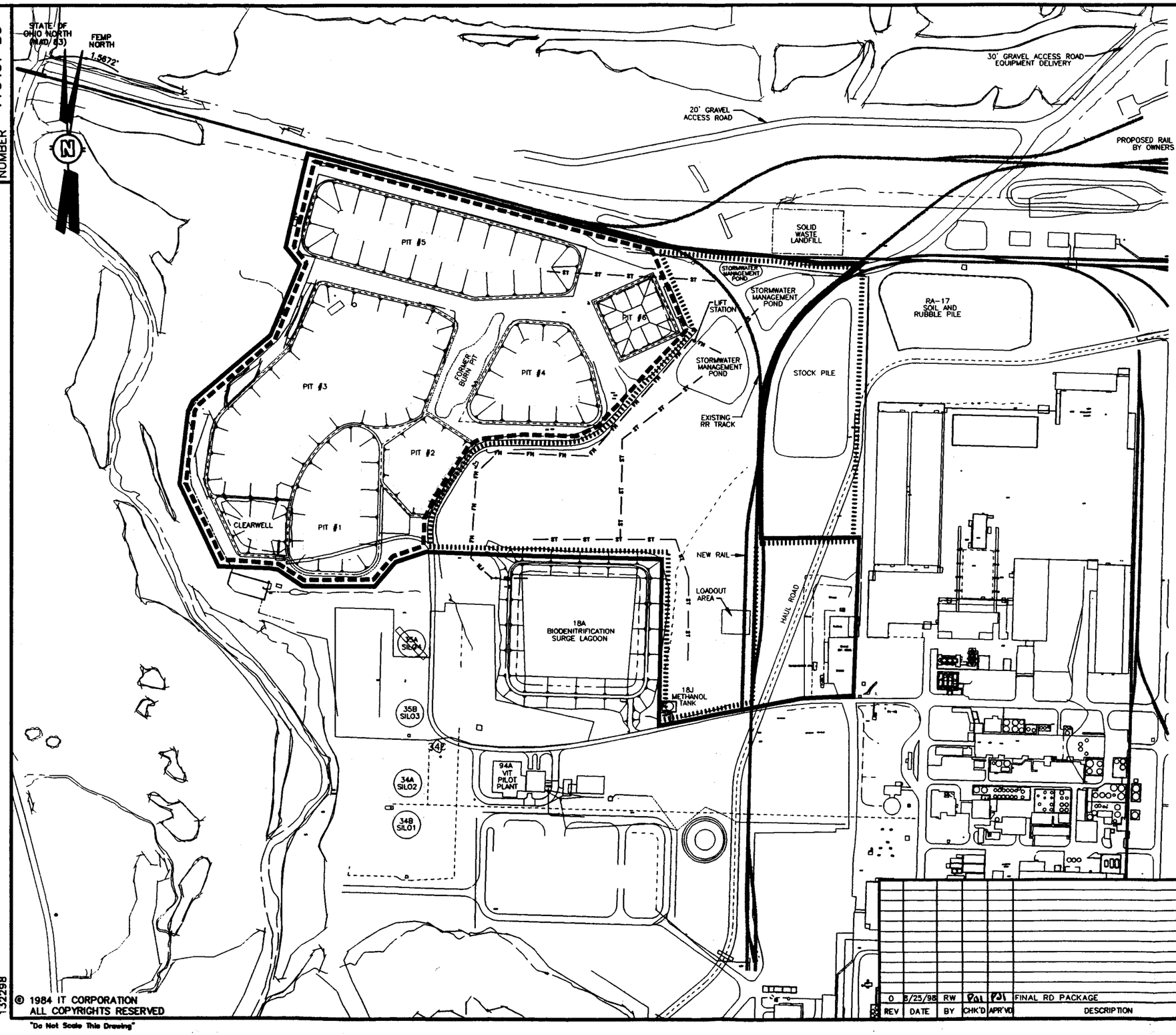
FIGURES

1730

DRAWING NUMBER 773481-B8



LEGEND:

- EXISTING RAIL
- NEW RAIL
- FIRE WATER
- STORM DRAIN
- FORCE MAIN
- PROCESS FACILITY LOCATION
- WASTE PIT AREA
- IT WORK AREA 000178

FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

SCALE
0 300 600 FEET

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	RW	PJI	PJI	FINAL RD PACKAGE

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE
FIGURE 1-1
WORK AREA PLAN

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY	RCH	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	RW	APPROVED BY	PJI		0
DATE	12 DEC 97	DWG. SCALE	1"=300'		
IT PROJECT NO	773481	DRAWING NO.	773481-B8		

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"Do Not Scale This Drawing"

8-17-98
3:58 PM
132298

INTERNATIONAL TECHNOLOGY CORPORATION

HWMU 27, WASTE PIT NO. 4 - MONTHLY INSPECTION RECORD

1730

Inspector's Signature:			Badge #:	Date:
Supervisor's Signature:			Badge #:	Date:
Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions to be Completed
1	Signs: -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	Boundary Markers (e.g., chains, rope)			
3	Condition of Soil at Edge of Flexible Membrane Liner (FML) (soil erosion should not expose FML below grade)			
4	Condition of Anchor Trenches (FML should be securely anchored in trench)			
5	Condition of Field Seams (tears)			
6	Condition of Factory Seams (tears)			
7	Condition of FML Panels (holes)			
8	Condition of Hold-Down Pillows (secure)			
9	Walk Over Monthly Inspection			

Comments: _____

_____

_____

_____

IT-FS-F-3632 (Rev. 5/29/98)

FIGURE 4-1

INTERNATIONAL TECHNOLOGY CORPORATION

1730

HWMU 42, WASTE PIT NO. 5 - MONTHLY INSPECTION RECORD

Surface Impoundment

Inspector's Signature:		Badge #:	Date:
Supervisor's Signature:		Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions to be Completed
1	Signs: -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	Boundary Markers (e.g., chains, rope)			
3	Unit Condition (Dike/Liner)			
4	Bottom Material Exposed			
5	Area Condition			
6	Safety Equipment			
7	Visual Evidence of Material Release			
8	Estimated Freeboard Level	Feet:_____	Inches:_____	
9	Secondary Containment Condition			
10	Emergency and Spill Response Equipment			

Comments: _____

_____

_____

_____

IT-FS-F-3647 (Rev. 5/29/98)

FIGURE 4-2

INTERNATIONAL TECHNOLOGY CORPORATION

HWMU SURFACE IMPOUNDMENT DAILY FREEBOARD INSPECTION LOG

Inspector's Signature:			Badge #:			Date:
Supervisor's Signature:			Badge #:			Date:
HWMU No.	HWMU Location	Time	Freeboard Level (Feet/Inches)	Acceptable	Unacceptable	Observations/Corrective Actions to be Completed
42	Waste Pit #5					

Comments: _____

_____

_____

_____

_____

IT-FS-F-4886 (Rev. 5/29/98)

FIGURE 4-3

INTERNATIONAL TECHNOLOGY CORPORATION

WASTE PITS AREA - SHIFT INSPECTION LOG

Date: _____
Day: _____

Time	Waste Pit # 5						Waste Pit #6[2]							Clearwell					
	Freeboard	Decant		Time[1]		Clearwell Composite[1] Sample No.	Freeboard	Operation	Pit #6 Sample No.	Analytical Resusts				Freeboard	Pumping		Time[1]		Clearwell Composite[2] Sample No.
		Y	N	Start	Stop					U	pH	F	TSS		Y	N	Start	Stop	
10:00 p.m.																			
2:00 a.m.																			
Comments																			
6:00 a.m.																			
10:00 a.m.																			
Comments																			
2:00 p.m.																			
6:00 p.m.																			
Comments																			

	Operator	Badge No.	Supervisor	Badge No.
Shift 1 - 10:00 p.m. - 6:30 a.m.				
Shift 2 - 6:00 a.m. - 2:30 p.m.				
Shift 3 - 2:00 p.m. - 10:30 p.m.				

[1]Complete only during decant/pumping operations
[2]Complete during periods of adding/removing water

FIGURE 4-4

INTERNATIONAL TECHNOLOGY CORPORATION

WPRAP AREA
DAILY/WEEKLY
INSPECTION CHECKLIST

Inspector Name:		Badge Number:		Date:
Supervisor Name:		Badge Number:		Date:
Area	Inspection Item	Status		Comments
		Acceptable	Unacceptable	
COMPLETE WEEKLY				
Pit 3 Clearwell	Level			
	Area Neat			
Pit 6	Area Neat			
	Pump & Hoses Secure			
	Surface Level Exposed ____%			
	Barricades in Place			
	Liner Condition			
	Condition of Patches			
Roadways	Erosion			
	Ice/Snow Buildup			
	Ponded Water			
	General Condition			
Fencing	Condition of Posts/Fabric			
	Condition of Gates			
	Condition of Locks			
	Signs Legible: Damaged:			
COMPLETE DAILY				
Stormwater Management Pond	Area Neat			
	Condition of Liner			
	Condition of Dike			
	Sedimentation			

Comments: _____

FIGURE 4-5

000183

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APPENDIX A

FLUOR DANIEL FERNALD, INC. PROCEDURE EW-1015, INSPECTION OF HAZARDOUS WASTE MANAGEMENT UNITS

CONTROL NUMBER: _____
SITE PROCEDURE EW-1015
REVISION NO. 0

1730

INSPECTION OF HAZARDOUS WASTE MANAGEMENT UNITS (HWMUs)

EW-1015

Effective Date: 05-24-97

Originator (Subject Expert): _____ _____
B. Huffman Date

Checker Concurrence: _____ _____
M. Harper Date

Approved By: _____ _____
T. Walsh, EW FAM Date

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Fluor Daniel Fernald, Inc.
P. O. Box 538704
Cincinnati, Ohio 45253-8704

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ISSUE AND REVISION SUMMARY

Revision	Date	Description
0	05-30-97	New document to convert 20-C-616 into a site procedure per Request No. WR-0396; initiated by B. Huffman. This document replaces 20-C-616, dated 07-05-96, Rev. 1.

1.0 PURPOSE

1730

This procedure provides the inspection requirements and responsibilities for Hazardous Waste Management Units (HWMUs), mobile lockers storing hazardous/recyclable waste and materials, and special projects that require temporary hazardous waste storage at the Fernald Environmental Management Project (FEMP).

2.0 SCOPE

This procedure applies to all personnel involved in the inspection of active and inactive HWMUs and related components.

3.0 REFERENCES

3.1 20-C-606, Hazardous Material Spill Clean-up

3.2 20-C-600, Overpacking Defective Containers

3.3 EP-0004, Spill Incident Reporting and Clean-up

3.4 EW-0015, FEMP RCRA Operating Record

4.0 RESPONSIBILITIES

4.1 Inspection Supervisors

- Maintains a current copy of safety equipment from Attachment G-I of the RCRA Contingency Plan at those HWMUs that actively store RCRA containers (to be accessible to HWMU Inspectors).
- Maintains a centralized current copy of Attachment G-I safety equipment for all HWMUs that do not store RCRA containers (accessible to HWMU Inspectors).

  NOTE: Current controlled copies of any portion of Attachment G-1 of the RCRA Contingency Plan may be obtained from Environmental Compliance (EC).

- Coordinates with the HWMU Facility Owner to initiate corrective actions.
- Ensures that any listed corrective actions are resolved and/or listed on ensuing Inspection Logs.
- Verifies that the inspections are performed at required frequencies.
- Reviews the HWMU Inspection Logs for completeness to ensure the appropriate signatures, dates, and times are recorded and all item descriptions are checked acceptable, unacceptable, or N/A.

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- Obtains original Inspection Logs from HWMU Inspectors immediately following inspections.
- Ensures that the Operators wear the appropriate respiratory protection and/or additional personal protective equipment (PPE) specified by the work permit for the task being performed.
- Verifies that personnel assigned to HWMU Inspections have documented, current training to this procedure and are qualified to do the work.
- Provides and documents on-the-job training for HWMU Inspectors to ensure familiarity with inspection process.
- Documents all actions taken, including information regarding any spills or leaking containers noted during the inspection period.
- Forwards Inspection Logs to the Centralized Inspection Group.

4.2 HWMU Facility Owners

- Ensures their HWMU is maintained in compliance with applicable RCRA criteria (as listed on the Inspection Log) by reviewing and signing the Inspection Log.
- Provides Inspection Supervisors with responses or planned corrective actions for any non-compliant items noted on the inspection.

4.3 HWMU Inspectors

- Inspects the HWMU in accordance with this procedure and records all observations on the HWMU Inspection Log.
- Provides completed Inspection Logs to the Inspection Supervisors for corrective action and further processing.
- Notifies Inspection Supervisor of non-compliant items found during inspection.

4.4 Centralized Inspection Group

- Collects HWMU Inspection Logs from Inspection Supervisors and tracks the receipt of logs, non-compliant items, and appropriate corrective actions taken.
- Reviews the HWMU Inspection Logs for completeness to ensure the appropriate signatures, dates, and times are recorded and all item descriptions are checked acceptable, unacceptable, or N/A.
- Contacts Inspection Supervisors in the case of incomplete or missing Inspection Logs.

1730

- Forwards completed inspections to EC for review.

4.5 Environmental Compliance (EC)

- Reviews the HWMU Inspection Logs for completeness to ensure the appropriate signatures, dates, and times are recorded and all item descriptions are checked acceptable, unacceptable, or N/A.
- Ensures unacceptable checked items are addressed in the "Comments" section on the HWMU Inspection Log along with any corrective actions as either verified or documented.
- Signs and dates the bottom of the HWMU Inspection Log denoting receipt and transfer to the FEMP RCRA Operating Record.
- Contacts the Centralized Inspection Group for incomplete or missing HWMU Inspection Logs.
- Conducts surveillance at the HWMUs to verify compliance.
- Provides quarterly status reports for management review.

4.6 Training Records - Provides EC and Centralized Inspection Group with lists of trained, qualified HWMU Inspectors within two working days of each training class.

5.0 GENERAL

5.1 Warnings and Cautions shall precede the Section, Sub-Section, Item, step, or sub-step to which they apply.

6.0 PREREQUISITES

SAFETY AND HEALTH REQUIREMENTS

6.1 Safety glasses shall be worn unless other eye protection is specified by Industrial Hygiene and/or Radiological Control on applicable permits (such as cover goggles, face shields, or respirators).

6.2 Cover gaggles/face shields, neoprene rubber gloves, and a rubber apron shall be worn when handling caustic, acids, or any other chemical which could cause immediate skin damage upon contact.

6.3 PPE specified by the work permit or posted signs shall be worn.

6.4 Leather-palm gloves shall be worn when handling drums, operating equipment, and when handling rough/sharp-edges.

1730

6.5 A Confined Space Entry Permit is required for entry into any confined space such as a tank or sump.

6.6 Personal safety equipment (listed in the RCRA Contingency Plan) and the required emergency response equipment (listed in Attachment G-1 of the RCRA Contingency Plan) shall be operational and readily available for HWMUs/facilities in use.

6.7 Required Safety equipment (as noted in Attachment G-1 of the RCRA Contingency Plan) shall be inspected for availability and good working condition.

6.8 A communications device, such as a telephone or hand-held two-way radio, capable of summoning emergency assistance shall be immediately available to persons conducting work/inspections in or around HWMUs. (Device must be operationally tested prior to entering the HWMU.)

6.9 Any release of hazardous waste shall be reported immediately per procedure 20-C-606, "Hazardous Material Spill Clean-Up."

6.10 Employees shall review and be familiar with the hazards (e.g., chemical physical, biological, and radioactive) that may be encountered at the HWMUs they are inspecting.

6.11 Any circumstance that could have resulted in an intake of radioactive materials by inhalation, ingestion, or absorption shall immediately be reported to an area Supervisor. The Supervisor shall immediately report the circumstance of possible radioactive materials intake to Safety and Health (S&H) Radiological Control Department for evaluation. When the suspect isotope is uranium, the involved personnel shall report to the Urine Sampling Station at the end of their shift to complete an Incident Investigation Report (ICR) (Form No. FS-F-1458), and submit an incident urine sample. The involved personnel shall report to the Urine Sampling Station at the start of their next shift to submit a follow-up urine sample. When the suspect isotope is something other than uranium, the involved personnel shall report to the Dosimetry Section of the Radiological Control Department for further determination of actions. Employees are responsible for complying with additional requirements as specified by the Radiological Control Department.

6.12 Any situation which could have resulted in the inhalation, ingestion, or absorption of a hazardous material shall immediately be reported to an area Supervisor or to the Assistant Emergency Duty Officer (AEDO), who will immediately report the circumstances to Medical and Industrial Hygiene. The involved personnel shall be directed by the Supervisor or AEDO as to when and where to report for medical evaluation, completion of an Incident Investigation Report (IIR) (Form No. FS-F-1458), and submitting bioassay samples (e.g., blood, urine). Employees are responsible for complying with any additional requirements as specified by S&H.

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7.0 PROCEDURE

7.1 PROVIDING INSPECTION DOCUMENTS

Training Records

1. Provide Centralized Inspection Group with a list of trained, qualified HWMU Inspectors within two working days of each training class.

Inspection Supervisor

2. Prior to inspection, provide the HWMU Inspector with the following:

   A. Inspection Log
   B. Copy of (or access to) Appendix G-1 safety equipment lists
   C. A list of (or access to) unresolved corrective actions
   D. A list of (or access to) approved/trained HWMU Inspectors

7.2 COMPLETING AND ROUTING THE APPLICABLE HAZARDOUS WASTE MANAGEMENT UNIT (HWMU) INSPECTION LOG

HWMU Inspector

1. Enter name in the top portion of the Inspection Log (See Attachments A through FF):

   NOTE: The Inspection Supervisor shall determine if it is necessary to physically enter the HWMU in order to conduct the inspection.

2. Conduct inspection in accordance with requirements for the type of HWMU as contained in Table 1. "HWMU Identification."

   NOTE: The specific inspection requirements for each particular type of HWMU are contained in Sections 7.3 through 7.9.

3. Enter a check mark or an N/A (with explanation) in the "Acceptable" or "Unacceptable," as applicable, for each item number.

4. Enter a brief description of the observation and corrective action taken in the appropriate column of the Inspection Log, if an item is checked "Unacceptable".

   NOTE: The "Comments" Section shall be used if additional space is required.

5. For items deemed unacceptable that pose an imminent hazard, or where a hazard has already occurred, do the following:

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A. Enter a brief description of the observation and corrective action taken in the appropriate column of the Inspection Log.

B. Report the items to the Inspection Supervisor.

Inspection Supervisor

C. Contact the Assistant Emergency Duty Officer (AEDO) and the HWMU Facility Owner.

Inspection Supervisor, AEDO, and HWMU Facility Owner

D. Immediately correct the hazard.

HWMU Inspector

6. For discrepancies that can be easily corrected (for example, fallen chains), do the following:

   A. Fix discrepancy.

   B. Note the discrepancy as corrected in the Comments section of the Inspection Log.

7. Check that the following HWMU signs are in place, are readable from 25 feet away, and are in sufficient quantities to be seen from any approach to the HWMU, as required on the individual Inspection Logs:

   A. DANGER Authorized Personnel Only
   B. No Smoking, Matches, or Open Flame
   C. PCB Warning signs (and labeled containers) at PCB storage locations
   D. Asbestos Warning signs (and labeled containers) marked with the words **"DANGER ASBESTOS CONTAINING MATERIAL"** for Material Type 028.

8. Record any changes to the configuration of the HWMU or change(s) in type or location of safety equipment (as listed in Attachment G-1 of the RCRA Contingency Plan) at the HWMU in the "Comments" Section of the applicable Inspection Log.

9. Ensure the HWMU boundary marker (yellow chain, yellow/magenta rope, yellow paint line, or fencing) is intact and in position.

10. Inspect the area in/around the HWMU for debris and/or trash.

11. Check that safety equipment, as identified in Attachment G-1 of the RCRA Contingency Plan is available, appears to be functional, and has unobstructed access.

1730

12. List any items requiring corrective action or unacceptable items reported on prior inspections that have been corrected.

13. After inspection is complete, sign, date, and enter badge number on the Inspection Log.

14. Forward the Inspection Log to the HWMU Facility Owner. (Point out any potential corrective actions needed.)

HWMU Facility Owner

15. Review HWMU condition from the completed inspection log and provide information in the comments section (and/or by attachment) for any corrective actions needed or completed.

    NOTE: Conditions which warrant corrective action may be verified through EC. The Inspection Supervisor can assist in coordinating/initiating corrective actions.

16. Sign and date the completed inspection.

17. Return Inspection Log to HWMU Inspector.

HWMU Inspector

18. Deliver the completed Inspection Logs to Inspection Supervisor by the end ~~and~~ of each shift. Point out any required corrective actions.

Inspection Supervisor

19. Coordinate with the HWMU Facility Owner to initiate corrective actions, if necessary. Ensure that any previously listed corrective actions are being resolved and recorded on future Inspection Logs.

20. Forward completed Inspection Logs to Centralized Inspection Group for tracking and review.

Centralized Inspection Group

21. Review Inspection Logs for completeness. Return any incomplete inspections to Inspection Supervisor for correction.

22. Track logs to verify receipt. Contact Inspection Supervisor if an inspection has not been received.

23. Maintain a logbook of non-compliant items and corrective actions until completion (when it will be documented on the subsequent Inspection Log).

24. Retain a backup file copy and forward the original Inspection Log to EC. 1730

    NOTE: A copy of the original Inspection Log is acceptable for placement in the FEMP RCRA Operating Record if the original is unobtainable.

Environmental Compliance (EC)

25. Review the HWMU Inspection Logs for accuracy and to verify training of HWMU inspection personnel.

26. Return any incomplete inspections to Inspection Supervisor for correction.

27. Sign and date the bottom of the completed HWMU Inspection Log denoting that the inspection was received and forwarded to the RCRA Operating Record.

28. File the Inspection Log(s) in the FEMP RCRA Operating Record per EW-0015.

7.3 INSPECTING CONTAINER STORAGE AREAS FOR ACTIVE AND INACTIVE HWMUs

HWMU Inspector

1. Inspect the building/pad condition using the following criteria:

    A. Check the structural integrity of the pad surface and curbing for cracks and structural failure which would be of a significant nature as to allow a material release to reach the environment.

    B. Check around the pad for erosion problems and dead vegetation.

    C. Check around the pad for signs of a release (such as a pool of liquid or stains).

    D. Check the condition of the ramps.

    E. Check the building structures for holes in the roof or walls which could allow precipitation to enter the HWMU.

    F. Record any discrepancies on the Inspection Log.

    G. Report any discrepancies to the Inspection Supervisor.

2. Inspect Secondary Containment Systems of Active and Inactive Container Storage Area HWMUs as follows:

    NOTE: It is not required that HWMUs with secondary containment that have had hazardous waste removed be pumped out within 24 hours. Corrective action only has to take place if the liquid does not appear to be water (such as oil sheen).

1730

A. Verify the Containment System is sealed and sufficiently impervious to contain spills, leaks, or accumulated precipitation.

B. Check for visible unsealed gaps, holes, cracks, or breaks in the floor, curbs, or dikes of the containment system.

C. Check the drainage features (including sumps. drains, and troughs) for standing or pooled liquids.

NOTE: **Standing liquids in HWMUs actively storing waste shall be removed within 24 hours. Inspection Supervisor shall contact the HWMU Facility Owner to arrange for pumping and removal of the liquid.**

D. Check for visible signs of spills (such as liquids, or solid material on the floor and/or stains).

E. Look for pooled liquids, clogged drains, and/or erosion after a storm.

F. Record any discrepancies on the Inspection Log.

G. Report any discrepancies to the Inspection Supervisor.

7.4 INSPECTING CONTAINERS WITHIN ACTIVE CONTAINER STORAGE AREA HWMUs

NOTE: Containers that are under evaluation for RCRA determination are subject to a daily outdoor/uncovered inspection or a weekly indoor/covered inspection.

HWMU Inspector

1. Check that pallets are stacked securely.

2. Check that pallets are stored far enough from the containment edge to prevent waste escaping if a leak occurs in a container.

3. Check for containers that are leaking waste, corroded, bulging and/or damaged.

   A. If a container is damaged, do the following:

      (1) Classify the container per "Container Inspection Categories" (See Attachment GG).

      (2) Immediately report containers with Type I characteristics to the Inspection Supervisor and AEDO.

      (3) Document Type I, II, and III containers on the Inspection Log.

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NOTE: Hazardous waste markings (labels) on newly generated containers of hazardous waste will only contain the address, EPA Waste ID Codes, and accumulation start date until time of shipment when the remainder of the label will be completed. Backlog containers already in storage will not need the proper shipping name removed until shipment offsite (at that time, label may need to be changed in regards to new HM181 regulations); however, markings (labels) may be changed as time permits.

4. Check that containers known to contain hazardous waste have a hazardous waste marking (label) affixed with legible "accumulation start date" entered.

5. Check that aisle spacing of at least 24 inches is maintained between rows of containers within storage bays, next to curbs, and between safe mass groupings of RCRA enriched materials.

6. Check the height of stacked drums per "Pallet Drum Capacity and Stacking Limits" (See Table 2).

7. Record any discrepancies on the Inspection Log.

8. Report any discrepancies to the Inspection Supervisor.

9. Inspect the Unit Reactivity Group Codes (RGCs) as follows:

   A. Check that all "Active Container Storage" areas have material RGCs clearly posted at the boundary (such as end of rows, bays, or on building entrances) of each separate material RGC area.

   B. Inspect the Unit RGCs per the following criteria:

      (1) Check that containers are marked with a RGC.

      NOTE: Refer to Attachment HH for the "Hazardous Waste Storage Compatibility Chart."

      (2) Check for the separation of incompatible material.

      (3) Ensure that containers of incompatible material are separated by distance or by a physical barrier such as a dike, berm, or wall.

      (4) For containers that have an RGC or K "Ignitable," the stacking should be in accordance with "NFPA 30" (See Table 3).

10. Record any discrepancies on the Inspection Log.

11. Report any discrepancies to the Inspection Supervisor.

7.5 INSPECTING EQUIPMENT

1730

HWMU Inspector

1. Inspect the condition of operation equipment in active container storage areas (RCRA Warehouse) per the applicable "FEMP RCRA Warehouse, Building _____ Operation Equipment Log" (See Attachment DD).

2. Record any discrepancies on the Inspection Log.

3. Report any discrepancies to the Inspection Supervisor.

7.6 INSPECTING ACTIVE ABOVE GROUND RCRA STORAGE TANKS

HWMU Inspector

1. Check that tank and auxiliary equipment (stand-pipes, fill pipes, vents, valves, or transfer pumps) are isolated, closed, or locked out.

2. Check that lids/manways are locked or have a tamper-proof seal installed.

3. Check the tank structure and all associated piping for deterioration (e.g., corrosion/erosion, leaking fixtures/seams) that could affect tank integrity.

4. Check the secondary containment per step 2 of Section 7.3.

5. Check in and around the unit for erosion, dead vegetation, and signs of material release.

6. Check the condition of overfill/spill control equipment.

7. Check for the presence of monitoring equipment (such as contact level indicator or high level alarm).

8. If no monitoring equipment is installed, a lock-and-tag system should be in use to prevent inadvertent overfilling.

   NOTE: If tank has undergone closure and is now empty, all of the above criteria would be recorded as "not applicable" (n/a), with the exception of steps 4 and 5 of Section 7.6.

9. Check that the words "Hazardous Waste" have been stenciled on the tanks or a hazardous waste label has been attached.

10. Record any discrepancies on the Inspection Log.

11. Report any discrepancies to the Inspection Supervisor.

7.7 INSPECTING SURFACE IMPOUNDMENTS

1730

HWMU Inspector

NOTE: Surface impoundments and landfills shall also be inspected after storms have occurred.

1. Check that the containment dike/berm will prevent water run-off and run-on during rainfall events.

   NOTE: For example, the top of the dike is above the surrounding ground so that rainfall cannot overtop the dike.

2. Check around the dike/berm for dead vegetation, which could lead to erosion.

3. Check the dike/berm for cracks, holes, breaks, and slumped areas.

4. Check for erosion.

5. Check the impoundment freeboard daily (and during HWMU inspections) as follows:

   NOTE: A separate daily freeboard inspection is not required on the day the HWMU inspection is conducted.

   A. Locate the freeboard indicator.

   B. Check the indicator to determine the freeboard level.

   C. Record the level on the "HWMU Surface Impoundment Daily Freeboard Inspection Log" (See Attachment CC).

   D. Inspect Waste Pit #5 for low water level to ensure that the impoundments bottom material is not exposed. If an exposed area exists, contact supervisor to restore water coverage.

   E. Document freeboard level on Inspection Log and report free board level to Inspection Supervisor.

6. Check the sides of the berm, dike, and containment basin for damage and deterioration.

7. Check the visible section of liners (if installed) for rips, tears, and seam separation.

8. Record any discrepancies on the Inspection Log and provide additional information in the "Comment" Section of the Inspection Log as needed.

9. Report any discrepancies to the Inspection Supervisor. 1730

7.8 INSPECTING PROCESS UNITS

HWMU Inspector

1. Check for visible signs of release (such as residues or dead vegetation).
2. Check for damage such as broken piping and dented tanks.
3. Check for open unit components (such as doors, lids, or ports), which could effect the integrity of the unit or lead to a potential material release.
4. If the unit has an associated tank or tanks, perform Section 7.5.
5. Record any discrepancies on the Inspection Log.
6. Report any discrepancies to the Inspection Supervisor.

7.9 INSPECTING LANDFILLS

HWMU Inspector

1. Check the dikes and trenches (run-on, run-off controls) around the unit for deterioration and/or erosion.
2. Check that wind dispersal control systems such as rubber panels and hold down pillows (if present) are correctly functioning.
3. Inspect the flexible membrane liner for rips, tears, and seam separation.
4. Check the overtopping control systems for deterioration/damage (such as broken pipes or damaged dikes).
5. Record any discrepancies on the Inspection Log.
6. Report any discrepancies to the Inspection Supervisor.

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7.10 INSPECTING SUMPS

HWMU Inspector

1. Check the drainage features for standing liquid.
2. Check inside the sump for foreign objects.
3. Check around the sump and the sump wells for cracks, holes, gaps, and structural defects.
4. Check outside the sump perimeter for erosion.
5. Check around the sump for dead vegetation, stains, and other signs of a release.

   NOTE: In some cases the sump will not pump dry. They almost always have some standing liquid.

6. If the sump is being used as a containment, then check for standing liquid.

   NOTE: Notification shall be made to the HWMU Facility Owner and Inspection Supervisor in addition to the entry on the appropriate Inspection Log.

7. If standing liquid is found, do the following:

   A. Immediately notify the Inspection Supervisor.

   B. Notify the HWMU Facility Owner.

8. Record any discrepancies on the Inspection Log.
9. Report any discrepancies to the Inspection Supervisor.

7.11 INSPECTING HAZARDOUS WASTE STORAGE LOCKERS

HWMU Inspector

1. Check containers to ensure they are stacked securely.
2. Check the condition of containers for leaking waste, corrosion, bulges, and/or damage.

   A. If a container is damaged, do the following:

      (1) Classify the container per "Container Inspection Categories" (See Attachment GG).

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(2) Immediately report containers with Type I characteristics to the Inspection Supervisor and AEDO.

(3) Overpack the container per Procedure 20-C-600, Overpacking Defective Containers.

(4) Document all Type I, II, and III containers on the Inspection Log.

3. Check for visible signs of spills (such as liquids, solid material, or stains on the floor or in the sub-floor containment).

4. Check for the separation of incompatible material. (Refer to Attachment HH for the "Hazardous Waste Storage Compatibility Chart").

NOTE: Containers stored in the Hazardous Waste Storage Locker should be marked/labeled as to contents.

5. Record any discrepancies on the Inspection Log.

6. Report any discrepancies to the Inspection Supervisor.

7.12 <u>INSPECTING SPECIAL PROJECTS UTILIZING TEMPORARY RCRA STORAGE</u>

NOTE: Inspections of special projects are only required if RCRA material is present.

HWMU Inspector

1. Determine whether the special project utilizes temporary RCRA storage.

2. Do one of the following:

A. If the project contains a hazardous waste processing unit, inspect the unit per the criteria in Section 7.8, using an FS-F-4890, Special Project Hazardous Tank/Container/Tanker Truck Inspection (Attachment FF).

<u>OR</u>

B. If the project contains a hazardous waste container storage area, inspect the area per the criteria in Section 7.3 and 7.4. using an FS-F-4890.

<u>OR</u>

C. If the project is staging a tanker truck and trailer holding hazardous waste, do the following, using an FS-F-4890:

(1) Check the integrity of the tanker for corrosion, dents, holes, or leaks.

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(2) Ensure that the tanker is labeled with a hazardous waste marking or placarding that identifies the contents.

(3) Verify that lids and manways are closed when not adding or removing waste.

(4) Check for accessability to spill control equipment.

(5) Record any non-compliant items on the Inspection Log.

(6) Report any non-compliant items to the Inspection Supervisor.

8.0 RECORDS

The following documents will be generated as records as a result of this procedure and will be managed according to RM-0022, FEMP Records Management Program Records Management Users Manual and EW-0015, FEMP RCRA Operating Record:

Hazardous Waste Management Unit (HWMU) Inspection Logs

9.0 DRIVERS

9.1 DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities

9.2 40 CFR 265, Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

9.4 40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distributing in Commerce, and use Prohibitions

9.5 OAC 3745-65, Hazardous Waste Facility Interim Standards

9.6 Stipulated Amendment to the Consent Decree (Signed/Dated January 22, 1993)

9.7 FEMP Part B Permit Application

10.0 DEFINITIONS

10.1 Active Container Storage Areas - Units authorized to store RCRA hazardous wastes.

10.2 Bulge - A swollen area, convex distortion, or outward bend.

10.3 Corrosive - Aqueous wastes with a pH ≤ 2 or ≥ 12.5.

10.4 Dent - A crease, depression, or hollow made by a blow or pressure, or a concave distortion.

1730

10.5 Freeboard - The vertical distance between the top of a tank or surface impoundment dike and the surface of the waste contained therein.

10.6 Hazardous Waste - A waste material listed in 40 CFR 261 or a material that exhibits the characteristic of ignitability, corrosivity, reactivity, or TCLP toxicity.

10.7 Hazardous Waste Management Unit (HWMU) - An identifiable area where hazardous waste is or has been treated, stored (more than 90 days), disposed of, or systematically released into the environment.

10.8 Hazardous Waste Storage Facility - Any unit/area where hazardous waste is stored.

10.9 Hole - An opening that penetrates the container, including breach, gouge, puncture, or leak.

10.10 HWMU Inspectors - Personnel who have successfully completed the training requirements to inspect HWMUs.

10.11 Ignitable - Liquid or non-liquid wastes capable of combustion due to heat (flash point less than 140°F), friction, absorption of moisture, or spontaneous chemical changes.

10.12 Inactive Container Storage Areas - Units that do not presently store hazardous waste but have been previously identified as HWMUs.

10.13 Landfill - A disposal facility or part of a facility where hazardous waste is placed in or on land.

10.14 Mixed Waste - Waste containing both radioactive and hazardous components as defined by the Atomic Energy Act and the Resource Conservation and Recovery Act (RCRA), respectively.

10.15 Process Unit - Equipment that was used during the production years (and no longer active) and meets the definition of HWMU.

10.16 Reactive - Wastes that respond violently when contacting another substance, forming potentially explosive mixtures or generating toxic gases with water, generating toxic gases (cyanide or sulfide) at pH between 2 and 12.5, or detonating or exploding at standard temperature and pressure or when heated under confinement.

10.17 Resource Conservation and Recovery Act (RCRA) - The Congressional Act that established safe, environmentally acceptable, strict "cradle to grave" management control and practices for specific hazardous wastes.

10.18 Spill - Any unplanned event that permits the entry of hazardous waste into the ground water, or air.

10.19 Storm - A significant weather event.

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10.20 Surface Impoundment - A topographic depression, man-made excavation, or diked area formed primarily of earthen materials designed to hold liquid hazardous waste or wastes containing free liquids.

10.21 Toxicity Characteristic Leaching Procedure (TCLP) - An analytical process to determine the type and concentration of hazardous contaminants in waste material.

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TABLE 1 - HWMU IDENTIFICATION
(Sheet 1 of 2)

HWMU IDENTIFICATION

HWMU NO.	UNIT	TYPE OF HWMU	SOP SECT.	FREQ OF INSP
1	Fire Training Facility	Landfill	7.8	Annual
2	DELETED			
3	DELETED			
4	Drum Storage Area Near Loading Dock (Lab Bldg)	Inactive Container Storage	7.3.1 and 7.3.2	Quarterly
5	Drum Storage Area South of W-26 (Lab Bldg)	Inactive Container Storage	7.3.1 and 7.3.2	Quarterly
6	DELETED			
7	DELETED			
8	DELETED			
9	DELETED			
10	NAR System Components	Process Unit (With Tanks)	7.7	Weekly
11	Tank Farm Sump	Surface Impoundment	7.6	Annual
12	DELETED			
13	DELETED			
14	Box Furnace	Process Unit	7.7	Weekly
15	Oxidation Furnace No. 1	Process Unit	7.7	Monthly
16	DELETED			
17	Plant 8 East Drum Storage Pad	Inactive Container Storage	7.3.1 and 7.3.2	Quarterly
18	Plant 8 West Drum Storage Pad	Active Container Storage	7.3	Quarterly
19	CP Storage Warehouse (Bldg 56)	Active Container Storage	7.3	Weekly
20	Plant 1 Pad	Active Container Storage	7.3	Weekly
21	DELETED			
22	Abandoned Sump West of Pilot Plant	Sump	7.9	Annual
23	DELETED			
24	DELETED			
25	Plant 1 Storage Bldg (Bldg 67)	Inactive Container Storage	7.3.1 and 7.3.2	Annual

SAMPLE

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TABLE 1 - HWMU IDENTIFICATION (cont.)
(Sheet 2 of 2)

HWMU NO.	UNIT	TYPE OF HWMU	SOP SECT.	FREQ OF INSP
26	DELETED			
27	Waste Pit No. 4	Landfill	7.8	Monthly
28	Trane Thermal Liquid Incinerator	Process Unit (with Tanks)	7.7	Weekly
29	Plant 8 Warehouse (Bldg 80)	Active Container Storage	7.3	Weekly
30	DELETED			
31	DELETED			
32	DELETED			
33	DELETED			
34	KC2 Warehouse (Bldg 63)	Active Container Storage	7.3	Weekly
35	Plant 9 Warehouse (Bldg 81)	Active Container Storage	7.3	Weekly
36	Storage Pad North of Plant 6	Active Container Storage	7.3.1 and 7.3.2	Quarterly
37	Plant 6 Warehouse (Bldg 79)	Active Container Storage	7.3	Weekly
38	DELETED			
39	DELETED			
40	DELETED			
41	Sludge Drying Beds	Surface Impoundment	7.6	Monthly
42	Waste Pit No. 5 Waste Pit No. 5 Freeboard	Surface Impoundment	7.6	Monthly Daily
43	DELETED			
44	DELETED			
45	DELETED			
46	UNH Tanks (NFS Storage Area)	RCRA Storage Tank	7.5	Annual
47	UNH Tanks (North of Plant 2)	RCRA Storage Tank	7.5	Annual
48	UNH Tanks (SE of Plant 2)	RCRA Storage Tank	7.5	Annual
49	UNH Tanks (Digestion Area, 2 Locations)	RCRA Storage Tank	7.5	Annual
50	UNH Tanks (Raffinate Bldg, 2 Locations)	RCRA Storage Tank	7.5	Annual
51	DELETED			
52	DELETED			
53	DELETED			
54	Thorium Nitrate Tank T2	RCRA Storage Tank	7.5	Annual

SAMPLE

1730

TABLE 2 - PALLET DRUM CAPACITY & STACKING LIMITS

CONTAINER	DRUM/PALLET	MAXIMUM INDOOR STACKING HEIGHT	MAXIMUM OUTDOOR STACKING HEIGHT
85-Gallon Overpack	3	3 Pallets	3 Pallets
55-Gallon Drum	4	4 Pallets	3 Pallets
30-Gallon Drum	4	4 Pallets	3 Pallets
10-Gallon Pail	9	7 Pallets	3 Pallets
5-Gallon Pail	16	7 Pallets	3 Pallets
110-Gallon Overpack	2	1 Pallet on Top Pallet of Stack	3 Pallets
White Metal Boxes	N/A	3 High	3 High

NOTE 1: **If the container has a RGC of K "Ignitable" the stacking of containers should be in accordance with NFPA 30. Refer to the MEF for the flashpoint to determine the class (i.e. <73°F - Class I-A flammable) (See Table 3).**

NOTE 2: **Stacking four (4) high may also consist of any of the following:**

- **Three pallets of 55-gallon drums with either one pallet of 85-gallon drums or one (1) pallet of 110-gllon drums on top.**
- **Two pallets of 55-gallon drums with two pallets of 85-gallon drums on top.**

SAMPLE

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Table 3 - NFPA 30

EPA RCRA Definitions		NFPA 30 Definitions	
RCRA Ignitable Liquid (D001)	Flash Point <140°F	NFPA Class I-A Flammable Liquid	Flash Point <73°F Boiling Point <100°F
		NFPA Class I-B Flammable Liquid	Flash Point <73°F Boiling Point ≥100°F
		NFPA Class I-C Flammable Liquid	Flash Point ≥73°F and <100°F
		NFPA Class II Combustible Liquid	Flash Point ≥100°F and <140°F
		NFPA Class III-A Combustible Liquid	Flash Point ≥140°F and <200°F
		NFPA Class III-B Combustible Liquid	Flash Point ≥200°F

Indoor Unprotected Storage of Liquids in Containers

		Container Storage	
Class	Max. Pile Height (ft)	Max. Quant. per Pile (gal)	Max. Total Quant.(gal)*
IA	5	660	660
IB	5	1,375	1,375
IC	5	2,750	2,750
II	10	8,250	8,250
IIIA	15	27,500	27,[illegible]
IIIB	15	55,000	55,[illegible]

SAMPLE

ATTACHMENT A - HWMU 1, FIRE TRAINING FACILITY

1730

Landfill

Inspector's Signature:		Badge #:	Date:
HWMU Facility Owner Signature:		Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Area Condition**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3607 (REV. 04/03/97)

SAMPLE

1730

ATTACHMENT B - HWMU 4, DRUM STORAGE AREA NEAR LOADING DOCK (LAB BLDG)

Inactive Container Storage

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Area Condition**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3609 (REV. 04/03/97)

1730

ATTACHMENT C - HWMU 5, DRUM STORAGE AREA SOUTH OF W-26 (LAB BLDG)

Inactive Container Storage

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Area Condition**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3610 (REV. 04/03/97)

ATTACHMENT D - HWMU 10, NAR SYSTEM COMPONENTS

(Sheet 1 of 2)

1730

Process Unit With Tanks

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Tank Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior To Entry Contact			
2	**Surrounding Area & Unit Integrity**			
3	**Condition Of Secondary Containment**			
4	**Safety Equipment**			
5	**Liquor Coolers E3E-210, E3E-211 & F3E-220** **Signs:** -Danger-Authorized Personnel Only -No Smoking Or Open Flame -Emergency & Prior to Entry Contact			
6	**Corrosion Or Release Of Waste**			
7	**Surrounding Area & Unit Integrity**			
8	**Weir Box F3E-207, 213, 215, & 218:** **Signs:** -Danger-Authorized Personnel Only -No Smoking Or Open Flame -Emergency Contact			
9	**Corrosion Or Release Of Waste**			
10	**Surrounding Area & Unit Integrity**			
11	**Spill Response Equipment**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3615 (REV. 04/03/97)

SAMPLE

ATTACHMENT D - HWMU 10, NAR SYSTEM COMPONENTS
(Sheet 2 of 2)

1730

Process Unit With Tanks

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
12	**Denitration Pot G3E-207:** **Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency Contract			
13	**Overfill/Spill Control Equipment**			
14	**Monitoring Equipment In Place (Content Level)**			
15	**Surrounding Area & Unit Integrity**			
16	**Condition Of Secondary Containment**			
17	**Safety Equipment**			
18	**Boundary Markers (e.g., chain, rope)**			
19	**Emergency & Spill Response Equipment**			
20	**Manway/Fill Pipe Seals Unbroken**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3615 (REV. 04/03/97)

ATTACHMENT E - HWMU 11, TANK FARM SUMP

1730

Surface Impoundment

TANK FARM SUMP

S

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel On -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Sump Drainage**			
3	**Area Condition**			
4	**Boundary Markers (e.g., chain, rope)**			

A

M

Comments: _____

P

Environmental Compliance:	Date:

FS-F-3616 (REV. 04/03/97)

L

E

ATTACHMENT F - HWMU 14, BOX FURNACE

1730
Process Unit

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Unit Condition**			
4	**Visible Signs Of Material Release**			
5	**Safety Equipment**			
6	**Spill Response Equipment**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3619 (REV. 04/03/97)

ATTACHMENT G - HWMU 15, OXIDATION FURNACE NO. 1

1730

Process Unit

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel On -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Unit Condition**			
4	**Visible Signs Of Material Release**			
5	**Safety Equipment**			
6	**Spill Response Equipment**			

Comments: _____

Environmental Compliance:	Da

FS-F-3620 (REV. 04/03/97)

ATTACHMENT H - HWMU 17, PLANT 8 EAST DRUM STORAGE PAD 1730

Active
Container Storage

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Pad Condition**			
4	**Area Condition**			
5	**Safety Equipment**			
6	**Visible Signs Of Material Release**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3622 (REV. 04/03/97)

SAMPLE

ATTACHMENT I - HWMU 18, PLANT 8 WEST DRUM STORAGE PAD

1730

Inactive Container Storage

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Pad Condition**			
4	**Area Condition**			
5	**Safety Equipment**			
6	**Visible Signs of Material Release**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3623 (REV. 04/03/97)

SAMPLE

1730

ATTACHMENT J - HWMU 19, CP STORAGE WAREHOUSE (BLDG 56)

Active Container Storage

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Building Condition**			
3	**Condition of Secondary Containment**			
4	**Emergency & Spill Response Equipment**			
5	**Compatibility Codes**			
6	**Container Management**			
7	**Conditions Of Drums (Evidence Of Leaks Or Spills)**			
8	**Safety Equipment**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3624 (REV. 04/03/97)

SAMPLE

ATTACHMENT K - HWMU 20, PLANT 1 PAD

1730

Active
Container Storage

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Building Condition**			
3	**Pad Condition**			
4	**Condition of Secondary Containment**			
5	**Safety Equipment**			
6	**Emergency & Spill Response Equipment**			
7	**Compatibility Codes**			
8	**Container Management**			
9	**Conditions Of Drums (Evidence Of Leaks Or Spills)**			
10	**Boundary Markers (e.g., chains, rope)**			

Comments: _____

Environmental Compliance:	Date:

F-3625 (REV. 04/03/97)

ATTACHMENT L - HWMU 22, ABANDONED SUMP WEST OF PILOT PLANT 730

Sump

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -Emergency & Prior to Entry Cont			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Area Condition**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3627 (REV. 04/03/97)

SAMPLE

ATTACHMENT M - HWMU 25, PLANT 1 STORAGE BUILDING (BLDG 67)

1730

Inactive Container Storage

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Area Condition**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3630 (REV. 04/03/97)

ATTACHMENT N - HWMU 27, WASTE PIT NO. 4

1730

Landfill

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Condition of Soil at Edge of flexible membrane liner (FML)** (soil erosion should not expose FML below grade)			
4	**Condition of Anchor Trenches** (FML should be securely anchored in trench)			
5	**Condition of Field Seams** (tears)			
6	**Condition of Factory Seams** (tears)			
7	**Condition of FML Panels** (holes)			
8	**Condition of Hold-Down Pillows** (secure)			
9	**Walk Over Monthly Inspection**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3632 (REV. 04/03/97)

SAMPLE

ATTACHMENT O - HWMU 28, TRANE THERMAL LIQUID INCINERATOR

1730

Process Unit (With Tanks)

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior To Entry Con			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Area Condition (Evidence of Leaks)**			
4	**Bldg. 39A Condition**			
5	**Tank F3E-406: Overfill/Spill Control Equipment**			
6	**Secondary Containment Condition**			
7	**Tank Condition or Release Of Waste**			
8	**Monitoring Equipment**			
9	**Safety Equipment**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3633 (REV. 04/03/97)

SAMPLE

ATTACHMENT P - HWMU 29, PLANT 8 WAREHOUSE (BLDG 80)

1730 Active Container Storage

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior To Entry Contact			
2	**Building Condition**			
3	**Condition of Secondary Containment**			
4	**Safety Equipment**			
5	**Emergency & Spill Response Equipment**			
6	**Compatibility Codes**			
7	**Container Management**			
8	**Conditions of Drums (Evidence of Leaks/Spills)**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3634 (REV. 04/03/97)

SAMPLE

ATTACHMENT Q - HWMU 34, KC-2 WAREHOUSE (BLDG 63)

1730

Active Container Storage

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Building Condition**			
3	**Condition Of Secondary Containment**			
4	**Emergency & Spill Response Equipment**			
5	**Compatibility Codes**			
6	**Container Management**			
7	**Conditions of Drums (Evidence Of Leaks/Spills)**			
8	**Safety Equipment**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3639 (REV. 04/03/97)

SAMPLE

1730

ATTACHMENT R - HWMU 35, PLANT 9 WAREHOUSE (BLDG 81)

Active Container Storage

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Building Condition**			
3	**Condition Of Secondary Containment**			
4	**Safety Equipment**			
5	**Emergency & Spill Response Equipment**			
6	**Compatibility Codes**			
7	**Container Management**			
8	**Conditions of Drums (Evidence Of Leaks/Spills)**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3640 (REV. 04/03/97)

SAMPLE

ATTACHMENT S - HWMU 36, STORAGE PAD NORTH OF PLANT 6 1730

Inactive Container Storage

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -Emergency & Prior to Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Area Condition**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3641 (REV. 04/03/97)

SAMPLE

ATTACHMENT T - HWMU 37, PLANT 6 WAREHOUSE (BLDG 79) 1730

Active Container Storage

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior To Entry Contact			
2	**Building Condition**			
3	**Condition Of Secondary Containment**			
4	**Spill Response Equipment**			
5	**Compatibility Codes**			
6	**Container Management**			
7	**Conditions of Drums (Evidence Of Leaks/Spills)**			
8	**Safety Equipment**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3642 (REV. 04/03/97)

ATTACHMENT U - HWMU 41, SLUDGE DRYING BEDS

1730

Surface Impoundment

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -Emergency & Prior To Entry Contact			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Unit Condition (Dike/Liner)**			
4	**Area Condition**			
5	**Safety Equipment**			
6	**Visual Evidence Of Material Release**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3646 (REV. 04/03/97)

SAMPLE

ATTACHMENT V - HWMU 42, WASTE PIT NO. 5

1730

Surface Impoundment

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior To Entry Contact			
2	**Boundary Markers (e.g., chain,**			
3	**Unit Condition (Dike/Liner)**			
4	**Bottom Material Exposed**			
5	**Area Condition**			
6	**Safety Equipment**			
7	**Visual Evidence Of Material Release**			
8	**Estimated Freeboard Level**	**Feet:**	**Inches:**	
9	**Secondary Containment Condition**			
10	**Emergency and Spill Response Equipment**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3647 (REV. 04/03/97)

SAMPLE

ATTACHMENT W - HWMU 46, UNH TANKS (NFS STORAGE AREA)

1730

(Tanks F2-605, 606, 607, 608, 02-E004A-Tank)

RCRA Storage Tank

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior To Entry Contact			
2	**Surrounding Area And Unit Integrity**			
3	**Secondary Containment Condition**			
4	**Safety Equipment**			
5	**Boundary Markers (e.g., chain, rope)**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3651 (REV. 04/03/97)

ATTACHMENT X - HWMU 47, UNH TANKS (NORTH OF PLANT 2)

1730

(Tanks F2E-5, F2E-6, & F2E-8)

RCRA Storage Tank

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior To Entry Contact			
2	**Surrounding Area And Unit Integrity**			
3	**Secondary Containment Condition**			
4	**Safety Equipment**			
5	**Boundary Markers (e.g., chain, rope)**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3652 (REV. 04/03/97)

ATTACHMENT Y - HWMU 48, UNH TANKS (SOUTHEAST OF PLANT 2)

1730

(Tanks F3E-223)

RCRA Storage Tank

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior To Entry Contact			
2	**Surrounding Area And Unit Integrity**			
3	**Secondary Containment Condition**			
4	**Safety Equipment**			
5	**Boundary Markers (e.g., chain, rope)**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3653 (REV. 04/03/97)

SAMPLE

ATTACHMENT Z - HWMU 49, UNH TANKS (DIGESTION AREA, 2 LOCATIONS)

(Tanks D1-1, 2, 4, 7, 10 F1-1, 25, 26)

E-1730

RCRA
Storage Tank

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Surrounding Area And Unit Integrity**			
3	**Secondary Containment Condition**			
4	**Safety Equipment**			
5	**Boundary Markers (e.g., chain, rope)**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3654 (REV. 04/03/97)

ATTACHMENT AA - HWMU 50, UNH TANKS (RAFFINATE BLDG, 2 LOCATIONS)

(Tanks F1-301, 302, 303 & 308)

1730

RCRA
Storage Tank

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior To Entry Contact			
2	**Surrounding Area And Unit Integrity**			
3	**Secondary Containment Condition**			
4	**Safety Equipment**			
5	**Boundary Markers (e.g., chain, rope)**			

Comments: _____

Environmental Compliance:	Date:

FS-F-3655 (REV. 04/03/97)

ATTACHMENT BB - HWMU 54, THORIUM NITRATE TANK (T2) 1730

RCRA Storage Tank

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -HWMU Facility Owner and Emergency Information			
2	**Boundary Markers (e.g., chain, rope)**			
3	**Condition of Area**			
4	**Secondary Containment Condition**			

Comments: _____

Environmental Compliance:	Date:

FS-F-4885 (REV. 04/03/97)

ATTACHMENT CC - HWMU SURFACE IMPOUNDMENT DAILY FREEBOARD INSPECTION LOG

1730

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

HWMU No.	HWMU Location	Time	Freeboard Level (Feet/Inches)	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
42	Waste Pit #5					

Comments: _____

Environmental Compliance:	Date:

FS-F-4886 (REV. 04/03/97)

SAMPLE

1730

ATTACHMENT DD - FEMP RCRA WAREHOUSE, BUILDING ____ OPERATION EQUIPMENT LOG
(Sheet 1 of 2)

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Procedures Available For All Equipment Used and Processes Conducted In RCRA Warehouse**			
2	**All PM Inspections Conducted Per Applicable Procedure**			
3	**Scale:** Daily PM Inspection Conducted			
	Current Calibration Sticker Present			
	Platform Guard In Place			
	Printer Operational			
	Check Weights Serviceable (Have Current PM Date)			
4	**Forklruck:** Daily PM Inspection Conducted			
	Form FS-F-2414 Completed			
	Current PM Card Present			
5	**Hoist, Crane:** Daily PM Inspection Conducted			
	Form FMPC-H&S-2423 Completed			
	Current PM Tag Present			
	Equipment Weight Capacity Not Exceeded By Load Weight			

Comments: _____

Environmental Compliance:	Date:

FS-F-4887 (REV. 04/03/97)

SAMPLE

ATTACHMENT DD - FEMP RCRA WAREHOUSE, BUILDING ____ OPERATION EQUIPMENT LOG (cont.)

(Sheet 2 of 2)

1730

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
6	**Hand Stacker/Pallet Jack:** Daily PM Inspection Conducted			
	Form FMPC-SAML-2415 Complete			
7	**Current PM Tag Present**			
8	**Drum Lift & UHLD:** Current PM Tag Present			
	Daily PM Inspection Conducted (Damaged/Missing Hardware)			
9	**Flammable Liquid Cabinets:** Positioned On Level Surface			
	Vent Port Capped (Unless Using A Vent Fan Adapter)			
	Cabinet Properly Grounded			
	No Combustible Materials Stored In/Around Cabinets			

Comments: _____

Environmental Compliance:	Date:

FS-F-4887 REV. 04/03/97)

SAMPLE

ATTACHMENT EE - HAZARDOUS WASTE STORAGE LOCKER (CLEAN SIDE)

1730 **Storage Locker Clean Side (For less than 90-day storage)**

SAMPLE

Inspector's Signature:	Badge #:	Date:
HWMU Facility Owner's Signature:	Badge #:	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
1	**Signs:** -Danger-Authorized Personnel Only -No Smoking or Open Flame -Emergency & Prior to Entry Contact			
2	**Locker Condition**			
3	**Condition of Secondary Containment**			
4	**Emergency & Spill Response Equipment**			
5	**Compatibility Codes**			
6	**Container Management**			
7	**Condition of Drums (Evidence of Leaks/Spills)**			
8	**Safety Equipment**			

Comments: _____

Environmental Compliance:	Date:

FS-F-4889 (REV. 04/11/97)

ATTACHMENT FF - SPECIAL PROJECT HAZARDOUS TANK/CONTAINER/TANKER TRUCK INSPECTION
(Sheet 1 of 2)

1730

PROJECT NAME:

Inspector's Signature:	Badge #:	Date:
Project Engineer's Signature:	Badge #	Date:
HWMU Facility Owner's Signature:	Badge #	Date:

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
TEMPORARY TANK STORAGE List Tank Numbers & Location(s):				
1	Overfill/Spill Control Equipment			
2	Corrosion or Release of Waste			
3	Monitoring Equipment in Place (Content Level)			
4	Surrounding Area Condition & Unit Integrity			
5	Secondary Containment Condition			
6	Accumulation of Precipitation in Secondary Containment: (See Note Below)			
7	Manway Closed (Except When Adding or Removing Waste):			
8	Sump Pump Switch Position (Should be "off")			
9	Tank has "Hazardous Waste" Marking (Label) Affixed			
DRUM STORAGE AREA List Location(s):				
1	Drums have "Hazardous Waste" Marking (Label) Affixed			
2	Corrosion, Holes, Dents, Bulges, or Leaks:			
3	All Drums Closed Except When Adding or Removing Waste			
4	Spill Response Equipment			
5	Secondary Containment Equipment			

SAMPLE

FS-F-4890 (REV. 04/11/97)

ATTACHMENT FF - SPECIAL PROJECT HAZARDOUS TANK/CONTAINER/TANKER TRUCK INSPECTION
(Sheet 2 of 2)

1730

Item No.	Item Description	Acceptable	Unacceptable	Observations/Corrective Actions To Be Completed
TANKER TRUCK AND TRAILER List Location(s):				
1	Labeled with "Hazardous Waste" Marking			
2	Corrosion, Holes, Dents, Bulges, or Leaks:			
3	Lid/Manway Closed Except When Adding or Removing Waste			
4	Spill Response Equipment			

NOTE: Inspection of special projects is only required when RCRA material is present.

NOTE: HAZARDOUS WASTE CONTAINERS STORED OUTDOOR MUST BE INSPECTED DAILY. INDOOR DRUMS AND STAGING AREAS MUST BE INSPECTED WEEKLY. TANKER TRUCKS MUST BE INSPECTED DAILY.

NOTE: REMOVE ACCUMULATIONS OF PRECIPITATION IN SECONDARY CONTAINMENT PRIOR TO PROJECT START-UP EACH DAY. IF THE PROJECT IS NOT OPERATIONAL (i.e., WEEKENDS/HOLIDAYS), PRECIPITATION SHALL BE REMOVED WHEN THIS LEVEL EXCEEDS APPROXIMATELY ONE INCH.

COMMENTS: _____

Environmental Compliance:	Date:

FS-F-4890 (REV. 04/11/97)

SAMPLE

ATTACHMENT GG - CONTAINER INSPECTION CATEGORIES

1730

TYPE	CHARACTERISTIC	CORRECTIVE ACTION
I	Material flowing from the container with accumulation on the pallet or pad.	1. Notify the Inspector Supervisor. **The Supervisor shall notify the AEDO.** 2. Immediately stop or contain the leak. 3. Supervisor records on the inspection log that the required action has been completed. 4. Complete additional cleanup as necessary.
II	Material on the container exterior only; no material on the pallet or pad.	1. Record the leak on the inspection log. 2. Notify the Inspector Supervisor. **The Supervisor shall notify the AEDO (see EP-0004, "Spill Incident Reporting and Cleanup). The Supervisor shall review the completed inspection logs to prioritize containers for transfer to the overpacking area and subsequent mitigation.**
III	The container exterior is discolored with visible contamination; no material release. Severe corrosion with deep pitting and/or metal flaking. Dents and/or bulges which affect container to the degree of potential release.	1. Record the condition on the inspection log. 2. Notify Inspector Supervisor. **The drum requires disposition as directed by the Supervisor.**

SAMPLE

1730

ATTACHMENT HH - HAZARDOUS WASTE STORAGE COMPATIBILITY CHART

REACTIVITY GROUP DESCRIPTION	RGC CODE (1)	A	B	C	D	E	F	G	H	I	J	K	L	M
HALOGENATED ORGANICS AND PCB	A	X	X	O	O	X	X	X	O	O	O	X	O	O
ALCOHOLS AND COMBUSTIBLES	B	X	X	O	O	X	X	X	X	O	O	X	O	O
MINERAL ACIDS + CORROSIVES	C	O	O	X	O	O	O	O	O	O	O	O	O	O
CAUSTICS	D	O	O	O	X	O	O	O	O	O	O	O	O	O
TOXICS AND TCLP METALS	E	X	X	O	O	X	X	X	X	O	O	X	O	O
FLUORIDES	F	X	X	O	O	X	X	X	X	O	O	X	O	O
WATER MIXTURES	G	X	X	O	O	X	X	X	X	O	O	X	O	O
CYANIDES	H	O	X	O	O	X	X	X	X	O	O	X	O	O
OXIDIZERS	I	O	O	O	O	O	O	O	O	X	O	O	O	O
REACTIVES	J	O	O	O	O	O	O	O	O	O	X	O	O	O
IGNITABLE	K	X	X	O	O	X	X	X	X	O	O	X	O	O
PEROXIDES	L	O	O	O	O	O	O	O	O	O	O	O	X	O
EXPLOSIVES	M	O	O	O	O	O	O	O	O	O	O	O	O	X

(1) An "X" indicates a compatible combination, and an "O" indicates an incompatible combination.

SAMPLE

APPENDIX B

S&WP DIVISION PROCEDURE 43-C-601, INSPECTION/OPERATION OF SURFACE IMPOUNDMENTS

CONTROL NUMBER

Fernald Environmental Management Project Fluor Daniel Fernald, Inc.		Revision No. 1 Effective: 10/10/97 PCN No. N/A
S&WP DIVISION PROCEDURE	**Inspection/Operation Of Surface Impoundments**	**43-C-601** **TECHNICAL PROCEDURE**
Authorization: E. Henry, Team Coach Wastewater Treatment Operations	Supersedes: None	Page 1 of 8

{Direct questions concerning this procedure to the PTR, T. Arnold, X5774} 1730

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RECORD OF ISSUE/REVISIONS

REV. NO.	EFFECTIVE	DESCRIPTION AND AUTHORITY
N/A	08/28/81	Updated to include Pit No. 6 and requirements for controlling ammonia labels per changes in SOP Nos. 626 and 627, initiated by J. Farr.
N/A	08/27/85	General update of SOP including addition of procedure section per SOP Change Request No. 950, initiated by J. Farr.
N/A	10/28/86	Revision to clearwell operation per SOP Change Request No. P86-250, initiated by M. Griffin.
0	07/30/92	Issued to update inspection/operation per Request No. P92-132, initiated by J. Hensley.
0	08/31/95	Reissued without technical changes to conform to current requirements following Periodic Review R95-046, per Request No. P95-0183, initiated by J. Leslie.
1	10/10/97	Revised and updated following periodic review per Request No. P97-0287, initiated by T. Arnold.

1730

1730

1.0 PURPOSE

1.1 The purpose of this procedure is to provide the Inspection and Operation requirements for Waste Pit No. 5, Pit No. 3 Clearwell and the Lime Sludge Lagoons.

2.0 SCOPE

2.1 This procedure applies to the Inspection/Operation of Waste Pit No. 5, Pit No. 3 Clearwell and the Lime Sludge Lagoons. These Surface Impoundments are listed as Hazardous Waste Management Units (HWMUs) numbers 42, 39, and 43 respectively.

3.0 APPLICABLE DOCUMENTS

3.1 Source Documents

3.1.1 29 CFR 1910.120, "Occupational Safety & Health Act (OSHA)"

3.1.2 40 CFR 261, "Identification & Listing of Hazardous Waste"

3.1.3 40 CFR 264.226, "Inspection of Surface Impoundments"

3.1.4 40 CFR 265.16, "Personnel Training"

3.1.5 40 CFR 265.226, "Inspection of Surface Impoundments (Interim status)"

3.2 Reference Documents

3.2.1 EP-0004, "Spill Incident Reporting and Clean-Up"

3.2.2 20-C-616, "Inspection of Hazardous Waste Management Units"

3.2.3 43-C-340, "AWWT Phase I And II Operations"

3.3 Information Sources

3.3.1 None.

4.0 DEFINITIONS

4.1 Authorized Personnel - Personnel who have successfully completed all training requirements to perform work related to this procedure and have been authorized by the Facility Owner to perform the work.

4.2 Freeboard - The distance between the top of surface impoundment's/sump's content level and the top of the containment dike/berm.

4.3 Hazardous Waste Management Unit (HWMU) - Any unit/facility where hazardous waste is currently controlled or an empty unit which held hazardous waste (i.e. treatment, storage or disposal).

1730

4.0 **DEFINITIONS** (cont.)

4.4 Operators/Inspectors - Personnel who have successfully completed the training requirements to perform work related to surface impoundments per the guidelines of this procedure.

4.5 Resource Conservation and Recovery Act (RCRA) - The congressional act which established safe and environmentally acceptable management practices for specific wastes. RCRA requires strict "cradle to grave" control and proper management of hazardous waste.

4.6 Sample - A portion of a universe or of a whole (e.g., waste pile lagoon, ground water, material, etc.) which can be expected to exhibit the average properties of the universe or whole. For the purposes of this procedure samples do not include any contact wastes, sample extracts, leachates, digestates, or other sample derivatives.

4.7 Spill - Any unplanned event involving leaking, pumping, pouring, injecting, escaping, emitting, emptying, leaching, releasing, dumping, discharging, or disposing of hazardous waste onto the ground, into water, or into the air, within or beyond the boundaries of the FEMP.

4.8 Surface Impoundment - A facility or part of a facility which is a topographic depression, manmade excavation, or diked area formed primarily of earthen materials designed to hold liquid hazardous waste or wastes containing free liquids.

5.0 **RESPONSIBILITIES**

5.1 The **Facility Owner** is responsible for the following:

5.1.1 Coordinating and contacting support organizations for assistance as required per this procedure.

5.1.2 Controlling access to HWMUs.

5.1.3 Ensuring personnel are authorized per the established training requirements as identified by the Department/Staff Manager.

5.1.4 Ensuring the Inspection Log(s) are completely filled out.

5.1.5 Initiating appropriate work request for problems noted.

5.1.6 Signing and distributing Inspection Logs to the RCRA Operating Record (Trailer No. 26) and to Environmental Compliance (EC).

5.1.7 Ensuring authorized storage configurations, aisle spacing, waste segregation, and other building requirements are maintained.

5.1.8 Ensuring nuclear criticality safety signs are posted.

5.1.9 Maintaining a current copy of the RCRA Contingency Plan.

5.2 The **Supervisor** is responsible for the following:

5.2.1 Notifying Facility Owner of corrective actions required.

5.0 **RESPONSIBILITIES** (cont.)

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5.2.2 Implementing needed corrective actions and recording actions taken including completion date on the appropriate Inspection Log.

5.2.3 Contacting Industrial Hygiene or Radiological Safety to determine the appropriate respiratory protection and/or additional protective clothing for the process being performed.

5.2.4 Providing Operators/Inspectors with the required Personal Protective Equipment (PPE).

5.2.5 Notifying the Assistant Emergency Duty Officer (AEDO) and completing an Incident Investigation Form if a spill occurs.

5.3 **Operators** are responsible for the following:

5.3.1 Performing required operations/inspections of surface impoundments per this procedure.

5.3.2 Noting observed deficiencies and notifying the Supervisor.

5.3.3 Following all posted safety requirements.

5.3.4 Taking steps to immediately control a spill or leak.

5.3.5 Notifying the Supervisor (or AEDO in Supervisor's absence) of the magnitude, location, status, and type of material spilled per EP-0004, "Spill Incident Reporting and Clean-Up".

6.0 **GENERAL**

6.1 The surface impoundment procedures are to be performed twice every shift (every four (4) hours).

6.2 After a period of heavy rain, an area inspection shall be repeated.

6.3 For daily and weekly inspections of HWMUs refer to Procedure 20-C-616, "Inspection of Hazardous Waste Management Units".

6.4 Warnings, Cautions, and Notes shall precede the Item, Step, Sub-Step, Section, or Sub-Section to which they apply.

7.0 **HEALTH AND SAFETY REQUIREMENTS**

7.1 Leather-palm gloves shall be worn when handling sharp-edged or abrasive materials or containers.

7.2 Personnel within five (5) feet of the lip of the Bio-Surge Lagoon (BSL) and/or operating a water craft shall wear a life jacket.

7.3 Operations involving the use of water craft or outside the restricted walkways shall be performed by at least two (2) persons.

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7.0 **HEALTH AND SAFETY REQUIREMENTS** (cont.)

7.4 Water craft not in use shall be attached to a secure anchorage on the shore.

7.5 Personnel working around the BSL shall carry two-way radios.

7.6 Vehicles shall not be driven on the exposed liner membrane surface or within seven (7) feet of the visible edge of the membrane.

7.7 Appropriate footwear shall be worn by personnel walking on the membrane. Care shall be taken to impose only minimum loads on the membrane while walking.

7.8 When using a water craft in the lagoon, care shall be taken to avoid damage to the lagoon liner by oars or paddles or by sharp or rough surfaces on the boat.

7.9 If work is to be performed along the side walls or bottom when the water level is low and the use of potentially damaging equipment is required, a work plan shall be prepared to establish precautions to protect the lagoon liner.

7.10 In case of contact with methanol, remove contaminated clothing and wash the affected body area in a safety shower/eye bubbler. If methanol is ingested, induce vomiting. Injured personnel shall report to Medical Services as soon as possible for treatment.

7.11 Respiratory protection provided by the Supervisor shall be worn when required.

7.12 Safety glasses shall be worn unless additional eye protection is specified by S&H, the Supervisor, or posted signs.

7.13 Personnel operating a watercraft shall wear protective equipment specified by a Radiation Work Permit (RWP).

7.14 Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion, or absorption shall immediately be reported to a Supervisor. The Supervisor shall immediately report the circumstance of possible radioactive materials intake to O&PI, Safety and Health Department, Dosimetry Section for evaluation. When the suspect isotope is uranium, the involved personnel shall report to the Urine Sampling Station at the end of their shift to complete an Incident Investigation Report (IIR), and submit an incident urine sample. The involved personnel shall also report to the Urine Sampling Station at the start of their next shift to submit a follow up urine sample. When the suspect isotope is other than uranium, the involved personnel shall report to the Dosimetry Section for further determination of actions. Employees are responsible for complying with additional requirements as specified by the Dosimetry Section.

7.15 Any situation which could have resulted in the inhalation, ingestion, or absorption of a hazardous material shall immediately be reported to a Supervisor or to the Assistant Emergency Duty Officer (AEDO), who will immediately report the circumstances to Medical and Industrial Hygiene. The involved personnel shall be directed by the Supervisor or AEDO as to when and where to report for medical evaluation, completion of an Incident Investigation Report (IIR), and submitting bioassay samples (e.g. blood, urine). Employees are responsible for complying with any additional requirements as specified by the Dosimetry Section.

7.0 **HEALTH AND SAFETY REQUIREMENTS** (cont.)

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7.16 Notify the Facility Owner or the Water Plant Supervisor for authorization when Operator access is required beyond the posted chain boundary.

8.0 **PROCEDURE**

NOTE: Contact the Supervisor or the AEDO if required results of any step are not obtained, or if any off-normal conditions occur or are observed.

8.1 Waste Pit No. 5 Operation

OPERATOR

8.1.1 Ensure no water is entering the pit through the influent discharge line at the east side of Waste Pit No. 5.

8.1.2 Inspect three (3) valves on south side of pit.

8.1.3 Ensure valves are closed to prevent water entry to the pit.

8.1.4 Inspect effluent discharge at the Decant Tower of the pit for water leakage to Pit No. 3 Clearwell.

8.1.5 Check freeboard level gauge at effluent monitoring station at the Decant Tower.

8.1.6 Record the level on the "K-65 Round Sheet" in Procedure 43-C-340, "AWWT Phase I And II Operations".

8.1.7 Perform decant operations as follows if freeboard level is two (2) feet or less:

A. Notify the Supervisor that the freeboard level is two (2) feet or less and decant operation is being initiated.

B. Open sluice gate valve at Decant Tower.

C. Flow shall not exceed approximately 100 gallons per minute to the Pit No. 3 Clearwell.

D. IF flow exceeds 100 gallons per minute,
THEN adjust the sluice gate valve to reduce the flow.

E. Submit a sample from Pit No. 3 Clearwell composite sampler ~~to the AWWT Process Control Lab~~ for Total Uranium and pH.

F. Close sluice gate valve when freeboard level reaches two feet six inches (2 ft. 6 in.).

8.0 **PROCEDURE** (cont.)

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8.2 Pit No. 3 Clearwell Operation

OPERATOR

8.2.1 Inspect the influent line from Pit No. 5, located at the northwest corner of Pit No. 3 Clearwell, for leakage.

8.2.2 Check the freeboard level gauge at the effluent monitoring station at the south corner of Pit No. 3 Clearwell.

8.2.3 Record the freeboard level on the "Log - Inside Rounds 'A'" form and the "K-65 Round Sheet" in Procedure 43-C-340, "AWWT Phase I And II Operations".

8.2.4 Start pumping operations as follows if freeboard level is five (5) feet or greater:

A. Notify the Utilities Supervisor that the freeboard level is five (5) feet or greater and pumping operation is being initiated.

B. Start the Clearwell pump and align valving to the Bio-Surge Lagoon.

C. Submit sample from composite sampler ~~to the AWWT Process Control Lab~~ for Total Uranium and pH.

D. WHEN the Clearwell freeboard level lowers to six (6) feet,
THEN stop the pump and close valves to the Bio-Surge Lagoon.

8.3 North Lime Sludge Lagoon Operation

OPERATOR

8.3.1 Inspect the influent valve at the southeast corner of the North Lime Sludge Lagoon for leakage.

8.3.2 Check the freeboard level gauge at the effluent monitoring station at the northwest corner of the North Lime Sludge Lagoon.

8.3.3 Record the level on "K-65 Round Sheet" in Procedure 43-C-340, "AWWT Phase I And II Operations".

APPENDIX C

S&WP DIVISION PROCEDURE 43-C-412, MANAGEMENT OF WATER COVER FOR WASTE PIT NO. 6

CONTROL NUMBER

Fernald Environmental Management Project Fluor Daniel Fernald, Inc.		Revision No. 1 Effective: 10/10/97 PCN No. N/A 1730	
S&WP DIVISION PROCEDURE	**Management Of The Water Cover For Waste Pit 6**	**43-C-412** **TECHNICAL PROCEDURE**	
Authorization: E. Henry, Team Coach Wastewater Treatment Operations	Supersedes: None	Page 1 of 12	

{Direct questions concerning this procedure to the PTR, T. Arnold, X5774}

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RECORD OF ISSUE/REVISIONS

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REV. NO.	EFFECTIVE	DESCRIPTION AND AUTHORITY
0	08/08/91	New procedure for the Management of the Water Cover for Waste Pit 6 per Request No. P91-102, initiated by K. Dunbar.
0	08/03/95	Reissued without technical changes to conform to current requirements following Periodic Review R95-041, per Request No. P95-0173, initiated by J. Leslie.
1	10/10/97	Revised following periodic review and updated format per Request No. P97-0286, initiated by T. Arnold.

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1.0 PURPOSE

1.1 This document establishes the requirements for operating, maintaining, and inspecting the Water Cover (environmental cap) for Waste Pit 6.

2.0 SCOPE

2.1 This procedure applies to all (utilities) personnel operating, maintaining or inspecting the Water Cover (environmental cap) for Waste Pit 6 located in the Waste Storage Area "Diagram of the Waste Storage Area" (See Figure 1).

3.0 APPLICABLE DOCUMENTS

3.1 Source Documents

3.1.1 None.

3.2 Reference Documents

3.2.1 20-C-606, "Hazardous Material Spill Clean-Up"

3.2.2 43-C-340 "AWWT Phase I And II Operations"

3.3 Information Sources

3.3.1 None.

4.0 DEFINITIONS

4.1 Spill - Any unplanned event involving spilling, leaking, pumping, injecting, escaping, emitting, emptying, leaching, releasing, dumping, discharging, or disposing of hazardous waste onto the ground, into water, or into the air, within or beyond the boundaries of the FEMP.

4.2 Storage Location - A defined area, usually a warehouse, approved for long-term storage.

4.3 TSS - Total Suspended Solids.

5.0 RESPONSIBILITIES

5.1 The **Supervisor** is responsible for:

5.1.1 Ensuring that only personnel trained per this procedure shall inspect Waste Pit 6 and operate the pumps for Pit 6.

5.1.2 Contacting Safety and Health (S&H) to determine the appropriate level of protection for the process being performed.

5.1.3 Providing Operators with the required respiratory protection.

5.1.4 Maintaining records required by State and Federal governments.

5.1.5 Determining when excess water is to be removed and its disposition.

5.0 **RESPONSIBILITIES** (cont.)

1730

Supervisor (cont.)

5.1.6 Ensuring that personnel checking the water level and removing excess water from Waste Pit 6 are qualified per the established training requirements identified by the Department/Staff Manager.

5.2 The **Operator** is responsible for:

5.2.1 Complying with this procedure.

5.2.2 Performing tasks in accordance with this procedure.

6.0 **GENERAL**

6.1 Warnings, Cautions, and Notes shall precede the Item, Step, Sub-Step, Section, or Sub-Section to which they apply.

7.0 **HEALTH AND SAFETY REQUIREMENTS**

7.1 A defined safety system is not involved.

7.2 Safety glasses shall be worn at all times unless other eye protection is specified by S&H, the Supervisor, or posted signs.

7.3 Personnel safety equipment (eyewash, fire extinguishers, safety showers) shall be available for emergencies.

7.4 Leather-palm gloves shall be worn while handling drums, operating equipment, and handling rough, sharp-edged, or contaminated materials.

7.5 Respiratory protection provided by the Supervisor as specified by S&H shall be worn when required.

7.6 Normal Controlled Area clothing shall be worn unless otherwise specified by S&H.

7.7 Vehicles shall not be driven on the exposed liner membrane surface of Pit 6 or within seven (7) feet of the visible edge of the membrane.

7.8 To protect the membrane, appropriate footwear shall be worn by personnel walking on the membrane. Care shall be taken while walking on the membrane.

7.9 If work is to be performed along the side walls or bottom when the water level is low and the use of potentially damaging equipment is required, a job plan shall be prepared to establish precautions to protect the Waste Pit or lagoon liner.

7.10 An approved life jacket, in addition to other required clothing, shall be worn by personnel within five (5) feet of the Waste Pit or Surge Lagoon.

7.11 Personnel working around the Waste Pit or Surge Lagoon shall carry two-way radios.

7.0 **HEALTH AND SAFETY REQUIREMENTS** (cont.)

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7.12 Tasks involving any operation outside the restricted walkways shall be performed by at least two (2) persons.

7.13 All samples shall be labeled to identify the type of material.

7.14 Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion, or absorption shall immediately be reported to a Supervisor. The Supervisor shall immediately report the circumstance of possible radioactive materials intake to O&PI, Safety and Health Department, Dosimetry Section for evaluation. When the suspect isotope is uranium, the involved personnel shall report to the Urine Sampling Station at the end of their shift to complete an Incident Investigation Report (IIR), and submit an incident urine sample. The involved personnel shall also report to the Urine Sampling Station at the start of their next shift to submit a follow up urine sample. When the suspect isotope is other than uranium, the involved personnel shall report to the Dosimetry Section for further determination of actions. Employees are responsible for complying with additional requirements as specified by the Dosimetry Section.

7.15 Any situation which could have resulted in the inhalation, ingestion, or absorption of a hazardous material shall immediately be reported to a Supervisor or to the Assistant Emergency Duty Officer (AEDO), who will immediately report the circumstances to Medical and Industrial Hygiene. The involved personnel shall be directed by the Supervisor or AEDO as to when and where to report for medical evaluation, completion of an Incident Investigation Report (IIR), and submitting bioassay samples (e.g. blood, urine). Employees are responsible for complying with any additional requirements as specified by the Dosimetry Section.

7.16 A whole body frisk by S&H is required before being allowed to exit the Waste Storage Area.

7.17 A spill of hazardous material shall be reported per Procedure 20-C-606, "Hazardous Material Spill Clean-Up".

8.0 **PROCEDURE**

~~WARNING 1~~

~~During periods of high radon levels, personnel will be denied access to the waste storage area to avoid exposure.~~

WARNING ~~2~~

All personnel must wear an approved life jacket in addition to other required clothing when within five (5) feet of the basin to prevent injury.

8.0 **PROCEDURE** (cont.)

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NOTE 1: Before periods of pumping, a sample shall be taken from Waste Pit 6.

NOTE 2: Allow at least 24 hours settling time prior to sampling.

8.1 Sampling Waste Pit 6

OPERATOR

8.1.1 At the start and midpoint of each shift when pumping, obtain a one (1) quart polyethylene container.

8.1.2 Inspect the polyethylene container for any holes or other damage that could affect container integrity.

8.1.3 Inspect the polyethylene container for any type of foreign material that could affect test results.

8.1.4 Each polyethylene sample container must be properly labeled to indicate the following information:

A. Date the sample was taken.

B. Time of day the sample was taken.

C. Location where the sample was taken.

D. Badge number and the name of the person taking the sample.

NOTE: The sample from Waste Pit 6 shall be taken from the location where the gasoline-powered pump is located at Pit 6, shown in "Diagram of Waste Pit 6" (See Figure 2).

8.1.5 Obtain a sample of Waste Pit 6 effluent using the one (1) quart container.

8.1.6 Wipe the outside of the sample container with a damp cloth to remove contaminants.

8.1.7 Dispose of the damp cloth in an approved storage receptacle.

NOTE: As a minimum, each sample shall be analyzed for Uranium (U), pH, fluoride (ppm), and Total Suspended Solids (TSS).

8.1.8 Submit the sample ~~to the AWWT Process Control Lab~~.

8.1.9 Record the analysis results received from the Laboratory Technician on the K-65 Round Sheets in Procedure 43-C-340, "AWWT Phase I And II Operations", located at the AWWT Plant.

8.0 **PROCEDURE** (cont.)

1730

~~WARNING 1~~

~~During periods of high radon levels, personnel will be denied access to the waste storage area to avoid exposure.~~

WARNING ~~2~~

All personnel must wear an approved life jacket in addition to other required clothing when within five (5) feet of the basin to prevent injury.

NOTE 1: During periods of high pit levels, such as early spring, portable pumps and hoses may be required to transfer materials from Waste Pit 6 to the Surge Lagoon or General Sump.

NOTE 2: Transfers of effluent from one pit to another location will be dictated by a Supervisor or a qualified representative.

8.2 Removing Water From Waste Pit 6

OPERATOR

8.2.1 Obtain the fire hose from the designated storage location.

8.2.2 Connect one (1) end of the fire hose to the gasoline-powered pump at Pit 6.

8.2.3 Stretch the other end of the fire hose to the middle berm valve for Pit 5 (See Figure 2).

8.2.4 Connect the fire hose to the middle berm valve for Pit 5 (See Figure 2).

8.2.5 Examine all apparatus (fire hose, pump, for example) for any indications of wear or potential failure.

NOTE: The suction hose strainer should be a few inches below the surface of the water to assure the transfer of as few solids as possible.

8.2.6 Start the gasoline-powered pump at Pit 6.

8.2.7 Open the middle berm valve at Pit 5 (See Figure 2).

8.2.8 Pump the excess water to the Surge Lagoon.

8.2.9 WHEN the water level in Pit 6 is six (6) inches from the top of the solids, THEN stop the gasoline-powered pump.

8.2.10 Close the middle berm valve at Pit 5.

8.2.11 Disconnect the fire hose from the gasoline-powered pump.

8.0 **PROCEDURE** (cont.)

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8.2 Removing Water From Waste Pit 6 (cont.)

OPERATOR (cont.)

8.2.12 Disconnect the fire hose from the middle berm valve located at Pit 5.

8.2.13 Return the fire hose to the designated storage location.

NOTE 1: No water from Pit 6 will be pumped into Pit 5.

NOTE 2: Visual estimations of the flows from Pit 6 are able to be calculated since the dimensions of Pit 6 are known. Exact flow records of Pit 6 are not kept, because precise flow rates are difficult to calculate.

8.2.14 Record the pumping on the "K-65 Round Sheet" in Procedure 43-C-340, "AWWT Phase I And II Operations".

~~WARNING 1~~

~~During periods of high radon levels, personnel will be denied access to the waste storage area to avoid exposure.~~

WARNING ~~2~~

All personnel must wear an approved life jacket in addition to other required clothing when within five (5) feet of the basin to prevent injury.

8.3 Adding Water To Waste Pit 6

OPERATOR

8.3.1 Obtain a fire hose from the designated storage location.

8.3.2 Examine all apparatus (fire hose, pump, for example) for any indications of wear or potential failure.

8.3.3 Connect the fire hose to the fire hydrant valve southwest ~~east~~ of Pit 6 (See Figure 2).

8.3.4 Stretch the fire hose to the berm of Waste Pit 6.

8.3.5 Open the valve for the fire hydrant to start filling Waste Pit 6.

NOTE: If possible, water levels in all pits should be kept 36 inches below the top of the embankment to eliminate possible overflows.

8.3.6 WHEN the water level in Waste Pit 6 is six (6) inches below the level indicator marked on the liner,
THEN close the valve for the fire hydrant.

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8.0 **PROCEDURE** (cont.)

8.3 Adding Water To Waste Pit 6 (cont.)

OPERATOR (cont.)

8.3.7 Remove the fire hose from the fire hydrant.

8.3.8 Place the fire hose in its designated storage location.

8.3.9 Record the amount of water pumped to Waste Pit 6 on the "K-65 Round Sheet" in Procedure 43-C-340, "AWWT Phase I And II Operations".

~~WARNING 1~~

~~During periods of high radon levels, personnel will be denied access to the waste storage area to avoid exposure.~~

WARNING 2

All personnel must wear an approved life jacket in addition to other required clothing when within five (5) feet of the basin to prevent injury.

NOTE 1: During periods of heavy rain inspections shall be performed every two (2) to three (3) hours instead of twice a shift.

NOTE 2: The time period between two (2) successive inspections of the Waste Pit 6 Area shall not exceed seven (7) calendar days.

8.4 Routine Inspections Of Waste Pit 6

NOTE 1: Any of the criteria noted as unacceptable must be corrected in a timely manner.

NOTE 2: If more than 0 percent of the surface level is exposed, the condition is unacceptable.

OPERATOR (cont.)

8.4.1 Record the water level in the pit on the "K-65 Round Sheet" in Procedure 43-C-340, in "AWWT Phase I And II Operations".

8.4.2 Mark any unacceptable conditions about the inspection on the K-65 Round Sheet" in Procedure 43-C-340, "AWWT Phase I And II Operations" and include any remedial action to be taken.

8.4.3 Record the name and badge number of the person performing the inspection and the date in the appropriate places on the "K-65 Round Sheet" in Procedure 43-C-340, "AWWT Phase I And II Operations".

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8.0 **PROCEDURE** (cont.)

8.4 Routine Inspections Of Waste Pit 6 (cont.)

OPERATOR (cont.)

8.4.4 Sign the completed inspection list.

8.4.5 Record all routine operating requirements and abnormal conditions on the "K-65 Round Sheet" in Procedure 43-C-340, "AWWT Phase I And II Operations".

8.4.6 Retain these forms on file indefinitely.

DIAGRAM OF THE WASTE STORAGE AREA

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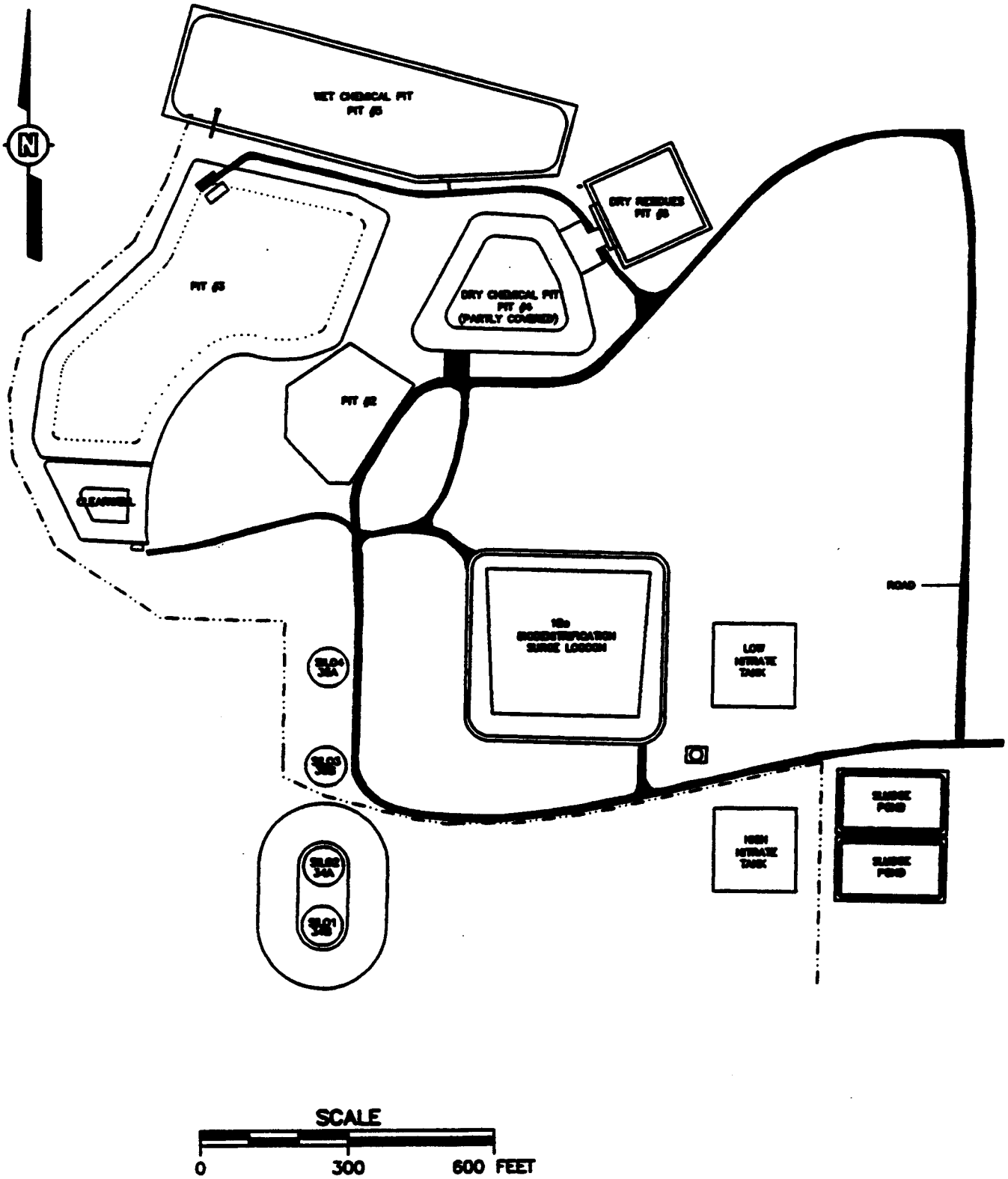

DIAGRAM OF THE WASTE STORAGE AREA
Figure 1

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DIAGRAM OF WASTE PIT 6

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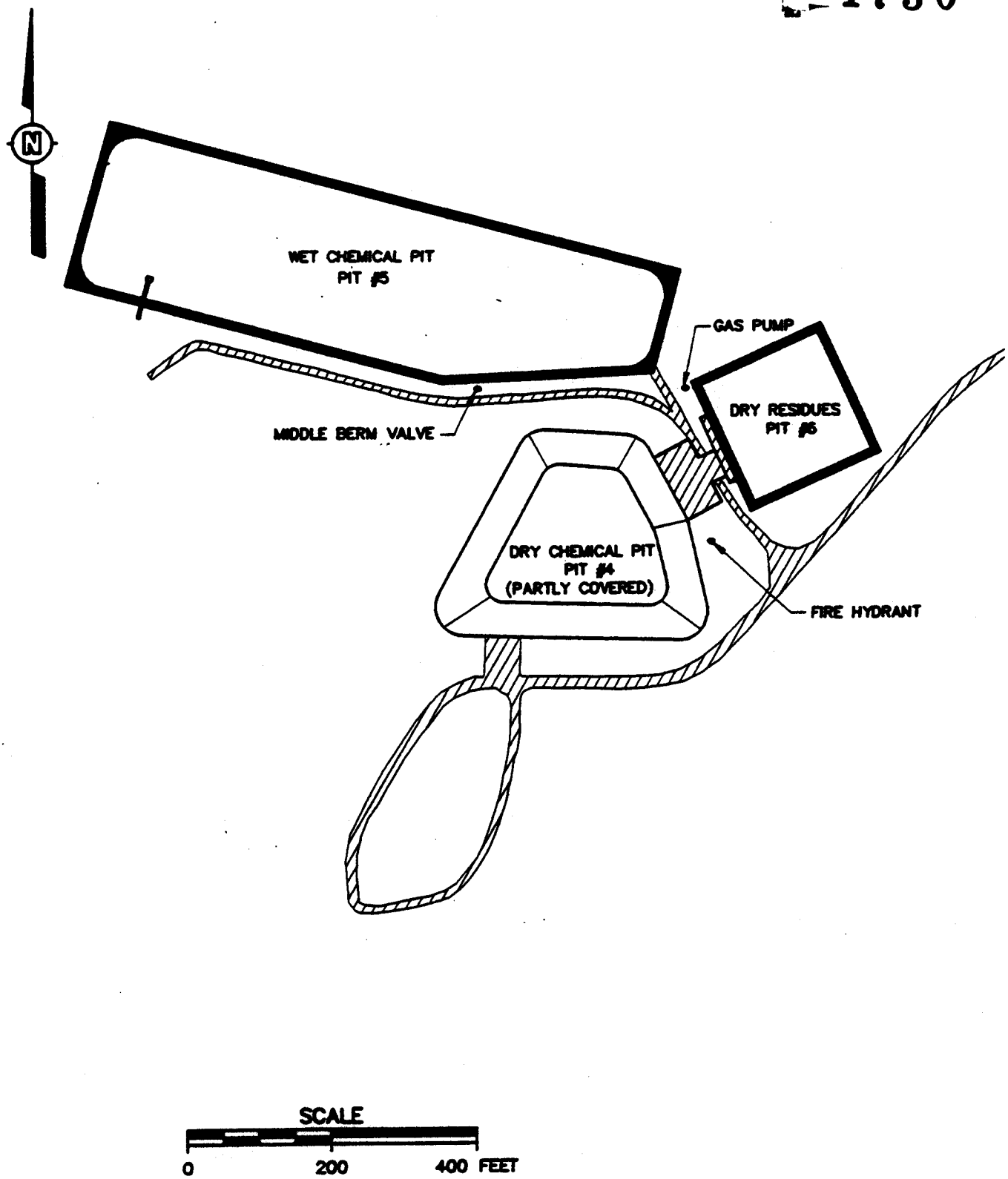

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DIAGRAM OF WASTE PIT 6
Figure 2

APPENDIX D

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AWWT FIELD OPERATOR ROUND SHEET (cont.)

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AWWT Field Operator Round Sheet

Date:_____

EQUIPMENT OR AREA TO BE CHECKED	EXPECTED OR NORMAL	ACTUAL STATUS BADGE#: 2200 - 0600	BADGE #.: 0600 - 1400	BADGE #.: 1400 - 2200
Bio Tower Control Room Condition	Okay			
Methanol Tank (ft+in)	Varies			
High Nitrate Tank (ft+in)	Varies			
Surge Lagoon (inches of outage)	Varies			
Collect Samples from Surge Lagoon	N/A			
Collect Sample from South Underdrain	N/A			
K-65 Trench Level	Not Overflowing			
Pit 6 Level	Not Overflowing Below the grass			
Sample Pit 6 if Pumping	N/A			
Pit 5 Level (ft+in)	Varies			
Collect Sample from West Underdrain	N/A			
Cement Pond Condition	OK			
Cement Pond Level (if >zero)	Varies			
Notify supervisor if cement pond level is >= 30 inches	N/A			
Clearwell Level (ft+in)	Varies			
Collect clearwell sample if pumping	N/A			
HWMU Inspection Daily + Weekly on Sunday	N/A			

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DRAFT

Waste Pits Remedial Action Project
(WPRAP)
OPERATIONS ENVIRONMENTAL CONTROL PLAN

***

PREPARED
for
Fluor Daniel Fernald, Inc.
Fernald, Ohio

FDF Subcontract No. 98SC000001

***

PREPARED
by
IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 773481

***

Revision No.: C
Issue Date: September 25, 1998

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Record of Issue/Revisions

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Date	Rev. No.	Description of Revision
6/24/98	A	Original Issue of Draft
8/28/98	B	Draft for FDF Review
9/25/98	C	Draft Issue for EPA Review

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List of Acronyms/Abbreviations

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AASHTO	American Association of State Highway Transportation Officials
ABMA	American Bearing Manufacturers Association
ACGIH	American Conference of Government Industrial Hygienists
ACI	American Concrete Institute
ACM	Asbestos Containing Material
ACOE	United States Army Corps of Engineers
AFBMA	Anti-Friction Bearing Manufacturers Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
ALARA	As Low As Reasonably Achievable
ALTER	Accelerated Life Testing and Environmental Research Facility
AMCA	Air Movement and Control Association
ANS	American Nuclear Society
ANSI	American National Standards Institute
APC	Air Pollution Control
API	American Petroleum Institute
ARAR	Applicable or Relevant and Appropriate Requirement.
ARI	American Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
AWWT	Advanced Wastewater Treatment
BAT	Best Available Technology
BSL	Biodenitrification Surge Lagoon
CAM	Continuous Air Monitor
CBR	California Bearing Ratio
CDF	Commercial Disposal Facility
CEM	Continuous Emissions Monitor
CEMA	Conveyor Equipment Manufacturers Association
CERCLA	Comprehensive, Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Constituent of Concern
CPT	Cone Penetrometer Test
CRSI	Concrete Reinforcing Steel Institute
CRU	CERCLA/RCRA Unit
CWA	Clean Water Act of 1977, as amended
D&D	Decontamination and Dismantlement
DAC	Derived Air Concentration
DCD	Design Criteria Document

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List of Acronyms/Abbreviations (Continued)

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DEEP	Dewatering Excavation Evaluation Program
DOE	United States Department of Energy
DOE-NV	United States Department of Energy - Nevada Office of Operations
DOT	United States Department of Transportation
EJMA	Expansion Joint Manufacturers Association
ERDA	Energy Research and Development Administration
F	Fahrenheit
FDF	Fluor Daniel Fernald, Inc.
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
FFCA	Federal Facilities Compliance Agreement
fpm	feet per minute
FS	Feasibility Study
FSAR	Final Safety Analysis Report
ft^2	square foot (feet)
GCS	Gas Cleaning System
GFCI	Ground Fault Circuit Interrupter
GLC	Ground Level Concentration
gpm	gallons per minute
HEPA	High Efficiency Particulate Air (filter)
hr	hour
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineers Society
ID	Induced Draft
IPC	Inclined Plate Clarifier
ISA	International Society for Measurement and Control
IT	IT Corporation
kg	kilogram
kV	kilovolt
kVA	kilovolt-ampere
kW	kilowatt
lb	pound
LLRW	Low Level Radioactive Wastes
m^2	square meter
MAGLC	Maximum Allowable Ground Level Concentration
MAWC	Maximum Average Waste Concentration
MBMA	Metal Building Manufacturers Association
MCC	Motor Control Center
MEI	Maximally Exposed Individual
MHB	Material Handling Building
µCi/cc	microcurie per cubic centimeter
mrem	millirem

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List of Acronyms/Abbreviations *(Continued)*

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MSS	Manufacturers Standardization Society
NAD	North American Datum
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NESHAP	National Emission Standards for Hazardous Air Pollutants
NETA	National Electrical Testing Association
NFC	National Fuel Code
NFPA	National Fire Protection Association
NP	Nonplastic
NPDES	National Pollutant Discharge Elimination System
NPH	Natural Phenomenal Hazard
NTS	Nevada Test Site
OAC	Ohio Administrative Code
OBBC	Ohio Basic Building Code
ODOT	Ohio Department of Transportation
OEPA	Ohio Environmental Protection Agency
OSDF	On Site Disposal Facility
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PC	Performance Category
PCB	Polychlorinated Biphenyl
pcf	pounds per cubic foot
pCi/L	picoCuries per liter
PFD	Process Flow Diagram
PID	Photoionizing Detector
PLC	Programmable Logic Controller
PPE	Personal Protective Equipment
psf	pounds per square foot
psi	pounds per square inch
psig	pounds per square inch gauge
PTI	Permit to Install
PTO	Permit to Operate
PVC	Polyvinyl Chloride
QAP	Quality Assurance Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
RLB	Railcar Loadout Building
ROD	Record of Decision
SAE	Society of Automotive Engineers
SCS	Soil Conservation Service
scfm	standard cubic feet per minute
SDI	Steel Deck Institute

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List of Acronyms/Abbreviations *(Continued)*

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sec	second
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPT	Standard Penetration Test
SSC	Structure, System and Component
STD	Standard (DOE)
SWM	Storm Water Management
SWPPP	FERMCO Storm Water Pollution Prevention Plan
TBC	To Be Considered
TBP	Tributyl Phosphate
TEMA	Tubular Exchanger Manufacturers Association
TOC	Total Organic Carbon
TSDF	Waste Treatment, Storage or Disposal Facility
UBC	Uniform Building Code
UCRL	University of California Research Laboratory
UL	Underwriters Laboratory
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency (EPA)
V	Volt
WAC	Waste Acceptance Criteria
WESP	Wet Electrostatic Precipitator
WPRAP	Waste Pits Remedial Action Project
WTS	IT Corporation Wastewater Treatment System
yd^3	cubic yard
yr	year

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1.0 Introduction

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1.1 Project Background

IT Corporation (IT) has been contracted by Fluor Daniel Fernald, Inc. (FDF) to complete the Waste Pits Remedial Action Project (WPRAP) which involves remediation of Waste Pits Nos. 1 through 6, the Burn Pit, the Clearwell, and the Operable Unit 1 (OU1) Contaminated Soil Stockpile at the Fernald Environmental Management Project (FEMP) in Fernald, Ohio. This facility was formerly operated for and by the U.S. Government to process and produce high purity uranium metal and thorium products for the U.S. Department of Energy (DOE) and its predecessor agencies. The facility operated from 1952 until 1989, when production was discontinued. Since that time, the facility has been officially closed and is in the process of environmental restoration.

1.2 Site Description

The FEMP site comprises an area of 1,050 acres. The waste pits to be remediated under the scope of work for the WPRAP are located to the northwest of the former main manufacturing/processing locations, inside the area designated as OU1. An overall map of the waste pit area and the OU1 facilities is provided in Figure 1-1. Specific details of topography, drainage patterns, and storm water management facilities of this area are provided in Figure 1-2. As shown in Figure 1-2, the relief of the site is generally flat, with moderate grading and contouring to facilitate drainage from clean areas and containment within waste disposal areas. Since the site has previously been developed for industrial use, most vegetation is limited. The greatest extent of vegetative cover is within the waste pit area. Since one of the best sources of erosion and sedimentation control is vegetation itself, the waste pit area will remain undisturbed to the maximum extent possible as the work progresses, thus reducing the area requiring erosion and sedimentation control.

1.3 Scope of Work

The purpose of this plan is to detail the methods and means which IT will utilize to control erosion and sedimentation, suppress dust, control air emissions, and manage storm water and wastewater in the waste pit area and the plant facilities area. This plan is intended to cover the period of work following the installation of plant facilities, up to the point of decontamination and dismantlement (D&D) of the facilities and restoration of the site. The pre-operations phase of the project has a separate environmental control plan to govern site work associated with construction of the facilities.

This plan is intended to compliment and comply with the existing FDF Storm Water Pollution Prevention Plan (SWPPP) and National Pollutant Discharge Elimination System (NPDES) permits for water management, treatment, and storm water discharge at the facility.

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2.0 Plan Objectives

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2.1 Erosion and Sedimentation Control

The objectives for erosion and sedimentation controls described in this plan are:

- Present erosion controls that comply with the Ohio Department of Natural Resources (ODNR) "Rainwater and Land Development, Ohio's Standards for Storm Water Management, Land Development, and Urban Stream Protection," Second Edition, 1996 (ODNR Rainwater and Land Development Guidance).
- Present methods for erosion control consistent with the SWPPP.
- Provide an evaluation of the site's existing and proposed hydrologic features, including topography and surface water hydrology.
- Describe how erosion and sediment control measures will minimize erosion and prevent sediment pollution.
- Describe how control features will be constructed and how they will be integrated with existing/permanent erosion and sedimentation control features.
- Specify appropriate maintenance and inspection requirements for temporary and permanent features.
- Provide adequate flexibility in the plan to allow for field conditions and as-built modifications which may be required at a later date.

2.2 Dust Control

The objectives for dust control measures described in this plan are:

- Describe the active dust control and mitigation measures that will be implemented during the remedial action operations.
- Describe engineering procedures which will be utilized to minimize the generation of dust.
- Provide descriptions of dust control equipment to be utilized at the site.
- Describe monitoring methods that will be used for evaluating levels of ambient dust.
- Indicate activities which may be critical to minimizing dust generation.
- Describe the impact that the local and seasonal climates will have on dust control.

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- The project will comply with the Fernald Environmental Management Project (FEMP) Sitewide Dust Control Policy.

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2.3 Emissions Control

The objectives for emissions control under this plan are:

- Discuss emission control procedures to be implemented during the remedial action operations phase of this project which are consistent with the requirements dictated in the "Applicable and Relevant and Appropriate Requirements" (ARAR) and by the "As Low As Reasonably Achievable" (ALARA) principle.

- Provide an overview of the stack monitoring and air monitoring measures which will be employed.

- Describe how FDF's air model will be incorporated into IT's emission control measures.

- Discuss the measures and means to be utilized to control fugitive emissions over the course of the remedial action operations.

- Provide adequate flexibility in the plan so as to allow for field conditions and as-built modifications which may be required at a later date.

- Describe maintenance and inspection requirements for the emissions control measures to be employed.

2.4 Storm Water Management

The objectives for storm water management under this plan are:

- Discuss storm water management procedures to be implemented during the remedial action operations phase of this project which are consistent with the existing SWPPP and facility NPDES permit.

- Describe storm water management structures and site features to be constructed under this plan in accordance with the ODNR Rainwater and Land Development Guidance.

- Provide an evaluation of the site's existing and proposed hydrologic features, including topography and surface water hydrology that will impact storm water management and treatment.

- Describe maintenance and inspection requirements for storm water management structures, features, and facilities.

- Provide adequate flexibility in the plan so as to allow for field conditions and as-built modifications which may be required at a later date.

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- Provide an analysis of historical climatological data relative to the facility.
- Provide the results of calculations or modeling to demonstrate the adequacy of storm water management systems to accommodate rainfall events.

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3.0 Site Conditions

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3.1 Climate and Weather Data

The Fernald site is located immediately northwest of Cincinnati, Ohio, approximately 30 miles north of the Kentucky border. The climate is somewhat tempered due to its southern location and situation in the Ohio River Valley. The site is located in U.S. Department of Agriculture Zone 6, meaning average winter low temperatures in the range of -10°F and 0°F, and accumulations of snow are normal during the winter months. Summer temperatures range from generally seasonable to hot and somewhat humid due to the proximity of the Ohio River and periodic frequency of summer precipitation. Cooling tower engineering design data provided by the Marley Cooling Tower Company for the Cincinnati, Ohio area indicates that the dry bulb temperature will exceed 85°F on ten percent of the days annually, 88°F on five percent of the days, 89°F on two and one half percent of the days, and 92°F on one percent of the days. The wet bulb temperature will exceed 75°F on ten percent of the days annually, 77°F on five percent of the days, 78°F on two and one half percent of the days, and 79°F on one percent of the days. The region has seen both flood and drought conditions over the past few years during the spring and summer. These types of temperatures and frequency of precipitation invariably will lead to the need to effectively control dust, prevent erosion, and manage storm water.

The U.S. Department of Agriculture reports in their Technical Paper No. 40, titled "Rainfall Frequency Atlas of the United States," that the 25-year, 24-hour duration storm intensity would produce approximately 4.8 inches of precipitation in the region. Although greater intensity storm events are certainly possible, for the purposes of design, this has been accepted as the reasonable design criteria to be used for the sizing of storm water management and treatment equipment and erosion control structures.

3.2 Pre-Operation Site Layout and Significant Hydrologic Features

Storm water drainage patterns for the OU1 area prior to construction of the facilities are shown in Figure 1-2. Prior to commencement of excavation activities, storm water falling within the waste pit area is directed to the K-65 Runoff Basin or the Clearwell. Because all storm water falling within the waste pit area is considered to be contaminated, water from these two collection points was pumped to the Biodenitrification Surge Lagoon (BSL) for treatment in the FDF Advanced Wastewater Treatment system (AWWT).

As shown in Figure 3-1, prior to construction of the facilities, storm water falling in the portions of OU1 outside of the waste pit area drained to the K-65 Runoff Basin, the Storm Water Management (SWM) Pond, or drainage swales that lead to Paddys Run. Storm water management features for the facilities area (post construction) are shown in Figure 3-2. The storm water management features for the plant facilities area will remain in place over the course of remedial action operations.

3.3 Summary of Runoff Estimates

Surface water runoff calculations were performed for the plant facility area and the waste pit area using runoff coefficients and depth estimates established by the TR-55 Method, and in accordance with ODNR Rainwater and Land Development Guidance. Figure 3-1 presents the plant facilities area base map denoting the general direction of flow and location of catch basins under

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preconstruction conditions. Figure 3-2 presents the same data for postconstruction conditions. Figure 3-3 presents the drainage patterns in the waste pit area prior to excavation activities. The volume of runoff to each watershed area is noted on these figures in the legend. The volumes given are based on the rainfall received from the 25-year/24-hour storm. The results of the modeling are summarized for the plant facilities area, pre- and postconstruction conditions in Table 3-1 and Table 3-2, respectively. Table 3-3 contains the results of the modeling for the waste pit area.

As excavation in the waste pit area progresses, storm water that falls on areas which initially drained to the K-65 Runoff Basin will be incorporated into the excavation water stream and will be pumped to the Clearwell. Once a waste pit is certified as clean, storm water falling on this pit can be directed to Paddys Run. This change in the drainage patterns will result in a gradual decrease in the amount of water directed to the K-65 Basin and an increase in the amount of water pumped through the Clearwell. Toward the end of the project, all water from the waste pit area will be pumped to the Clearwell or directly to the IT Wastewater Treatment System (WTS). Storm water falling on areas certified as clean will drain to Paddys Run. During these late stages of the project, when the Clearwell is no longer being used as a collection basin, the K-65 Runoff Basin may have to be used as the primary collection point for storm water requiring treatment.

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4.0 Erosion and Sediment Controls During Operations

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4.1 Erosion and Sediment Control Methods for the Waste Pit Area

Silt fences will be utilized in the waste pit area to prevent excessive erosion and/or sedimentation during excavation activities. In accordance with the ODNR Rainwater and Land Development Guidance, hay or straw bales will not be used for temporary erosion control. Silt fence locations will be selected based upon the location of the excavation activities as they progress. At a minimum, silt fences will be positioned along the perimeter of open, disturbed areas which are under excavation. Silt fences may also be used within individual working areas within excavations as well, providing protection from sedimentation or erosion of adjacent areas as needed.

Silt fence fabric will conform to the American Society for Testing and Materials (ASTM) standards given in the Site Clearing Specification of the Site Preparation Package (see Volume 3 of 3, of the Remedial Design Package). Silt fence installation, inspection and maintenance, and removal will be in accordance with the requirements provided therein.

In addition to silt fencing, IT will take advantage of the natural vegetative cover which currently exists over the surfaces of Waste Pits Nos. 1, 2, and 3, and the Burn Pit and the elastomeric liner covering Waste Pit No. 4 to control erosion in the waste pit area. These covers will be left undisturbed, to the extent practicable, until such time as the excavation sequence reaches the respective locations.

4.2 Erosion and Sediment Control Methods for the Plant Facilities Area

Prior to construction, the plant facilities area will be graded to promote proper drainage of storm water into the existing storm water collection system as shown on Figure 1-2. In addition, disturbed areas which are not to be used for roads, parking, laydown/storage, or other purposes will be vegetated in accordance with ODNR Rainwater and Land Development Guidance. Silt fencing which was installed at the plant facilities area during the pre-operations phase of the project will be maintained until sufficient vegetative cover is provided to protect against erosion. After construction activities in the plant facilities area is completed, erosion and sediment control is not expected to require frequent corrective actions.

4.3 Disposal of Erosion Control Structures

Upon completion of remedial action operations, temporary erosion control structures such as silt fencing will be removed where no longer needed. Likewise, as silt fencing deteriorates or wears to the point of losing effectiveness it will be removed and replaced. Over the course of operations, silt fencing will be relocated and reused to the extent that it allows. Removal and disposal of these structures will be appropriate to their characterization following use.

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5.0 Dust Control

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5.1 Dust Control Within the Waste Pit Area

IT will take advantage of the natural vegetative cover which currently exists over the surfaces of Waste Pits Nos. 1, 2, and 3, and the Burn Pit, as well as the water covers of Waste Pits Nos. 5 and 6, and the elastomeric liner covering Waste Pit No. 4. These covers will be left undisturbed, to the extent practicable, until such time as the excavation sequence reaches the respective locations. This approach will serve to confine the overall surface area within the pit areas from which dust generation is possible. The most effective method for controlling dust generation will be the organized, well planned excavation of the pits so that the least amount of disturbed surface area is generated.

Once a pit area is disturbed, the natural drying effects of wind, temperature, and sunshine (which have the beneficial effect of drying the waste materials) may increase the likelihood of dust generation. For that reason, as well as practicality and cost effectiveness, the primary method to be used for dust suppression within the disturbed pit areas will be water sprays. The water spray will be delivered by conventional means such as water trucks, portable pumps, sprinklers, and spray nozzles. Water will be applied judiciously to avoid runoff, ponding, or the generation of mud. The application of water will be dependent on the ambient conditions, being more frequent during warm weather and under breezy conditions when dryout would occur more rapidly. The water truck will be filled with storm water from the SWM Pond or utility water from a convenient source (i.e. fire water). Additionally, the use of non-toxic surfactants may be utilized in conjunction with, or in place of water sprays. The use of surfactants may also add the benefit of a crusting agent, which could also reduce infiltration of precipitation into the excavation areas, thus reducing the thermal output required to meet Waste Acceptance Criteria (WAC) moisture levels.

High-traffic areas such as the haul roads and service roads will have an aggregate cover which will aid in the minimization of dust generation. Dust control on the roads in the waste pit area will be maintained through the use of water spray delivered by water trucks, portable pumps, sprinklers, and spray nozzles. In addition, a speed limit of 15 miles per hour will be enforced for heavy equipment and vehicles traveling within the waste pit area to minimize the potential for dust generation.

Additional detail on dust control in the waste pits area is given in sections 5.0 of the Excavation Plan which is part of the Remedial Design (RD) Package.

5.2 Dust Control Within the Plant Facilities Area

Unlike the pit areas, the plant facilities area will not have the natural advantage of a vegetative or lined cover. This area will be comprised of new gravel and concrete access roads, as well as vegetated non-work areas. Those areas which are disturbed during the plant facilities construction but will not be utilized for buildings, roads, or other work requirements will be revegetated in order to minimize erosion and dust generation.

The truck tire wash will serve to eliminate the majority of waste material entering the haul road and truck turn around area that could be deposited on the concrete and create a dust problem. In addition, dust control on the concrete haul road leading from the truck tire wash and the truck turn around area

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will be maintained using water spray delivered by water trucks, portable pumps, sprinklers, and spray nozzles.

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Dust suppression within the material handling and railcar loadout buildings will be accomplished via water spray from portable hoses and nozzles. Water will be applied as necessary to the floors of the buildings to ensure that dust generation does not occur. Handling of the waste material in these buildings will be performed in such a way as to minimize the possibility of dust generation. Multiple handling of dry material will be minimized to the extent practical.

5.3 Dust Monitoring Methods

Monitoring for dust will be performed visually. It will be the responsibility of each IT worker to observe his work area for the potential and for the actual generation of dust. This will be reported to the supervisor, foreman, or group leader in the work area who will arrange for immediate wetting of the area or implementation of other measures to eliminate the dust. If necessary, the work area will be minimized or work stopped until the dust can be controlled.

On-site personnel will work cooperatively with FDF personnel to identify and correct dust nuisance hazards. Dust control measures will be implemented, as necessary, to mitigate the dusting condition. The project will comply with the Fernald Environmental Management Project (FEMP) Sitewide Dust Control Policy.

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6.0 Emissions Control

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6.1 Conformance with ARAR and ALARA Requirements

The control of emissions from the OU1 project area was factored into the design of all the facilities, equipment and procedures developed for this project. The following types of emissions were considered to be possible:

- aqueous phase contaminants (i.e., contaminated water) from the storm water / wastewater management facilities
- dust/particulate from the waste pit excavations or the waste processing facilities
- radon from the waste pit excavations or the waste processing facilities
- particulate radionuclides from the thermal dryer
- vapor phase organic compounds from the thermal dryer
- acid vapors from the thermal dryer
- nitrogen oxides from the thermal dryer.

The means by which IT will control emissions to comply with the ARARs and ALARA, are summarized in the ARAR and Substantive Permitting Requirements tables submitted in the O&M Plan for Remediation Facilities, in this Remedial Action (RA) Package.

Control of contaminated water is addressed in the Storm Water Management section of this plan (Section 7.0). Control of airborne fugitive emissions and air monitoring are addressed in Section 6.2.

6.2 Control of Airborne Emissions and Air Monitoring

Dust control will be accomplished primarily through the use of water spray. Dust control is addressed in greater detail in Section 5.0 of this plan. Radon fugitive emissions from the excavated material will be controlled using BAT.

The control of emissions of particulate radionuclides, nitrogen oxides, and organic vapors from the rotary dryers will be accomplished through the use of the compliance strategies given in the ARAR and Substantive Permitting Requirements tables submitted in the O&M Plan for Remediation Facilities, in this Remedial Action (RA) Package. The technologies to be utilized are as follows:

- Particulate matter (High Efficiency Particulate Air [HEPA] filtration)
- Particulate Radionuclides (HEPA filtration)
- Vapor phase organic compounds (condensation and thermal oxidization)
- Acid vapors (wet scrubbing and caustic addition for pH control)
- Nitrogen oxides (use of low NO_x burners to prevent formation of these compounds)

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The exhaust stack from the Gas Cleaning System (GCS) will be equipped with a Continuous Air Monitor (CAM) system including an isokinetic sampler designed and built in accordance with the applicable sections of 40 CFR 61.92, NESHAPS Subpart H. The CAM system will include Beta/Gama particulate detection and radon detection.

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6.3 Incorporation of FDF Air Model Into IT's Emission Controls

FDF has performed site-wide air dispersion modeling calculations for the purpose of determining stack emission limits based on the maximum allowable ground level concentration (MAGLC) at the fence line for airborne contaminants of concern. The results of analytical testing performed on air samples taken from the discharge stack on the GCS will be compared against the FDF determined stack limits to verify compliance with emission limits. The CAM system readings may also be compared to the FDF stack limits to verify compliance with emission limits.

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7.0 Storm Water and Wastewater Management

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7.1 Existing Features and Facilities to be Maintained

The term "existing features and facilities" is used here to denote any storm water management features and facilities that will be in place following construction of the plant facilities. This includes those in place prior to construction activities by IT (e.g., the SWM Pond) and those installed by IT (e.g., roof drains and collection sumps). Operation of the existing water management facilities and new features and facilities will be conducted in accordance with the existing FEMP SWPPP.

Storm water drainage patterns in the plant facilities area will be maintained throughout the project as shown in Figure 3-2. Storm water collected from vegetated portions of the plant facilities area (i.e., those outside potentially contaminated areas) will be collected in catch basins which drain to the SWM Pond. Storm water collected from roof drains from the Material Handling Building and the Railcar Loadout Building will be directed into the SWM Pond. Roof runoff from other WPRAP buildings and structures may be directed to the collection basins or to other surface drainage features. Southern portions of the plant facilities area which do not drain to the SWM Pond collection basins drain to swales that lead to Paddys Run.

Storm water collected in the SWM Pond will be sampled and analyzed as described in the Sampling and Analysis Plan contained in the RA Package. If suitable for discharge, the water will be pumped directly to the drainage swales that lead to Paddys Run. If not suitable for direct discharge to Paddys Run, the water will be transferred to the Clearwell, WTS, or directly to the BSL. Water collected in the SWM pond may alternatively be used for dust suppression, Waste Pit 5 or Waste Pit 6 water cap management, or makeup water to the rotary dryer.

In the event of a 25-year, 24-hour storm event, the water in the SWM Pond naturally overflows to a series of smaller ponds north of the SWM Pond and eventually to drainage swales along the north boundary of OU1 to Paddys Run.

Storm water from the truck wash, haul road, truck turn around area, decontamination pad and dryer pad will be collected in local sumps and will be pumped to the Clearwell for subsequent pre-treatment by the WTS and final treatment by the AWWT. These areas have been designed with curbs to contain the volume of water generated in a 25-year/24-hour storm event and to reduce the potential for this contact storm water from entering adjacent areas. The collection sumps and transfer piping (extending westward to the truck wash) will be installed during construction of the facilities.

The pre-operation drainage patterns in the waste pit area, as discussed in section 3.2 of this plan, will continue to be utilized during operation until excavation begins in the respective pits. The K-65 Runoff Basin, the Clearwell and the BSL will continue to serve as storm water collection impoundments. All storm water falling in the waste pit area is considered contaminated and will be ultimately discharged to the BSL for treatment through the AWWT. Once excavation in a given waste pit begins, storm water which falls or drains into the excavation is considered excavation water and is transferred to the Clearwell for subsequent pre-treatment by the WTS and final treatment by the AWWT. The disturbed surface area within the excavation will be graded so as to properly

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control excavation water drainage patterns. Storm water from undisturbed areas of the pits under excavation will continue to drain as it had prior to operation.

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7.2 New Features and Facilities to be Installed

The term "new features and facilities" is used here to distinguish those storm water management features and facilities to be installed in the waste pit area during the excavation phases. These include berms, dikes, drainage ditches and portable pumps. The use and placement of storm water management features will change throughout the project and will be based on the excavation activities. All storm water (and drainage and seepage water) collected in the excavations will be pumped into a line that runs along the southern portion of the waste pit area and discharges in the Clearwell. This line is the extension of the sump water transfer line installed in the plant facilities area during construction. Additional branches will be added to this line as needed to reach excavation areas.

Waste stockpiles will be located inside the facility buildings. Buildings will have roofs, partial side walls, perimeter curbs, floor sumps, and areas sloped to manage drainage. These building features will control runon/runoff for the stockpiles. Stockpiles will be visually monitored by the personnel working in the area and/or remotely by video camera. The run-on/run-off collection and hold facilities from the buildings will be managed in compliance with the requirements of the SWPPP.

7.2.1 Removal/Management of Excavation Water

Excavation water (i.e., storm water, free water drainage from the excavated material, and perched water seepage into the excavations) will be diverted to low points within the excavations and will be pumped to the Clearwell via a network of hoses and piping. Portable gasoline- or diesel-powered pumps and flexible hoses will be used within the excavations to transfer water directly to the Clearwell or to hard lines which discharge to the clearwell. Pumps in the excavation area will be equipped with check valves and isolation valves as control against water backflow into the excavations. To the extent possible during colder months, above-grade hoses and pipes will be drained when not in use to prevent freezing. Additional detail on the management of excavation water is given in sections 4.5 and 6.0 of the Excavation Plan which is part of the Remedial Design (RD) Package.

7.2.2 Treatment, Analysis, and Disposal of Storm Water and Sediments

Storm water collected in the SWM Pond will be sampled and analyzed, as described in the Sampling and Analysis Plan contained in this Remedial Action (RA) Package, to determine if it meets the NPDES discharge requirements and remedial goals pursuant to established surface water FRLs. If the water meets these requirements, the water will be pumped to existing drainage swales that lead to Paddys Run. If the water does not meet NPDES discharge requirements, it will be transferred to the Clearwell, WTS, or directly to the BSL. Sediment accumulation in the SWM Pond is not expected to become a problem. However, if excessive sediment accumulates in the SWM Pond, the sediment will be removed by means which will not damage the plastic liner in the pond. Sediment accumulation around the SWM Pond catch basins will be removed as needed based on regular inspection of the catch basins.

Storm water collected in the sumps and lift stations associated with the plant facility area will be pumped to the Clearwell. Accumulated sediment in these sumps will be removed as needed to

prevent excessive solids from entering the piping. The sumps will be visually inspected on a weekly basis to determine if excessive solids have entered the sump.

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Storm water collected in the Clearwell will mix with excavation water, drainage water and several water streams from the treatment facilities (e.g., filter backwash water and cooling tower blowdown). Water from the Clearwell will be treated through the WTS as required to meet BSL influent criteria. The treatment process in the WTS consists of removal of suspended solids and select dissolved metals (in the clarifier) and removal of dissolved uranium (in the ion exchange unit). The effluent from the WTS is transferred to the BSL for final treatment by the AWWT. The sludge stream generated in the WTS clarifier will be transferred to the filter press feed tank in the GCS process blowdown pre-treatment system. The filter cake from the filter press will be sampled and evaluated to determine if it can be disposed with the waste being shipped in the railcars or if it must be handed over to FDF for disposal. Water samples will be taken from the Clearwell periodically to determine the efficiency of the WTS. Water sampling is described in greater detail in the Sampling and Analysis Plan which is part of this Remedial Action (RA) Package.

Sediments from the Clearwell may be removed prior to commencement of waste pit excavation activities to increase the holding capacity. Any sediment removed from the clearwell will be blended along with the other waste material and will be shipped off site via railcar for disposal. In the event that excessive sedimentation occurs in the Clearwell during the excavation phases, sediment may need to be removed again to increase the holding capacity of the Clearwell. This determination will be made during operation based on actual water flow rates and sludge level measurements in the Clearwell.

The majority of the storm water that falls on the undisturbed areas within the waste pit area is directed to the K-65 Runoff Basin. The K-65 Basin also receives water from other sources outside the WPRAP area. All the water collected in the K-65 Basin is pumped to the BSL for subsequent treatment by the AWWT.

7.3 Storm Water Management Contingencies

Storm water management contingencies have been factored into the design of the facilities and the operating procedures for the project to effectively manage storm water from a 25-year/24-hour storm. These contingencies include holding capacities in the Clearwell, the SWM Pond, and the containment curbs around potentially contaminated areas and pump and piping capacities. Storm events in excess of the 25-year/24-hour storm will be managed procedurally to ensure that detrimental effects such as erosion and free release of untreated storm water are avoided when possible. Additional information regarding storm water management is given in the Storm Water / Wastewater Management Plan provided as part of the Remedial Action (RA) Package.

7.3.1 Failure of Silt Fencing

Inspection of silt fencing within the waste pit area will be performed regularly during the operation phase. IT will maintain a supply of additional silt fencing material on site to facilitate the repair of existing fencing or to be used to provide additional erosion control. Should large quantities of silt

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accumulate at the base of fencing, it will be removed as appropriate to avoid silt inundation or overriding of the fence. Should a large movement of silt such as a slide occur that damages the fence, the excess material will be removed on both sides of the fence and additional control measures or regrading will be implemented to avoid reoccurring failure. Proper maintenance of the silt fencing is critical to effective storm water management to ensure that the desired drainage patterns are maintained and that excessive amounts of solids do not enter the water management/treatment system.

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7.3.2 Excessive Rainfall

In the event of a rainfall event in excess of the 25-year/24-hour storm (4.8 inches), water will continue to be managed as currently designed. During such an event, storm water will continue to enter or be transferred to the various collection points (i.e., the SWM Pond, Clearwell, and K-65 Runoff Basin) until there is no longer available holding capacity. Storm water that normally drains to existing drainage swales that lead to Paddys Run will continue to flow in this manner.

In the event that the SWM Pond does not have enough available capacity to contain all the noncontact storm water generated during a storm event, an uncontrolled overflow could occur. The SWM Pond is designed to overflow to a series of basins and swales located north of the pump that lead to Paddys Run. In the event that the SWM Pond is reaching capacity during such a storm event, notification will be provided to FDF that an uncontrolled discharge may occur.

In the event that the Clearwell reaches maximum holding capacity during a storm event, transfer of water from the water covers on Waste Pits Nos. 5 and 6 to the Clearwell can be temporarily halted. This can be achieved by closing the gates on the drain weir at Waste Pit No. 5 and discontinuing pumping from Waste Pit No. 6. Storm water from the excavations can be temporarily transferred to Waste Pits Nos. 5 and 6 if holding capacity is available (and approval from FDF is obtained) to minimize the infiltration of water through the bottom of excavations to the subsurface waters. If holding capacity in the BSL is available (and approval by FDF is obtained), water from the Clearwell can be pumped directly to the BSL, bypassing the WTS. This would make additional capacity available in the Clearwell for excavation water. Under such circumstances, the water in the Clearwell is expected to meet the BSL WAC due to short contact times with the waste material and increased dilution.

Water transfer to the BSL from IT operations will be coordinated with FDF personnel at all times. Increased coordination between IT and FDF personnel during excessive rainfall events will ensure that storm water is managed at the site as effectively as possible.

7.3.3 Storm Drain Blockage/Backup

In the event of a storm drain blockage in the SWM Pond collection basins or the storm water collection basins along the haul road and truck turn around area, an evaluation will be made as to the cause. If the drain becomes plugged due to excessive sediment, on-site personnel will re-evaluate the placement of sediment control structures and make appropriate corrective measures. If the backup is caused by pump failure, the pump and/or level controls will be inspected and repaired. The sump pumps utilized in the facilities have been standardized to facilitate replacement. Should a backup occur, temporary pumps will be installed to remove excess water. Water removed by

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pumping will be transferred to the Clearwell for subsequent treatment by the WTS. This ensures that potentially contaminated water does not enter the SWM Pond.

7.4 Maintenance and Inspection

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The level in the Clearwell and the SWM Pond will be monitored as part of project storm water and wastewater management. During excavation activities, personnel working in the waste pit area will be responsible for managing water present in the excavations and operating the portable pumps. During periods when no excavation activities are occurring, designated operators from the facilities may be required to enter the excavation areas and operate the pumps. These operators must comply with all the Health and Safety and decontamination procedures associated with work within the excavations. Routine maintenance and inspections for the storm water management facilities will include the following tasks:

- Recording water levels in all the reservoirs used to store water or having water covers (i.e., the Clearwell, SWM Pond, Waste Pits Nos. 5 and 6).
- Checking the operation of all permanent and portable pumps to ensure proper operation.
- Inspecting all catch basins, sumps and tanks for solids accumulation.
- Monitor daily average and instantaneous flow rates to the BSL for compliance with BSL influent criteria.
- Check the integrity of the silt fences used to control erosion and sedimentation to ensure that the desired drainage patterns are maintained.
- Check and maintain the vegetative covers used in the waste pit area and the plant facilities area for dust control and erosion control.

Inspection of the storm water and wastewater management facilities will be conducted routinely after each storm event as well as on a weekly basis. All maintenance and inspections will be performed in accordance with the SWPPP.

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TABLES

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Table 3-1
Estimated Runoff for Preconstruction Conditions

Drainage Location	Area (square feet)	Curve Number (CN)	Runoff Depth[1] (inches)	Total Runoff[1] (gallons)
Paddys Run	100,490	80	2.72	170,370
K-65 Storm Water Basin	71,320	80	2.72	120,920
Storm Water Management Pond	321,230	80	2.72	544,630

Note: [1] Values are based on a 25-year, 24-hour storm event equal to 4.8 inches.

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Table 3-2
Estimated Runoff for Postconstruction Conditions

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Drainage Location	Area (square feet)	Weighted Curve Number (CN)	Average Runoff Depth[1] (inches)	Total Runoff[1] (gallons)
Paddys Run	106,400	81	2.83	187,690
K-65 Storm Water Basin	63,160	80	2.72	107,090
Storm Water Management Pond	277,130	88	3.51	606,330
Clearwell[2]	46,350	98	4.56	131,750

Note: [1] Values are based on a 25-year, 24-hour storm event equal to 4.8 inches.
[2] Storm water is directed to the Clearwell during the operational phase.

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Table 3-3
Estimated Runoff for Waste Pit Area Pre-Excavation Conditions

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Drainage Location	Area (square feet)	Weighted Curve Number (CN)	Average Runoff Depth[1] (inches)	Total Runoff[1] (gallons)
K-65 Storm Water Basin	840,423	90	3.7	1,938,296
Clearwell[2]	284,110	97	4.45	788,074

Note: [1] Values are based on a 25-year, 24-hour storm event equal to 4.8 inches.
[2] Storm water is directed to the Clearwell during the operational phase.

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FIGURES

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DRAFT

Fernald Waste Pit Remedial Action Project (WPRAP)

SAMPLING AND ANALYSIS PLAN

****

PREPARED
for
FLUOR DANIEL FERNALD, INC.
7400 Willey Road
Fernald, OH 45030

FDF Subcontract No. 98SC000001

****

PREPARED
by
IT CORPORATION
7290 Mosside Boulevard
Monroeville, PA 15146-2790

Project No. 773481

****

Revision C
Issue Date: September 25, 1998

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RECORD OF ISSUES/REVISIONS

Date	Rev. No.	Description
06/24/98	A	Issue of Draft Plan to FDF
09/11/98	B	Issue of Revised Draft to FDF
9/25/98	C	Draft Issue for EPA Review

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LIST OF APPENDICES

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Appendix	*Description*
A	Statistical Study – Power Point Presentation & Spreadsheets

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Analytical Abbreviations

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AD	Absolute Difference
ADC	Analog to Digital Converter
ASL	Analytical Support Level -- See SCQ
ASTM	American Society for Testing and Materials
AWWT	Advanced Wastewater Treatment
BSL	Biodenitrification Surge Lagoon
BNA	Base/Neutral and Acid Extractable Compounds
CCB	Continuing Calibration Blank
CCV(S)	Continuing Calibration Verification (Standard)
CDF	Commercial Disposal Facility
Ci	Curie
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
DOT	US Department of Transportation
DR	Data are qualified based on results, using the review and validation guidance
DQO	Data Quality Objective
DUP	Duplicate
DWB	Dilution Water Blank
ECV	Energy Calibration Verification
EDXRF	Energy Dispersive X-Ray Fluorescence
FCV	Final Calibration Verification
FDF	Fluor Daniels Fernald
GAC	Glucose-Glutamic Acid Check
GC	Gas Chromatography
G(T)	Glass with Teflon-lined Lid
HAMDC	Highest Allowable Minimum Detectable Concentration (or Activity)
HEPA	High Efficiency Particulate Air
HPGe	High Purity Germanium Detector
IAP	Ion Abundance Pattern
IC	Initial Calibration
ICB	Initial Calibration Blank
ICP-MS	Inductively Coupled Plasma Mass Spectroscopy
ICS	Interference Check Standard
ICV(S)	Initial Calibration Verification (Standard)
IDL	Instrument Detection Limit
IS	Internal Standards
LCS	Laboratory Control Sample
LEG	Low Energy Germanium
MAWC	Maximum Allowable Waste Concentration
MB	Method Blank
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
MDL	Method Detection Limit

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Analytical Abbreviations (continued)

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MS	Matrix Spike
MSA	Method of Standard Additions
MSD	Matrix Spike Duplicate
NPDES	National Pollutant Discharge Elimination System
PLP	Pulsed Laser Phosphorimetry
ppb	Parts per Billion
PQL	Practical Quantitation Limit
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RER	Relative Error Rate
RMV	Reference Monitor Verification
RPD	Relative Percent Difference
SCQ	Fernald Environmental Management Project Site wide CERCLA Quality Plan
SVOA	Semi-Volatile Organic Compound
SWM	Storm Water Management
TCLP	Toxicity Characteristic Leaching Procedure
μCi	Micro-Curie
VOA	Volatile Organic Analysis
WAC	Waste Acceptance Criteria
WPRAP	Waste Pits Remedial Action Project (a.k.a. Operable Unit 1)
WTS	Water Treatment System
XRF	X-Ray Fluorescence

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1.0 INTRODUCTION

This sampling and analysis (S&A) plan was developed to document the sample collection and analytical performance specifications to be used in support of the Fernald Waste Pits Remedial Action Project (WPRAP). The plan specifies the techniques to be used for collecting and analyzing samples. Existing analytical data was reviewed to determine the analytes to be monitored and the frequency of sampling required. General methodologies are described. Detailed standard operating procedures will be written that will meet the data quality objectives. The procedures will be included in a Laboratory Standard Operating Procedures Manual.

1.1 PROJECT BACKGROUND

The FEMP is a 1,050-acre, government-owned, contractor-operated facility located in southwestern Ohio approximately 18 miles northwest of downtown Cincinnati. The facility is located just north of Fernald, Ohio, a small farming community, and lies on the boundary between Hamilton and Butler Counties. The primary mission of the Fernald Environmental Management Project (FEMP) during its 37 years of operation was the processing of feed materials to produce high purity uranium metal. These high purity uranium metals were then shipped to other U.S. Department of Energy (DOE) or U.S. Department of Defense (DOD) facilities for use in the nation's weapons program.

Production operations at the FEMP occurred in the fenced in, 136-acre tract of land now referred to as the former production area, located near the center of the property. Liquid and solid wastes were generated by the various operations at the FEMP between 1952 and 1989. Before 1984 solid and slurry wastes from FEMP processes were deposited in the on-property waste storage area. This area, located west of the former production area, includes six low-level radioactive waste storage pits; two earthen-bermed concrete silos containing K-65 residues; one concrete silo containing metal oxides; one unused concrete silo; two lime sludge ponds; a burn pit; a clearwell; a solid waste landfill; and a Biodenitrification Surge Lagoon (BSL) to treat wastewater.

The scope of work to be performed by IT during the WPRAP will consist of excavating the waste materials from each of the waste units (Waste Pits 1 through 6, the Burn Pit, and the Clearwell), transferring the material to process facilities, blending and drying as needed to meet the Envirocare Waste Acceptance Criteria (WAC), and then loading the product for shipment.

1.2 SAMPLING AND ANALYSIS OBJECTIVES

The purpose of the sampling and analysis program is to provide valid and defensible data to demonstrate compliance with the following objectives:

- That the blended waste meets the Envirocare radiological, chemical and physical WAC for disposal with 90% confidence.
- That the blended wastes are depleted in U235 with 90% confidence.
- That the blended wastes are DOT Low Specific Activity (LSA-I) with 90% confidence.

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- That process water, wastewater, and contact and noncontact storm water being discharged to the BSL meet the BSL influent criteria.

- That noncontact storm water from the SWM Pond transferred to Paddys Run meets the required discharge criteria.

- That regulatory limits for dryer off-gas and other air emissions are met.

- That timely information is available to IT personnel to guide the blending of the wastes to meet the above radiological constraints.

This plan is based on process and site knowledge existing at the time of planning and construction. As the plant is operated, additional process and site data will become available that could indicate the need to modify this sampling and analysis program to meet the above objectives. When this appears to be the case, IT will coordinate with FDF to develop any needed changes.

Table 1-1 summarizes the sampling program to be conducted during WPRAP activities. Table 1-2 summarizes the deliverables to support WPRAP activities.

1.2.1 Envirocare Radiological, Chemical, and Physical WAC

Samples of the processed and blended waste will be collected and analyzed to ensure compliance with Envirocare WAC for radiological, chemical, and physical parameters. These samples will be collected in the waste handling and railcar load out buildings prior to loading the railcars. Because of the relatively high radiological activities, modified methods will be used for analysis. The data will be reported using ASL E (refer to SCQ). For chemical and physical parameters, standardized methods and reporting limits should be applicable. Hence, ASL B data reporting will be used. In order to comply with the Envirocare requirements, the laboratory performing chemical analyses will be certified by the state of Utah.

1.2.2 AWWT WAC for Process Wastewater and Contaminated Storm Water

The flow of process wastewater and contaminated storm water is best summarized in Section 2.8 and Drawing D-90-10-001 of the "Description of the Operation and Processes" previously submitted in the Remedial Design (RD) Package. In general, process water and contaminated storm water are collected in the Clearwell. These waters are treated in the WPRAP Wastewater Treatment System (WTS) before being pumped to the BSL. From the BSL the water is eventually transferred to the AWWT for final treatment.

The effluent from the WTS to the BSL will be monitored for the compounds noted in Table 1-1. During normal operation, an automatic composite sampling device will be used to collect weekly WTS effluent samples. These samples will be used to confirm the operation of the WTS per the BSL influent requirements. ASL B will be used for these samples. During the first month of WTS operation the normal sampling frequency will be increased to 3 samples collected per week with analytical turnaround of 2 to 3 days. Data from this initial sampling will be used to confirm

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the initial operation of the WTS per the BSL influent criteria. The data will also be reviewed to identify if any operator performed screening tests or additional continuous monitoring devices could be used to aid in the operation of the WTS. Analytical parameters may be adjusted based on process knowledge gained during remediation activities.

The Clearwell will be monitored for the compounds listed in Table 1-1. Grab samples will be taken periodically to aid in the operation of the WTS. Sample frequency is anticipated to be initially once per week and may be adjusted based on clearwell water quality. Sampling may also be performed when a significant change to excavation activities occurs which could influence water quality in the Clearwell (i.e., start of excavations in a new pit). ASL B data reporting and QC requirements will be used for these samples.

Water from several support activities will be collected in the Grey Water Sump. These activities include water collected from laundry operations, respirator wash water, change out facility, decontamination shower, sampling equipment decontamination, emergency shower, and the on-site laboratory. In general the effluent from the Grey Water Sump will go directly to the BSL. Except for the on-site laboratory, the water flowing into the Grey Water Sump is expected to be similar to domestic water with neutral pH, low solids, low organics, etc. The on-site laboratory will be limited to performing radiochemical analyses. The primary focus will be on γ Spectroscopy with limited inorganic digestions for α Spectroscopy and Gross α/β counting. Water usage should be low compared to the other sources to the Grey Water Sump. Hence, the water quality from the on-site laboratory should have limited impact on the quality of the Grey Water Sump effluent and virtually no influence on the BSL.

The Grey Water Sump will be monitored for the compounds listed in Table 1-1. ASL B is specified for water samples collected from the Grey Water Sump. Grab samples will be taken from the sump periodically in order to gain process knowledge which will allow cessation of the Grey Water Sump sampling.

Analytical parameters and sampling frequencies may be adjusted based on process knowledge gained during remediation activities.

1.2.3 Storm Water Management Pond

The Storm Water Management Pond will be monitored for total Uranium. A grab sample will be taken prior to each discharge to Paddys Run. Total Uranium will serve as an indicator parameter. If total uranium is below 20 ppb, the water in the SWM Pond will be considered suitable for discharge to Paddys Run without further testing. ASL B data reporting and QC requirements are required for the these samples.

Analytical parameters and sampling frequencies may be adjusted based on process knowledge gained during remediation activities.

1.2.4 Regulatory Limits for Dryer Off-gas and other Air Emissions

The rotary dryer off-gas will be sampled initially upon system startup to ensure compliance with air emission criteria. ASL B data reporting and QC requirements are specified for the stack

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sampling data generated to demonstrate compliance for the dryer emissions. Additionally, during system operations, the dryer off-gas will be continuously sampled for radionuclides. ASL B data reporting and QC requirements are specified for the continuous stack monitoring data.

IT has calculated potential air emissions from the laundry, laboratory, and respirator wash and compared the calculated results with the requirements of 40 CFR 61, Subpart H. It appears that these air emission sources do not have the potential to provide significant fugitive air emissions. Nevertheless, a one-time, initial verification of these estimates will be performed for these sources (laundry, respirator wash, and laboratory). See section 2.4 for a description of the testing.

1.2.5 Process and Support Activity Samples

The sampling and analysis program will include collecting and analyzing samples from the pit face during excavation, at various locations in the blending area, and following dryer processing. Data obtained from these samples will be used for purposes internal to IT. These will, in general, be of a rapid screening nature and ASL A would apply.

1.3 DATA QUALITY OBJECTIVES

The objectives listed in 1.2 above drive data quality needs. These may be summarized by:

- Blended waste materials must meet radiological, chemical, and physical Envirocare WAC and DOT shipping requirements with a known confidence level. Based on SW846, Chapter 9 guidance, this has been set at 90% confidence.

- Waters going to the BSL must be characterized to guide treatment activities and verify compliance with the BSL influent criteria.

- SWM Pond discharges to Paddys Run must be shown to meet discharge requirements.

- Air emissions must meet regulatory requirements.

- IT will need rapid radiological screening information to guide blending operations.

1.3.1 Screening Samples

Many of these needs are straight forward and have obvious DQOs that may be easily linked to the ASLs. Other needs are not quite as obvious. The data reporting for rapid radiological screening information, for example, is most closely related to ASL A. Because the procedures are being applied to waste materials with high activities, the detection limits and counting times are modified making the DQO more similar to ASL E. Radiological screening methods have been assigned ASL E. In any case, the sampling methods and frequencies have not been specified here except to say that grab samples will be taken as needed for internal (to IT) informational purposes only.

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The above illustrates an important point. Although an attempt has been made to link DQOs to ASLs, the linkage is not always very successful. The SCQ was written primarily with CERCLA RI/FS in mind rather than remediation activities. Hence, this linkage is made for the purpose of using a common vocabulary rather than always a strict adherence to the quality control and reporting specification in the SCQ.

1.3.2 Air Emissions

Radionuclide air emission testing is covered by EPA Method 114. This testing is driven by regulatory compliance with 40 CFR 61, Subpart H. An initial performance test will be conducted on the Dryer off gas vent stack. Details of this test are given in the Performance Test Criteria. The description of continuous monitoring of this vent stack is given later in this plan. Contributions from other stacks and vents have been calculated to be well below action levels. Nevertheless, confirmatory measurements will be performed once the facility is operational as described in Section 2.4. The quality control criteria and reporting requirements are most similar to ASL B.

1.3.3 Storm Water

The purpose of storm water testing is to indicate that the storm water has been successfully segregated from the waste and waste handling activities. Since Uranium is a major component of the waste, testing the storm water for total Uranium by ASTM D5174-91 is very similar to ASL B.

1.3.4 Process Waters

Waters that eventually flow to the AWWT (generally via the BSL) are tested to verify compliance with the BSL influent criteria and to guide water treatment activities (i.e., process control). Hence, the quality control and reporting requirements of ASL B are appropriate.

1.3.5 Blended Wastes

Data gathered during the CIS and RI/FS clearly indicate high variability. Nevertheless, these studies provide a significant amount of data upon which to base the need for further testing.

A statistical study of the CIS and RI/FS data has been performed. The purpose of the study was to determine which parameters are already adequately characterized and which parameters will require additional analysis. In addition to this, the number of samples required to provide statistically valid results were estimated. The data included in the study were:

- TCLP Metals
- TCLP Organics
- Total activities for Radionuclides

The data were analyzed using the guidance provided by SW846 Chapter 9. The analysis was based on all available valid data existing in FDF's database(s). In addition to the above statistical study, total PCB and Herbicide data was inspected to identify general levels and trends.

In general, the data was aggregated in such a way as to simulate the weighted average mixing anticipated in the remedial action project. The key purpose of the statistical study was to obtain not only a weighted mean, but a weighted variance that could be used in the SW846 formulas to predict the number of samples required to characterize the final blended wastes. The assumption was made that the drying and blending process would not fundamentally change the chemical nature of the waste, but would tend to produce a mixture with weighted mean and weighted variances of the model. All of the data were pooled together rather than investigating all possible combination of blends. This was done not only to simplify calculations, but to simulate the widest variance likely to be encountered.

A considerable amount of time was spent compiling the electronic files and validating the data. All data that was considered invalid (i.e., flagged with "R" or "NV") was ignored. Furthermore, the IT study avoided combining data whenever possible to maintain as much valid variance information as possible. IT also used the stated detection limit divided by two (EPA guidance). The study was conducted on all TCLP Metals data and all Total Radiological parameters. For TCLP Organics, calculations were performed on five representative VOAs, and three representative BNAs and Pesticides. IT chose those Organics with the highest weighted mean to regulatory limit ratios.

In many cases, results of the IT study do not precisely correspond to the results of previous data evaluations. IT chose not to use "0" for values that were reported as "U" (i.e., "Undetected") or combine data points reported as "U". IT also considered analytical rerun and dilution data which may not have been previously considered.

A Microsoft® Power Point™ presentation of the findings of this study has been presented to FDF and is included in Appendix A. The raw data and spread sheets used in the statistical calculations are also included in Appendix A.

1.3.5.1 TCLP Metals:

Although the number of samples were generally well in excess of 20, the TCLP metals data often did not appear to be normally distributed. This could be from anomalous data or pockets of high concentrations. Under these conditions, it is unclear if the 90% Confidence Interval test of SW846 Chapter 9 was adequate. Nevertheless, application of the Chebyshev theorem for skewed distributions confirmed that all of the data except for Arsenic was adequately characterized and would be below the pertinent regulatory limit at 90% confidence. Unfortunately, this theorem is of little use in estimating the number of samples required to characterize Arsenic.

It was found that by using the hyperbolic arcsine transformation, the Arsenic (and other metals) data became normally distributed allowing the application of standard formulas from SW846. The transformed data predicted that 2 samples are required to characterize Arsenic. The untransformed data predicted that 3 samples were needed. Because the untransformed data is slightly more conservative (i.e., predicts higher means and variances) it was used in the final determination of the number of samples required to characterize the final blend. The results of the study are attached in Table 1-3.

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The data indicate that the wastes are already well characterized for TCLP metals and that TCLP metals (with the possible exception of Arsenic) are well below existing threshold values. Hence, no additional sampling for metals other than Arsenic will be required. Furthermore, three samples will be adequate to characterize Arsenic for a subset of the population. IT has selected a trainload as a "sample container". This will be the subset population of concern. A sampling frequency of one sample per production bin would translate to one sample per 4 to 6 railcars. Since a trainload will be 40-60 cars, this schedule would adequately characterize a trainload container by collecting 6 to 15 well composited, independent samples.

1.3.5.2 TCLP ORGANICS (VOA, BNAs, Pesticides, Herbicides):
The representative VOAs, BNAs, and Pesticides indicate that the wastes are well characterized and well below regulatory limits. There is no statistical reason to sample the blended wastes for these components. There are a few parameters for which insufficient data exists. These are Herbicides and Pyridine. Since these were not used in the processes at Fernald, they can be eliminated based on process knowledge. Furthermore, an inspection of the limited data for total Herbicides and Pyridine indicates that they are not present.

1.3.5.3 PCBs:
It appears that some Aroclor 1254 and 1260 are present in some of the pits (See RI/FS), but the data are highly qualified. In no case does the reported value approach the 50 ppm action level for Envirocare. Hence, PCB analysis is not statistically required.

1.3.5.4 Individual Radionuclide Activities:
Individual radiological activities cannot exceed the WAC. The major radioisotopes (U, Th, Ra) are summarized in Table 1-4. In many cases the data were not normally distributed. Nevertheless, the data were shown to be below the cutoff limit at 90% confidence using the Chebyshev theorem for all isotopes. Hence, no sampling is needed to insure that the individual activity levels are not exceeded for these radionuclides.

A similar approach was taken with the minor radioisotopes Cs137, Sr90, Tc99, Pu238, Pu239/240, and Ru106. In all cases the Chebyshev theorem (and the 90% Confidence Interval) confirmed that the distributions were below the cutoff limits with 90% confidence. Hence, these parameters do not need to be characterized to meet their individual radiological activity limits. These data are shown in Table 1-5.

1.3.5.5 Radiological WAC:
The radiological data were then tested for total radiological WAC using the weighting formula for Envirocare. The first step was to analyze the sensitivity of the total WAC to the minor radiological parameters. Since Cs137 is easily obtained by Gamma Spectroscopy, it was dropped from the list for this analysis. Hence, the shortened list became Np237, Sr90, Tc99, Pu238, Pu239/240, and Ru106. Two procedures were used to estimate the contribution of the minor components to the weighted average WAC. The first of these was to use the weighted average in the final blended waste of each minor isotope. This analysis showed that, in the weighted average, these minor components contribute only 0.030 to the total WAC. Unfortunately, this analysis does not easily yield an error term. A second analysis used actual data points for which

all of these minor values were known. The weighted contribution to the WAC for these minor components was calculated and the weighted variances summed. Using a total of 49 data points, this analysis showed that Tc, Sr, Pu, Ru, and Np contributed less than 0.041 to the WAC with 90% confidence.

Based on the above analyses, if the total weighted WAC from the U, Th, Ra, and Cs isotopes is less than 0.959 (1 - 0.041), the total WAC is less than 1 at 90% confidence. Hence, Tc99, Sr90, Pu238, Pu239/240, and Np237 analyses are not necessary as long as the total from depleted Uranium (sum of U234, U235, U238), Th230, Th232, Ra226, Ra228, and Cs137 are less than 0.959.

An additional analysis was performed on the WAC calculation using RI/FS data for the major isotopes and Cs137 (i.e., the same isotopes in the above paragraph). The weighted average WAC from this analysis was 0.54 with an estimated standard deviation of 0.47. Using this data to estimate the number of samples required to characterize the WAC at below 0.959 with 90% confidence yields 4 samples. Hence, one well-composited daily sample (i.e., 6-15 per trainload container) will more than suffice for WAC calculations.

1.3.5.6 LSA-I:

The formula for LSA-I calculation is complex, but easily reduces to something much simpler. When the sum of the activities (in Ci) divided by the A2 number (also in Ci) is less than 10^{-6}, the sample will meet the LSA-I limit. This formula was used to calculate the weighted mean LSA-I using the weighted mean of all the radionuclides (U, Th, Ra, Cs, Sr, Pu, Np, Ru, Tc). The sum of the factors is 6.24E-07. Hence, in the aggregate the mixed material will pass with nearly a 2X safety factor. A quick review of the calculation shows that contributions from Tc99, Pu238, Pu239/240, Sr90, and Ru106 to LSA-I are immaterial. Using the highest values for these, the contribution to LSA-I calculations are **three and four orders of magnitude** below the limit of 1E-6. Hence, they can be dropped from consideration for LSA-I.

A thirty eight (38) sample set taken from around the pits was used to calculate a weighted mean for the LSA-I and a 90% confidence limit. This study focused on the major nuclides (U, Th, Ra) plus Tc99 and Cs137, with a limit of 6.66E-7. These data indicate that the mixed material will be less than the limit of 6.66E-7 at the 90% confidence level. The calculation was repeated without Tc99. The result was indistinguishable from the first result. This again showed that Tc99 values are not needed for an accurate LSA-I calculation. The estimated number of samples required to show that LSA-I factor is below 1E-6 is 5. This fits with the general approach of one well-blended sample per day (i.e., 6-10 samples per trainload).

Based on the above studies for radiological data (individual activities, WAC calculations, and LSA-I calculations), the analytes of interest in order of importance are:

- U234, U235/236, U238
- Th228, Th230, Th232

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- Ra226, Ra228
- Cs137.

The required sampling for the above is 5 or fewer samples per container. This is consistent with the 1 well-composited sample per production bin scenario (i.e., 6-15 samples per trainload).

1.3.5.7 U235 Depletion:
The U235 depletion data from the CIS and RI/FS contains a number of anomalies. The data would indicate that the uranium at the site is slightly enriched. This does not correspond with historical or process information. It is believed that the data have a number of problems arising from trace level analytical procedures being applied to relatively high levels. In general, α spectroscopy was used for analysis of uranium. These samples had to be run using small aliquots at high dilutions. It is believed that using γ spectroscopy will give much better results since much larger samples (100 to 400 grams) will be used.

The number of samples required to characterize the blended waste is estimated from the expected depletion and the relative error anticipated in the method. The number of samples required was estimated to be three or fewer.

1.3.5.8 Summary:
In summary, the CIS and RI/FS data support the following analytical approach for the blended materials:

- TCLP Arsenic analysis on one well-composited sample per rail-car load-out bin (6-15 samples per train),
- Monitor U234, U235/236, U238, Th228, Th230, Th232, Ra226, Ra228, & Cs137 by gamma spectroscopy on one well-mixed sample per rail-car load-out bin (6-15 samples per train)
- Use the above data to calculate total Radiological WAC and LSA-I factor
- Based on process knowledge and estimates of anticipated error, the one sample per production bin frequency should provide adequate sampling for U235 depletion calculations.

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2.0 SAMPLING PROCEDURES

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This section describes the sample collection procedure to be used to collect solid, liquid and dryer off-gas samples during the WPRAP Project. Samples will be collected at each sample site using standardized, well-documented procedures to ensure that samples generate representative and consistent data. All samples will be collected and delivered to the on-site laboratory for processing or transfer to an off-site laboratory using a formal chain of custody procedure. Table 2-1 lists container types, sample volume, methods of preservation, and holding times for each sample matrix and analyze. An adequate stock of pre-cleaned sample containers will be stored at the on-site analytical laboratory. Table 2-2 summarizes the number of field samples and field QC samples to be collected per week during process operations. Samples collected in the field will be transported to the laboratory as expeditiously as possible and analyzed within the prescribed holding times. Analysis re-extractions, dilutions or confirmation runs must also be accomplished within the analytical holding time for a specific analyte.

The detailed Standard Operating Procedures for Sampling and Monitoring are to be found in the Laboratory Standard Operating Procedures manual. A brief description of these procedures are included below in this Section. Whenever practical (i.e., sample integrity is not compromised) sample splits will be provided to FDF, EPA, ISOPIA, Envirocare, and other interested parties approved by FDF. Sample splitting will be performed in accordance with EPA SW846 specifications (Chapters 12 & 13) or as otherwise directed by FDF. This should not be interpreted as meaning the taking of additional samples. Any additional sampling activities other than splitting those samples specified by this Plan are outside the scope of this Plan.

2.1 SOLIDS SAMPLING

2.1.1 Pit Faces and Waste Material Receiving/Blending Area

Samples of waste material may be collected from the newly exposed pit face during excavation or from temporary staging piles in the process area. These samples may be analyzed for radionuclides, moisture content, specific gravity, etc., at the discretion of the IT process managers. The purpose of the sampling will be to guide the blending process (especially for U235 depletion) and to indicate to IT personnel when changed or upset conditions exist. Sampling team members will utilize a portable organic vapor analyzer to screen the pit area for organic vapors prior to sample collection activities. Grab samples may be collected at various locations within the pit area being excavated to help guide the blending and drying processes. Selection of the location to collect grab samples within an individual pit will depend on the characteristics of the material being excavated. If the area being excavated appears to be visually uniform in characteristics, a grab sample will be collected near the middle of the flow or pile. If the material appears to be non-uniform or is being segregated during the excavation process grab samples will be collected and physically mixed in proportions approximately equal to the expected fraction of the pit waste material.

Because the data is for internal purposes only, considerable latitude will be allowed for sampling techniques. In most cases the sample can be collected using a hand trowel or scoop into a plastic

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container. Since the primary parameters of interest are radionuclides, no preservation will be needed.

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2.1.2 Blending Area/Railcar Storage Bin

Samples of the processed waste material will be collected from the blending area/railcar storage bin to document that the waste meets the Envirocare WAC prior to shipment. A set of grab samples will be collected and composited to form a representative sample for each loading bin. This composite will be analyzed for Arsenic, Moisture Content, Specific Gravity, Paint Filter Test, Reactivity, Ignitability, Corrosivity, and Radiological Parameters. A separate grab sample of 23 kg will be collected for Proctor Density. The compositing procedure will consist of collecting a grab sample of approximately 1 lb by volume from a loader bucket of blended material being placed in the railcar storage bin every hour. This should result in a minimum of 7 lbs of sample for each bin. The grab samples will be stored in a 5 gallon plastic bucket with a sealable lid. When the railcar storage bin is full, the sample will be mixed with a hand trowel. Aliquots will be removed and transferred to the appropriate sample containers for transportation to the appropriate laboratory. Two archive samples will be taken for all parameters and stored for possible re-analysis. Unused sample in the 5-gallon bucket will be returned to the waste pile. Sampling equipment will be cleaned between sampling events or kept segregated for the particular waste stream. Cleaning of pre-cleaned or segregated sampling equipment is not required.

Immediately after compositing and returning of the unused portions to the waste pile, a separate grab sample will be collected in the same plastic bucket for Proctor Density. This will be collected using a spade. The bucket will be properly labeled and transported to the on-site laboratory for Proctor Density. If not kept segregated or pre-cleaned, sampling equipment to be reused will be decontaminated as described in Section 2.8.

Immediately after sampling, the waste bin will be "locked-out" by the IT Quality Assurance Manager to insure that the bin is not loaded out before valid analytical data is available and reviewed.

2.2 WATER SAMPLING

All water sampling will be performed in accordance with EPA methods as described in SW846. Detailed procedures are given in the Laboratory Standard Operating Procedures manual.

2.2.1 Clearwell

A number of process generated wastewater and potentially contaminated storm water streams will be transferred to the Clearwell for storage and subsequent processing in the WTS (See Drawing D-90-10-001 "Description of the Operation and Processes" for details). Grab samples will be collected as described in Section 1.2.2 and analyzed for the parameters listed in Table 1-1. Samples will be taken from a tap on the line from the Clearwell to the WTS provided for that purpose. The samples will be taken, preserved, and marked as described in the Laboratory Standard Operating Procedures manual.

2.2.2 SWM Pond Wastewater

Non-contact storm water will be collected in the SWM pond. Grab samples will be collected as described in Section 1.2.2 and tested for Total Uranium. If the Total Uranium is below 20 ppb

the water in the SWM Pond will be considered to be suitable for discharge to Paddys Run. It will be necessary to sample the Pond before discharge can be initiated. This will require the implementation of surface water sampling techniques. The sampling procedure for collecting water samples from this pond is presented in the Laboratory Standard Operating Procedures manual.

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2.2.3 Water Treatment System Effluent

Effluent from the water treatment system will be sampled and composited on a continuous basis using an automated composite sampling system. Composite samples will be analyzed for compliance with the AWWT WAC. These parameters are listed in Table 1-1. The samples will be collected, preserved, and marked as described in the Laboratory Standard Operating Procedures manual.

2.2.4 Grey Water Sump

Water collected in the Grey Water Sump will be sampled to characterize it for compliance with AWWT parameters as described in Section 1.2.2. These parameters are listed in Table 1-1. Grab samples will be collected from a tap located on the line running from the Sump to the WTS. The samples will be collected, preserved, and marked as described in the Laboratory Standard Operating Procedures manual.

2.3 DRYER STACK

2.3.1 Performance Testing

A performance test will be conducted on the dryer off-gas stack upon startup of the system to demonstrate compliance with the air permitting regulations. The procedures for conducting the performance test will be covered in the Performance Test Criteria document.

2.3.2 Continuous Stack Monitoring

Emissions from the dryer stack will be monitored continuously during operation using an in-situ isokinetic sampling system that meets the requirements of 40 CFR61.93, Subpart H and 40 CFR 61, Appendix B, Method EPA 114. This system will withdraw a continuous representative sample of gas from the stack at the same velocity as the stack velocity. Particulates will be collected on a filter that will be changed once per week. The sampling equipment will be sized to collect approximately 25 liters/minute. The filter will be directly counted using EPA Method 114, Procedure A-3. The parameters to be monitored are listed in Table 1-1.

Radon will be monitored in the dryer stack using ionization chambers. One chamber will measure Rn220 and Rn222 together. Gas from this first chamber will be transferred to a second chamber that will be used to measure Rn222. Transfer plumbing will be sized so that the Rn220 will decay away before reaching the second ionization chamber. The Rn222 data will be used for emission monitoring and the total Rn220/222 data will be used for process control.

Since continuous, discriminatory radon monitoring for stack emissions is a new technology, performance specifications have not been finalized. The performance goal for the system is to be able to monitor for Rn222 emissions at 0.010 Ci/hour with an accuracy of ±10%.

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2.4 OTHER AIR MONITORING

Calculations indicate that fugitive air emissions from the respirator wash, laundry, and laboratory ventilation systems will result in an offsite dose of less than 0.1 mrem/year. Nevertheless, HEPA filtration will be provided for the vents. IT proposes to verify the above calculations by performing a one time verification test. The systems will be operated with HEPA filters in place for approximately six hours. The filters will then be analyzed for Uranium and Thorium isotopes using EPA Method 114, Procedure A-3. This test description consititutes a request for variance on sampling methodology as described in 40 CFR 61.93(3).

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2.5 SAMPLING IDENTIFICATION AND NUMBERING SYSTEM

Samples are collected in the field. Each sample will be uniquely numbered. All samples collected will be submitted to the laboratory for official logging, analysis, disposition, and record retention in the Laboratory Sample Logbook. Each sample shall be logged into a permanently bound, 12 column laboratory notebook, and be assigned a unique laboratory identification number (Laboratory ID Number) recorded in Column 1 by the Laboratory Supervisor using the following protocol:

axxyyzzbbb where:

- **a** is a sample matrix code (see "Column 5:" below)
- **xx** is the digital year
- **yy** is the digital month
- **zz** is the digital date, and
- **bbb** is a three-character code -indicates the numerical sequence the sample was submitted to the laboratory that day.

Each following column will be completed by the Laboratory Supervisor as appropriate using the following convention:

Column 2: Location (4 alphanumeric) (Field Sampler)

The location designation is based on the area from which the sample was collected. The reference indicator is IT Drawing Number 773481-M53, Overall Site Facilities Map. The location will be chosen from the following predesignated general locations, or a change to this procedure will accommodate locations not listed.

Location Codes:

- WP1 - Waste Pit 1
- WP2 - Waste Pit 2
- WP3 - Waste Pit 3

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- WP4 - Waste Pit 4
- WP5 - Waste Pit 5
- WP6 - Waste Pit 6
- ST - Slurry Tank
- BB - Blending Bins
- RSB1 - Storage Bin 1
- RSB2 - Storage Bin 2
- RSB3 - Storage Bin 3
- RSB4 - Storage Bin 4
- RSB5 - Storage Bin 5
- RSB6 - Storage Bin 6
- WH - Warehouse
- DO - Dryer Outlet
- CW - Clearwell
- LAB - Laboratory
- SWM Storm Water Management Pond
- WTS - Water Treatment System
- MHB - Material Handling Building
- GWST - Grey Water Storage Tank
- ROAD - Roadway
- HWRB - High WAC Receiving Bin
- LWRB - Low WAC Receiving Bin
- MISC - Other locations where a sample could be collected

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Column 3: Number (3 numeric) (Field Sampler)

Each sample that is submitted to the laboratory will be located on a sketch or map. The sample number will be indicated on the sketch or map with a three digit indicator as near the sample location as practical, or using a call-out with the sample number connected to the location on the map with a dot where the sample was collected. The first sample collected on that day by that Field Sampler on that map will be designated 001, and so on. Multiple sample numbers may be indicated on a single sketch or map, but a new sketch or map must be generated each day samples are collected.

Column 4: Sample (2 numeric) (Field Sampler)
Each sample may be re-sampled numerous times during the day. Each subsequent sample from the same location will be designated by a 2 digit designator. A given sample sketch will include the 3 digit number; the samples corresponding to that number will be designated in parentheses on the sketch from 01 to xx, where xx is the last resample. Example: 003 (01-05) corresponds to the third sample number on a given sketch, and five samples were collected from that location. This means at least 7 samples will be submitted to the laboratory on this day, 5 from this location, and at least one sample each from 001 and 002.

Column 5: Medium (1 alphanumeric) (Field Sampler)
Each sample must be logged in by the type of sample. This is indicated by the following one letter designator for the following media types:

A = Air Sample (e.g., filters from drier stack or other air stream)
W = Water (e.g., grey water, laboratory waste water)
R = Radiation control (e.g., swipes for contamination monitoring)
S = Solids (e.g., soils, dried solid waste)
X = Other (e.g., oils)

Column 6: Field Sampler (12 alphanumeric) (Field Sampler)
The 2 initials and first 10 letters of the last name of the person who collected the sample.

Column 7: Collection Date (6 numeric) (Field Sampler)
The date the sample was collected in the form xxyyzz where xx is the last 2 digits of the year, yy is the 2 digit month designator, and zz is the 2 digit day of the month designator.

Column 8: Collection time (4 numeric) (Field Sampler)
The time the sample was collected in the form hhmm where hh is the hour the sample was collected in military time (24 hour clock) and mm is the minute.

Column 9: Chemical analyses (20 field groups, 3 spaces wide each) (Laboratory Supervisor)
The chemical analyses required for the sample are designated by an x in the field group corresponding to the following analyses:

- Moisture
- Specific gravity

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- Proctor density
- Paint filter
- TCLP metal
- TCLP organic
- Reactivity
- Corrosivity
- PCB
- Particulate
- Nitrate
- Chloride
- Dissolved U
- Dissolved metal
- Dissolved solid
- Suspended solid
- Ammonia
- SVOA
- VOA
- Cyanide
- Other

Column 10: Radiochemical analyses (13 field groups, 3 spaces wide each) (Laboratory Supervisor)

The first 3 groups correspond to screening analyses:

- Gross αβ
- Gamma Spectroscopy

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- Alpha Spectroscopy

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The next 10 groups correspond to specific radiochemical analyses for the individual isotopes or for the isotopes of interest of the listed elements

- Uranium
- Thorium
- Plutonium
- Ra226/228
- Cs137
- Other

Column 11: Comments (Laboratory Supervisor)
Comments are developed to further clarify the specific issues associated with the collection or processing of the sample. For example:

- If a sample is to be recounted or re-analyzed, a new Laboratory ID Number will be assigned, and a comment will be made that this is a recount of the original Laboratory ID Number.
- If the sample requires unique radiochemical processing such as liquid scintillation
- If the sample requires a special analysis, such as for beryllium
- If the sample is from a core, the depth range would be recorded (e.g., 4' to 6')
- If the sample is to be a composite, a unique Laboratory ID Number will be assigned to the composite. The Laboratory ID Numbers of the samples that are combined will be listed in the comments section.
- Some samples may be split. Some split samples may be used for a specific analyses, with the remainder used in a composite. Only the specific analyses will be listed in Column 9 and 10. The analyses performed on the composite would be listed in Column 9 and 10 for the Laboratory ID Number corresponding to the composite.
- If a sample is to be sent to an outside laboratory for analysis, the laboratory will be listed in the Column 11. Include the date the sample was sent, and the method of transport. Any other unique comments will be recorded, such as special shipping paper ID number. The analyses to be performed by the laboratory will be annotated in Column 9 and 10.

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Samples which are split for different analyses will be assigned unique Laboratory ID Numbers, but columns 2 through 8 may be completed for the first sample listed only. Columns 9 and 10 will be completed according to the analyses to be performed on the given fractions. Column 11 on the latter sample will note the following: "split of Sample" and the "Laboratory ID Number".

Samples that are split for duplicate analyses will be given unique Laboratory ID Numbers. Column 2-10 may be completed for the first listed Laboratory ID Number only, but Column 11 must indicate the latter Laboratory ID Number of the split, and the laboratory that the sample will be split with, if different. The latter Laboratory ID Number will indicate in Column 11 the Laboratory ID Number of the split sample.

An example sample label to be used is shown below:

IT WPRAP SAMPLE LABEL

Location _____ Number _____ Sample _____	**FOR LAB USE**
Field ID _____ Drawing Number _____	Lab ID: _____
Collection Date and Time _____	Rec'd: _____
Field Sampler _____ Amount _____	Analyzed: _____
Medium (Check One) ☐ Air ☐ Solid ☐ Water ☐ Rad Control ☐ Other	Reported: _____
Rad Activity: Total _____ Background _____	Gross α/β: _____
Sample Type: ☐ Single Grab ☐ Composite of _____ Samples	α: _____
Preservative Added _____	γ: _____
Suspected Radioisotopes _____	Remarks:
Remarks:	

2.6 SAMPLE CUSTODY

Transportation and custody procedures will meet applicable DOT, DOE, and ISOPIA requirements (40 CFR Parts 170-179). Chain-of-custody procedures will document sample possession from the time of collection to disposal in accordance with IT internal procedures and federal guidelines. A sample is considered in custody if:

- It is in the sampler's or the transferee's actual possession.
- It is in the sampler's or the transferee's unobstructed view, after being in his/her physical possession.
- It was in the sampler's or the transferee's physical possession and then he/she secured it to prevent tampering.
- It is placed in a designated secure area restricted to authorized personnel.

Field custody includes the following activities:

- Before sampling begins, field personnel will review chain-of-custody procedures.
- The quantity and types of samples will be reviewed (applies to process samples).

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- Sampling locations will be finalized.

- The Sample Coordinator will determine whether proper custody procedures and report forms were used during the field work and will document findings in the field log book.

- The Field Sampler has overall responsibility for the care and custody of the samples collected until they are transferred or properly delivered to the laboratory. Each individual who collects a sample is responsible for its custody until it is transferred to someone else via the Chain-of-Custody Record.

- Shipment information will be recorded in the field log book at the end of the shift, day or collection period.

Transfer of custody and shipping procedures include the following activities:

- A Request for Analysis and Chain-of-Custody Record will be maintained in the field by each sampling team for each day of sampling. The white copy of this record will accompany each sample. The yellow carbon copy will be retained at the site.

- A Chain-of-Custody (COC) seal will be used to secure the lid on each shipping container to provide evidence that samples have not been tampered with.

- If the laboratory sample custodian judges the sample custody to be invalid (e.g., samples arrive damaged), a Nonconformance Report form will be initiated by the laboratory. A comment will be logged in the Sample Laboratory Logbook, Column 11.

The IT Project Manager will confer with the Laboratory Manager to determine the fate of the sample(s) in question. The sample(s) will either be processed "as is" with custody failure noted along with the analytical data, or rejected, with sampling rescheduled if necessary. The Project Manager and Quality Assurance Manager will sign the Nonconformance Report, noting the reason for disposition.

- Each time responsibility for custody of the sample changes, the new custodian will sign the record and note the time and date.

- The custody of individual sample containers will be documented by recording each container's identification on an appropriate Request for Analysis and Chain-of-Custody Record.

- The analyses to be performed for each sample will be recorded on the Request for Analysis and Chain-of-Custody Record. The original record will accompany the samples. A copy will be retained by the collector. The person who accepts

responsibility for the sample will provide a copy of the signed form to the person who relinquished the sample.

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- Upon sample destruction or disposal, the custodian responsible for disposal will complete the Request for Analysis and Chain-of-Custody Record, file a copy, and send a copy to the Laboratory Manager or the designated representative for record keeping.

2.7 RECORD KEEPING

The following section describes the field documentation procedures which will be followed as a means of recording observations and findings during field activities. All documentation will be completed in black indelible ink. Corrections will be single-line stricken, dated, and initialed.

Field Equipment Logbook

A field equipment logbook will be kept on site to document the proper use, maintenance, and calibration of field testing equipment. Accompanying the field equipment logbook will be a three-ring binder containing operator manuals, specifications, and calibration requirements and procedures for all field testing equipment. Information to be recorded in the field equipment logbook includes:

- Equipment calibration status
- Equipment decontamination status
- Equipment nonconformance
- Equipment inspection and repair records
- Name and signature of person making entry
- Date of entry
- Name of equipment and its identifying number
- Nature of work conducted
- List or reference of procedures used for calibration or maintenance
- Manufacturer, lot number, and expiration date of calibration standards
- Measurement results.

Sample Collection Log

A Sample Collection Log sheet will be completed for each sample collected during the project. Information to be included on the log includes:

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- Date and time of sample collection
- Sample location
- Sample type (i.e., untreated waste, surface water, etc.)
- Sample volumes and container types.

2.8 EQUIPMENT DECONTAMINATION

The following section describes the general process to be used to decontaminate sampling equipment. Decontamination is not needed when pre-cleaned equipment is used or between composite sampling, or between samples considered to be all one stream (e.g., the blended waste is all one stream). Prior to commencement of sampling activities, a decontamination area will be established at a suitable location. Except for composite sampling, all sampling equipment that may directly or indirectly contact samples that is not new and pre-cleaned by the manufacturer will be decontaminated before use. Sampling equipment (i.e., stainless steel bowls, scoops, trowels, spoons, dippers, shovels, buckets, etc.) will be decontaminated in the following sequential steps:

- Wash and scrub equipment with a solution of water and laboratory-grade nonphosphate detergent.
- Rinse several times with water.
- Rinse with ASTM Type II water.
- Allow equipment to air dry or dry with paper towels.
- Wrap in aluminum foil if not immediately used.

Decontamination solutions will be stored and dispensed in proper containers. All containers will be labeled for content. All fluids generated during decontamination activities will be collected in the grey water storage tank.

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3.0 ANALYTICAL PROCEDURES

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The procedures for analyzing the solid, liquid and gas samples collected at the locations identified in Section 2 are summarized in Table 3.1. Tables 3.1.2 through 3.1.10 present the QC checks and method performance criteria for the general chemistry and physical parameters to be measured during the WPRAP. Tables 3.2.1 through 3.2.4 present method performance criteria for the radiochemical methods and Tables 3.2.5 through 3.2.7 summarize the QC checks and acceptance criteria for the radiochemical methods. The radiochemical methods referenced in this section will be in the Laboratory Standard Operating Procedures manual.

3.1 GENERAL CHEMISTRY

The general chemistry analyses will be conducted using EPA approved test methods. Physical parameters will be measured using EPA approved and ASTM Methods. For Envirocare, all laboratory chemical analyses will be performed by a laboratory certified by the state of Utah.

3.2 RADIOCHEMICAL ANALYSES

There are essentially six distinct radiological data requirements. These are:

- Process monitoring to ensure proper blending and operating conditions to meet WAC
- WAC measurement of finished product
- Monitoring Uranium depletion on finished product
- LSA-I verification to assure compliance with DOT shipping regulations
- Monitoring water from the Clearwell to the WTS and from the WTS to the BSL to meet AWWT system criteria
- Monitoring water from the SWM Pond for discharge to Paddys Run

3.2.1 Process Monitoring:

Process monitoring will be performed only on those isotopes likely to cause problems with the WAC. These are:

- Uranium isotopes
- Radium isotopes
- Thorium isotopes
- Cesium

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These data will also be generated by using gamma spectroscopy. Although the gamma methods used for process monitoring for this application are for screening, they are given an ASL of "E" to indicate that they are methods that are yet to be validated. For screening applications, the QC acceptance criteria will be relaxed. Until blending and drying are completed, it is unlikely that the samples will be homogenous or of consistent moisture content. Hence, precision and accuracy will not be as favorable for raw materials as finished product. The criteria listed in Table 3.2.1 are based on process information needs rather than what might be achievable by optimization of analysis.

The gamma screening may be further augmented by screening for Gross α/β and total uranium and thorium by XRF or phosphorimetry. This information will be used to validate assumptions about the content of waste pits being processed and monitor for anomalies. The Gross α/β method will be a modification of the standard technique for gas proportional counters. A small amount (100 mg) of dried and ground material will be fixed on a planchet and counted. Both laboratory grade and portable XRF equipment are being evaluated. Because these data will be used only for internal control purposes, these techniques are designated ASL E.

3.2.2 WAC and Related Measurements:

The isotopes of interest for waste disposal are:

Chart 1
WAC Parameters

Isotope	MAWC pCi/g
U238	28,000
U234	37,000
U235/236	770
Th228	NA
Th230	15,000
Th232	680
Ra226	2,000
Ra228	670
Cs137	560
Np237	2,000
Pu238	1,000
Pu239/240	1,000
Ru106	19,000
Sr90	20,000
Tc99	10,000

It has been shown in the statistical study of the CIS and RI/FS data that the minor components, (Np237, Pu238, Pu239/240, Ru106, Sr90, and Tc99) are insignificant both in terms of individual

activity and contribution to the WAC. In that study it was determined that if the total of the activity ratios for the major components (U234, U235, U238, Th230, Th232, Ra226, Ra228, and Cs137) are kept below 0.959, the WAC will be met with 90% probability (See section 1.3.5.5). The procedures specified for WAC measurements (see Table 3.2.2) are designed to produce valid data for those isotopes quickly, cost effectively and with minimal waste production. They are also designed to be consistent with the activities that will be encountered. These activities are orders of magnitude above the activities encountered in routine environmental samples. This makes standard, trace level environmental methods inappropriate for this application. Hence, more appropriate methods must be developed and validated. For this reason the methods for WAC measurement have been designed ASL E.

The methods listed rely heavily on high resolution gamma spectroscopy. Recent advances in High Purity Germanium Detector (HPGe) technology make it possible to monitor isotopes that emit in the soft γ and even x-ray regions. At the expected levels, most of the isotopes of interest can be measured directly from γ-ray emission or from a short lived gamma/x-ray emitting daughter. By using extended range HPGe technology, it is now possible to monitor:

- Uranium 238, 234, 235
- Radium 226, 228 (from Ac228)
- Thorium 230, 232 (from Ac228)
- Cesium 137

A key element in achieving valid results will be careful selection of detectors and suitable energy calibration. For low energy γ-rays, a detector with rather low high energy efficiency would be desirable to reduce Compton noise. Hence a 10-20% N-type or LEG detector should be used. To obtain low MDAs on some of the higher energy lines, a higher efficiency (50% or more) P-type should be used. It is anticipated that both types of detectors will be needed to insure that spectra are optimized.

Table 3.2.5 specifies multipoint energy calibration over a wide range of energies. This is essential to insure adequate stability and resolution. The gamma spectra of the waste samples will be particularly complex and good resolution and energy calibration will be critical to proper isotope detection.

In addition to the activities of the above radionuclides, the U235 content must be compared to natural Uranium to insure that the materials being shipped are depleted. This calculation is discussed in Section 4.4.2.

And finally, the waste must meet DOT LSA-I criteria. A calculation will be performed on the data generated to insure that the material is LSA-I. This is discussed in detail in Section 4.4.3. Both of these issues were studied at length using CIS and RI/FS data.

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The methods proposed must be validated before they can be used for waste characterization. They will be tested by preparing a synthetic soil containing the isotopes of interest at 3 to 5 times the HAMDC. Seven replicate analyses will be performed on different days using the SOPs for the proposed method. The precision and accuracy will be calculated and compared to the acceptance criteria of Table 3.2.2. The HAMDCs will be estimated from standard background calculations. HAMDC estimates based on the standard deviations from the pooled data should qualitatively agree with the HAMDCs estimated from background calculations. Very large differences in these numbers should be investigated.

3.2.3 Clearwell and Process Waters:

Since waters leaving the Clearwell will be further processed, a screening analysis will be performed for:

- Total dissolved uranium
- Thorium 230, 232
- Radium 226

The methods are specified in Table 3.2.4. Total dissolved uranium analysis will be performed by a standardized method (PLP) at higher detection limits. Thorium isotopes will likely be performed using α spectroscopy. This standard method as modified will result in a higher detection limit. Gross alpha counting following co-precipitation yields very good results for Ra226. This method will have to be validated using the procedure described earlier. Hence, the appropriate ASL is "E". Quality criteria are listed in Table 3.2.5.

3.2.4 Storm Water Management Related Samples:

Water leaving the Storm Water Management Pond will be monitored for total Uranium. If the total Uranium is less than 20 ppb, it will be considered suitable for discharge to Paddys Run.

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4.0 DATA REQUIREMENTS AND MANAGEMENT

4.1 DATA MANAGEMENT

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Data management will be conducted to meet the requirements of the project. The objective of data management is to compile field and analytical data and develop a database which can be used to demonstrate compliance with the Envirocare WAC, AWWT WAC and applicable regulatory discharge criteria. All data generated will become the property of the DOE. All data not otherwise transferred to DOE during the project will be transferred to DOE or the Fernald contractor at the conclusion of the project.

4.2 DATA REDUCTION

Data reduction involves the process and the calculations used to convert raw field or laboratory measurements/analytical data into final results with proper reporting units.

4.2.1 Field Data Reduction Procedures

Field measurements that are direct readouts require no reduction or calculation. Such data will be entered into field log books immediately after the measurements are taken.

4.2.2 Laboratory Data Reduction Procedures

Analytical data are generated and reduced by extracting required information from laboratory worksheets, run logs, and instrument printouts and making necessary calculations to reduce the data to its final reporting concentrations. Sample results are calculated by using the equations provided in the approved analytical methods. In many cases this is performed by proprietary equipment manufacturer software. This information is then entered via computer into a Microsoft® Access™ database. All raw data necessary to support the calculations and quality assurance are archived at the laboratory. This raw data must be readily available for inspection and auditing by interested parties such as regulatory agencies or quality oversight personnel.

4.2.3 Summary Report

A Summary Report is generated for each sample or sample set that provides a deliverable for a regulatory or contractual requirement. The Summary Report is provided electronically and in hardcopy to FDF. The Summary Report will be generated directly from a Microsoft® Access™ database. The Summary Report contains:

- Sample Identification
- Compositing Information
- Date and Time Collected
- Analytical Result
- Maximum Allowed Value to Meet Requirements
- Signature of Final Reviewer (Laboratory Manager or in his/her absence the Quality Control Manager)

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4.2.4 Database Management

A Microsoft® Access™ database will be developed which is capable of:

- Generating a summary report directly
- Creating a diskette deliverable that can be "appended" to a full Access database
- Linking analytical results to process activities such as bin numbers, outfall sampling events, air-sampling events, etc.

4.3 DATA VERIFICATION

4.3.1 Procedures Used to Verify Laboratory Data

The analytical laboratory will perform a four-step documented data verification procedure, prior to the submittal of the results. This procedure will be documented using a check list. The check list will be designed to allow comments, anomalies, and QC issues to be documented.

Step 1: The bench analyst is responsible for the initial review of 100% of the data he/she generated.

Step 2: A peer review is performed which will consist of a review of predetermined QA/QC items, which are the major source of prevalent problems.

Step 3: The person incorporating the data into the Microsoft® Access™ database will review the data for completeness with respect to the deliverables, checklist, and any non-conformance memos.

Step 4: The Laboratory Manager will review the Summary Report, the check list, non-conformance memos, and raw data as needed to insure the quality of the Summary Report, and sign the hardcopy for FDF.

4.3.2 Procedures Used to Verify Field Data

Field data will be verified by checking for proper instrument operation and calibration each day prior to performing monitoring activities. At the conclusion of the monitoring activities, an instrument calibration check will be performed to ensure that the field monitoring data are accurate.

4.4 DATA REPORTING

The data deliverables and required turnaround times are summarized in Table 1-2. Besides the concentration or activity of individual compounds and radionuclides and the physical parameters listed in Table 1-1, the following derived parameters will be reported for the finished blended waste:

- Total Radiological WAC Contribution

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- Isotopic % Uranium 235 (Depletion Calculation)
- A_2/g Value and A_2/g Limit (LSA-I Calculation)

4.4.1 Total Radiological WAC Contribution

The representative Envirocare requires that the following WAC calculation be made and the result reported:

$$\sum A_i/MWAC_i <= 1$$

Where:

A_i = The activity in pCi/g for each analyze in Chart 1 of section 3.2.2
$MWAC_i$ = The maximum activity for each analyze A_i in Chart 1 of section 3.2.2

In order to meet this criteria, the calculation above will be made for U234, U235, U238, Th230, Th232, Ra226, Ra228, and Cs137. Data for an entire trainload will be averaged, a mean, a standard deviation, and a 90% confidence interval calculated using the guidance from SW846 Chapter 9. The confidence interval will be compared to 0.959. If it is below that limit, then the trainload meets the WAC with at least 90% confidence.

4.4.2 Isotopic Weight % Uranium 235 (Depletion Calculation)

The Uranium 235 isotopic weight percentage will be calculated and reported as follows:

%U235 = ((A235/S235)/((A234/S234) + (A235/S235)+ (A238/S238))) X 100

Where:

Axxx = Activity in pCi/g of Uranium isotope xxx
Sxxx = Specific Activity of Uranium isotope xxx

The samples for a trainload will be pooled and a mean, standard deviation, and a 90% confidence interval calculated as described in SW846 Chapter 9. The Uranium 235 isotopic weight percentage 90% confidence interval will be compared to the natural percentage of 0.7112%. If the confidence interval is below 0.7112%, then the blended waste is depleted with 90% confidence.

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4.4.3 LSA-I Calculation

The finished waste is shown to meet LSA-I specifications by comparing the measured activities for specific radionuclides to the limits set in 10 CFR 71 Appendix A. The sum of these activities per gram is compared to the A_2/g as shown below:

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$$A_2/g = \frac{1}{\sum \frac{f(I)}{A_2(I)}}$$

Where:
f(I) = The activity fraction of radionuclide "I" (i.e., activity of radionuclide "I" divided by the total activity of the relevant radionuclide)$A_2(I)$ = The A_2 activity (per gram) for radionuclide "I" from 10 CFR 71, Table A-1

Note: For radionuclides with "unlimited" A_2/g in Table A-1, (e.g., U238) the $f(I)/A_2(I)$ fraction is not considered. The activities for these radionuclides are included as part of the total activity for the calculation of f(I) for other radionuclides.

The above calculation for LSA-I can be shown to be equivalent to:

$$\sum_{i=1}^{n} \frac{a_i}{A_{2i}} < 10^{-6}$$

Furthermore, it can be shown that the activities of minor isotopes are of no consequence in the calculation of LSA-I. Hence, the above calculation will be made for the isotopes listed below:

- U234, U235
- Th228 (Ac228), Th230, Th232 (Ac228)
- Ra226, Ra228 (Ac228)
- Ac228
- Cs137

The data for samples from a trainload will be pooled and a mean, standard deviation, and a 90% confidence interval calculated as described in SW846 Chapter 9. If the 90% confidence interval is below 10^{-6}, the trainload will be judged to be LSA-I.

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Table 1-1. WPRAP Sampling Program
(page 1 of 2)

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Location	Matrix	Type Sample	Analytical Parameter	Purpose of Samples	ASL
Pit face & Waste Receiving	solid	grab	Gross Alpha/Beta, Total Uranium, Total Thorium, U234, U235, U238, Th230, Th228, Th232, Ra226, Ra228, Cs137, Moisture Content, Specific Gravity (As Needed)	Screening -- Guidance for Operation	E
Blending area/railcar storage bin	solid	composite	U234, U235, U238, Th230, Th232, Ra226, Ra228, Cs137, Moisture Content, Specific Gravity, Proctor Density, TCLP Arsenic, Paint Filter, Reactivity, Corrosivity (pH), Physical observations for Air & Water Reactivity, Pyrophoricity, & Shock Sensitivity.	Waste Acceptance Criteria (Radiological WAC, Uranium Depletion Calculation, LSA-I Calculation, and Physical observations)	B& E
Clearwell	liquid	grab	Arsenic, Cadmium, Chromium, Copper, Cyanide, Nickel, Silver, Ra226, Th230, Th232, Total Dissolved Uranium, Chloride, Nitrates, 1,1,1-Trichloroethane, Tetrachloroethane, 1,1-Dichloroethane, 1,1-Dichloroethene, Chloroethane, pH, Total Suspended Solids	Characterize for Discharge to BSL/AWWT	B
SWM pond	liquid	grab	Total Uranium	Characterize for Discharge to Paddys Run	B
Grey Water Sump	liquid	grab	Arsenic, Cadmium, Chromium, Copper, Cyanide, Nickel, Silver, Ra226, Th230, Th232, Total Dissolved uranium, Chloride, Nitrates, 1,1,1-Trichloroethane, Tetrachloroethane, 1,1-Dichloroethane, 1,1-Dichloroethene, Chloroethane, pH, Total Suspended Solids	Discharge Monitoring to BSL/AWWT	B
Dryer stack	off-gas	Initial Performance Testing	See Initial Performance Testing Criteria (Specifications not included in this S&A Plan)	Demonstrate Performance	NA

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Table 1-1. WPRAP Sampling Program
(page 2 of 2)

Location	Matrix	Type Sample	Analytical Parameter	Purpose of Samples	ASL
Laundry, Respirator Wash, Laboratory	off-gas	Confirmation Testing	U234, U235/236, U238 Th228, Th230, Th232	Demonstrate Performance	
Dryer stack	off-gas	continuous isokinetic sampling	U234, U235/236, U238 Th228, Th230, Th232	40 CFR 61 Subpart H Compliance	B
Dryer stack	off-gas	continuous	Radon & Operational Parameters	Monitor Compliance	A
Water treatment system effluent	liquid	composite	Arsenic, Cadmium, Chromium, Copper, Cyanide, Nickel, Silver, Ra226, Th230, Th232, Total Dissolved uranium, Chloride, Nitrates, 1,1,1-Trichloroethane, Tetrachloroethane, 1,1-Dichloroethane, 1,1-Dichloroethene, Chloroethane, pH, Total Suspended Solids	Discharge Monitoring to BSL/AWWT	B

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Table 1-2. WPRAP Deliverable Requirements

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Location	Matrix	Hard Copy Deliverable	Turn Time Hard Copy	Electronic Deliverable	Turn Time Electronic
Pit Face	Solid	Summary (Internal to IT)	2 hours	NA	NA
Waste Receiving/ Blending Area	Solid	Summary (Internal to IT)	2 hours	NA	NA
Blending Area/Railcar Storage Bins	Solid	Summary	72 hours	Access Diskette	72 hours
Clearwell	Liquid	Summary	168 hours	Access Diskette	168 hours
SWM Pond	Liquid	Summary	24 hours	Access Diskette	24 hours
Grey Water Sump	Liquid	Summary	168 hours	Access Diskette	168 hours
Dryer Stack (Continuous Isokinetic Sampling)	Off-gas	Summary	168 hours	Access Diskette	168 hours
Water Treatment System Effluent	Liquid	Summary	168 hours	Access Diskette	168 hours

Note: All turnaround times are calculated from time of sampling.

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TABLE 1-3TCLP Statistics

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Analyte	Units	Number of Sts	Mass Weighted Mean[1]	90% Confidence Interval[2]	Limit[3]	Recommended Samples[4]
Metals:5						
Arsenic	ug/L	38	1082	1631	5000	3
Barium	ug/L	38	1409	1944	100000	NR
Cadmium	ug/L	37	55.3	70.2	1000	NR
Chromium	ug/L	28	386	609	5000	NR
Copper	ug/L	28	771	995	700000	NR
Lead	ug/L	37	26.0	40.3	5000	NR
Mercury	ug/L	38	0.80	1.04	200	NR
Selenium	ug/L	28	48	70.7	1000	NR
Silver	ug/L	37	217	315	5000	NR
Zinc	ug/L	35	390	451	375000	NR
VOAs:						
1,2-Dichloroethane	ug/L	35	10.3	10.9	500	NR
Benzene	ug/L	36	4.07	4.87	500	NR
Carbon Tetrachloride	ug/L	35	10.2	10.8	500	NR
Trichloroethene	ug/L	36	14.8	16.25	500	NR
Vinyl Chloride	ug/L	35	37.7	38.8	200	NR
BNAs:						
2,4-Dinitrotoluene	ug/L	39	10.9	12.35	130	NR
Nitrobenzene	ug/L	36	9.52	9.85	2000	NR
Pentachlorophenol	ug/L	26	49.44	50.05	100000	NR
Pesticides:						
Endrin	ug/L	39	.07	.08	20	NR
Heptachlor	ug/L	39	.03	.04	8	NR
Heptachlor Epoxide	ug/L	38	.03	.04	8	NR

Notes:

1 Average concentration including mixing of pits

2 90% sure that the concentration is less than this value

3 Existing limit from Land Disposal Regulations or Envirocare

4 Number of samples required to characterize a subset of the population.

5 The un-transformed data are reported here because it gives higher mean and variance values (i.e., is more conservative)

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TABLE 1-4

Major Radionuclides (pCi/g):

			Th228	Th230	Th232	Ra226	Ra228	U234	U235	U238	Utot	
N=			83	86	83	49	49	81	83	85	81	
s=			385.09	3684.77	147.93	141.29	68.79	1804.52	822.68	7026.51	8694.04	
x=			173.43	3113.98	77.52	125.47	78.41	814.29	154.13	3108.26	4120.22	
RT=			NA	15000	680	2000	670	NA	NA	NA	110000	(Envirocare Limit)
RT-x=			NA	-11886	-602.48	-1874.53	-591.59	NA	NA	NA	-105880	
90%CI=			3625.15	3626.15	98.45	151.77	91.22	1072.74	270.53	4090.64	5365.51	(90% Confidence)
ChebyshevLevel=			1391.19	14766.25	545.32	572.27	295.94	6520.68	2755.67	25328.04	31613.19	(90% Confidence)
N	F	t.20	n	n	n	n	n	n	n	n	n	
1	0											
2	1	3.078	NA	0.910511	0.571169	0.053824	0.128099	NA	NA	NA	0.063878	
3	2	1.886	NA	0.341847	0.214442	0.020208	0.048094	NA	NA	NA	0.023983	
4	3	1.638	NA	0.257855	0.161754	0.015243	0.036277	NA	NA	NA	0.01809	

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TABLE 1-5

Minor Radionuclides Individual Limits (pCi/g):

			Cs137	Np237	Pu238	Pu239/24	Ru106	Sr90	Tc99	
N=			90	49	82	83	90	90	90	
s=			16.71	27	0.48	3.1	5.08	21.53	359.89	
x=			4.62	5.75	0.93	1.22	4.12	5.75	244.93	
RT=			560	2000	1000	1000	19000	20000	10000	(Envirocare Limit)
RT-x=			-555.38	-1994.25	-999.07	-998.78	-18995.9	-19994.3	-9755.07	
90%CI=			6.89	6.25	1	1.66	4.81	8.57	293.83	(90% Confidence)
ChebyshevLevel=			57.46	14.29	2.45	11.02	20.18	73.83	1383.00	(90% Confidence)
N	F	t.20	n	n	n	n	n	n	n	
1	0									
2	1	3.078	0.008576	1.74E-05	219E-06	9.13E-05	6.78E-07	1.1E-05	0.012895	
3	2	1.886	0.00322	6.52E-06	8.21E-07	3.43E-05	2.54E-07	4.12E-06	0.004841	
4	3	1.638	0.002429	4.92E-06	6.19E-07	2.58E-05	1.92E-07	3.11E-06	0.003652	

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Table 2-1. Requirements for Containers Preservation Techniques, Sample Volumes and Holding Times (page 1 of 2)

Location	Parameter	Container Type	Container Size	Minimum Sample Volume or Weight	Preservative	Holding Time
Pit face/Waste Receiving Blending Area	Moisture Content	G(T)	4 oz	50 g	store in dark 3°- 30°C	Not Applicable
	Specific Gravity			100 g	NR	Not Applicable
	Radionuclides	Plastic	500 g	400 g	NR	Not Applicable
Blending area/railcar storage bin	Proctor Density	Plastic	5 gal	23 kg	NA	Not Applicable
	Paint Filter Test,	G(T)	8 oz jar	100 g	store in dark 3°- 30°C	Not Applicable
	Moisture Content &			50 g		Not Applicable
	Specific Gravity			100 g	NR	
	TCLP As,			100 g		Not Applicable
	Reactivity,					6 Months
	Corrosivity, &					Not Applicable
	Radionuclides	Plastic	500 g	500 g		Not Applicable
Clearwell	Metals	G(T)	1 L	200 mL	4°C pH <2 HNO_3	6 Months (Hg 28 days)
	Cyanide	G(T)	1 L	1 L	4°C, pH >12 NaOH	14 Days
	Total Suspended Solids, Cl, NO_3	G(T)	1 L	100 mL	4°C	7 Days
	VOAs	G(T)	40 mL	40 mL	4°C	7 Days
	Radionuclides & Total Dissolved uranium	Plastic	1 gal	500 mL	4°C pH <2 HNO_3	6 Months
WM pond	Total Uranium	Plastic	1 gal	50 ml	4°C pH<2 HNO_3	6 Months

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Table 2-1. Requirements for Containers Preservation Techniques, Sample Volumes and Holding Times
(page 2 of 2)

Location	Parameter	Container Type	Container Size	Minimum Sample Volume or Weight	Preservative	Holding Time
Grey Water Sump	Metals	G(T)	1 L	200 mL	4°C pH <2 HNO_3	6 Months (Hg 28 days)
	Cyanide	G(T)	1 L	1 L	4°C, pH >12 NaOH	14 Days
	Total Suspended Solids, Cl, NO_3	G(T)	1 L	100 mL	4°C	7 Days
	VOAs	G(T)	40 mL	40 mL	4°C	7 Days
	Radionuclides & Total Dissolved uranium	Plastic	1 gal	500 mL	4°C pH <2 HNO_3	6 Months
Water Treatment System Effluent	Metals	G(T)	1 L	200 mL	4°C pH <2 HNO_3	6 Months (Hg 28 days)
	Cyanide	G(T)	1 L	1L	4°C, pH >12 NaOH	14 Days
	Total Suspended Solids, Cl, NO_3	G(T)	1 L	100 mL	4°C	7 Days
	VOAs	G(T)	40 mL	40 mL	4°C	7 Days
	Radionuclides & Total Dissolved uranium	Plastic	1 gal	500 mL	4°C pH <2 HNO_3	6 Months
Dryer stack (Continuous sampling)	U234, U235/236, U238, Th232, Th230, Th228	Filter		per air sampling methodology	None	6 months

G - glass
T - Teflon lined lid
NR - Nonrequired
1 - total sample weight for organic and inorganic analysis

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Table 2-2. Sample Collection Summary

Location	Field Sample		QC Samples		Total Sample Per Week
	Type Sample	Frequency	Type Sample	Frequency	
Pit face	Grab	As needed	NA	NA	NA
Waste receiving/ blending area	Grab	As needed	NA	NA	NA
Blending area/ railcar storage bin	Composite	1 per bin	field duplicate	10%	8
Clearwell	Grab	1 per week[1]	field duplicate	10%	2
SWM	Grab	1 per discharge event[1]	field duplicate	10%	NA
Grey Water Sump	Grab	1 per week[1]	field duplicate	10%	2
Drier Off-Gas Monitoring	Composite	1 per week	-	-	1
Water Treatment System Effluent	Composite	1 per day	-	-	7
Total Samples Per Week					20

Note:

1 As process knowledge is gained, frequency may be reduced. See text.

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Table 3.1 Analytical Procedures WPRAP

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ANALYTICAL PARAMETER	MATRIX	PREP METHOD	ANALYTICAL METHOD
Moisture content	S	I	ASTM D 2216-92
Specific Gravity	S	I	ASTM D 854-91
Proctor Density	S	I	ASTM D 698-91
Paint Filter Test	S	I	SW-846, 9095A
Total Suspended Solids	A	I	EPA Method 160.2
Corrosivity	S/A	I	9045C (S) 9040B (A)
Dissolved Metals	A	SW-846, 3010 I	SW-846, 6010 SW-846, 7470A
Reactivity	S/A	I	SW-846, Parts 7.3.3 & 7.3.4
TCLP Metals	S/A	SW-846, 1311	SW-846, 6010B
Radionuclides	S/A	I	See Tables 3.2.1, 3.2.2, 3.2.3, 3.2.4, & 3.2.5
VOAs	G	I	SW-846, 0030

S- solid
A- water
G- gas
I- Prep method included with the analytical method

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Table 3.1.2 QC Checks and Method Performance Criteria for Paint Filter Test (9095A) ASL: B

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REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
Duplicate	1/20	Results must agree	Qualify Data	

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Table 3.1.3 QC Checks and Method Performance Criteria for Total Suspended Solids (160.2) ASL: B

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REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
MB	1/20	DR	Qualify Data	Qualified by Data Review
DUP	1/20	0-20% RPD	Qualify Data	
LCS	1/20	80-120%	Qualify Data	
Detection Limit	NA	NA	NA	10 mg/l

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Table 3.1.4 QC Checks and Method Performance Criteria for Corrosivity (9045C & 9045B) ASL: B

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
DUP	1/sample	0-20% RPD	Qualify Data	

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Table 3.1.5 QC Checks and Method Performance Criteria for ICP-AES (6010)
ASL: B

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
ICVS	Begin	90-110%	Recalibrate	
CCVS	Every 10 and at end	90-110%	Recalibrate	
MB	Each Batch	<PQL	Redigest Batch	
ICB/CCB	With ICVS/CCVS	+/- 3 Std. Dev.	Recalibrate/ Reanalyze last 10	
ICS	Begin & end or every 8 hrs.	80-120%	Re-examine background/ reanalyze	
LCS	1/20 or 1/batch	80-120%	Redigest Batch	
MS	Each matrix	75-125%	Redigest or Post Digestion Spike or MSA	
DUP	1/20 samples	RPD <20% for samples 10 X IDL	DQO driven	
Detection Limit	NA	NA	NA	Per method 6010 Table 1

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Table 3.1.6 QC Checks and Method Performance Criteria for Mercury by Cold Vapor AAS (7470A) ASL: B

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REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
ICVS	Begin	90-110%	Recalibrate	
CCVS	Every 10 and at end	90-110%	Recalibrate	
MB	Each Batch	<PQL	Redigest Batch	
ICB/CCB	With ICVS/CCVS	+/- 3 Std. Dev.	Recalibrate/ Reanalyze last 10	
ICS	Begin & end or every 8 hrs.	80-120%	Re-examine background/ reanalyze	
LCS	1/20 or 1/batch	80-120%	Redigest Batch	
MS/MSD	1/10 or Each matrix	75-125% (MS)	Redigest or MSA	
DUP	1/20 samples	RPD <20% for samples 10 X IDL	DQO driven	
Detection Limit	NA	NA	NA	0.0002 mg/l
Standard Concentrations	NA	NA	NA	Per method

000359

Table 3.1.7 QC Checks and Method Performance Criteria for Reactivity (Parts 7.3.3 and 7.3.4) ASL: B

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REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
LCS	1/20	>50% and <110%	Reanalyze Batch	
MB	1/20	DR	Qualify Data	Qualified by Data Review
DUP	1/20	0-20% RPD	Qualify Data	

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Table 3.1.8 QC Checks and Method Performance Criteria for GC/MS for Volatile Organics (8260B) ASL: B

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REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
IAP	Start each 12 hr. period	Per method	Retune	
IC	Begin, following tune	Per method	Recalibrate	
CCV	Every 12 hours following tune	Per method	Recalibrate	
LCS	1/20 or 1/batch	Per method	Reanalyze	
MB	Each Batch	<PQL	Reanalyze	
MS/MSD	1/20 or Each matrix	Per method	Advisory	
Surrogates	All samples	Per method	Reanalyze	
IS	All samples	Per method	Reanalyze	
Detection Limits	NA	NA	NA	Per method
Standard Concentrations IAP IS MS Surrogate	NA	NA	NA	Per method
Calibration points & ranges ICV CCV	NA	NA	NA	Per method

000361

TABLE 3.1.9 QC Checks and Method Performance Criteria for GC/MS for Semivolatile Organics (8270C) ASL: B

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REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
IAP	Start each 12 hr. period	Per method	Retune	
IC	Begin, following tune	Per method	Recalibrate	
CCV	Every 12 hours following tune	Per method	Recalibrate	
LCS	1/20 or 1/batch	Per method	Reanalyze	
MB	Each Batch	<PQL	Reanalyze	
MS/MSD	1/20 or Each matrix	Per method	Advisory	
Surrogates	All samples	Per method	Reanalyze	
IS	All samples	Per method	Reanalyze	
Detection Limits	NA	NA	NA	Per method
Analyze Lists	NA	NA	NA	Per method
Standard Concentrations IAP IS MS Surrogate	NA	NA	NA	Per method
Calibration points & ranges ICV CCV	NA	NA	NA	Per method

000362

TABLE 3.1.10 QC Checks and Method Performance Criteria for GC for PCBs (8082) ASL: B

1730

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
Degradation Check	Start each 12 hr. period	Per method	Reanalyze	
IC	Begin	Per method	Recalibrate	
CCV	Start, 1/10 samples and end	Per method	Recalibrate	
LCS	1/20 or 1/batch	Per method	Reanalyze	
MB	Each Batch	<PQL	Reanalyze	
MS/MSD	1/20 or Each matrix	Per method	Advisory	
Surrogates	All samples	Per method	Reanalyze	
Detection Limits	NA	NA	NA	Per method
Analyze Lists	NA	NA	NA	Per method
Standard Concentrations MS Surrogate	NA	NA	NA	Per method
Calibration points & ranges ICV CCV	NA	NA	NA	Per method

000363

Table 3.2.1 Radiochemical Method Performance Criteria for Screening Methods

ANALYZE	ASL[1]	HAMDC[2]	PRECISION[3]	ACCURACY[4]	MAX BLANK ACTIVITY	Reference
Gross α/β	A	100 pCi/g	+/- 30%	+/- 30%	<HAMDC	EMSL-LV 0539-17[7]
Total U & Th	A	50 mg/kg	+/- 30%	+/- 30%	<HAMDC	XRF Manufacturers Specification
U234, U238, U235/236 Th228, Th230, Th232	E	3 pCi/ analyze/ filter	+/- 30%	+/- 50%	< HAMDC	Alpha Spec Manufacturers Specification
U234 U235/6 U238	E E E	3700 pCi/g 77 pCi/g 2800 pCi/g	+/- 30%	+/- 30%	<HAMDC	EMSL-LV 0539-17[7,8]
Th230 Th232	E E	1500 pCi/g 68 pCi/g	+/- 30%	+/- 30%	<HAMDC	EMSL-LV 0539-17[7,8]
Ra226	E	200 pCi/g	+/- 30%	+/- 30%	<HAMDC	EMSL-LV 0539-17[7,8]
Ra228	E	67 pCi/g	+/- 30%	+/- 30%	<HAMDC	EMSL-LV 0539-17[7,8]
Cs137	E	56 pCi/g	+/- 30%	+/- 30%	<HAMDC	EMSL-LV 0539-17[7,8]

1 Analytical Support Level -- See SCQ
2 Highest Allowable Minimum Detectable Concentrations (or Activities)
3 Precision established by replicate analyses of soils of known activity (LCS or SRM)
4 Accuracy established by replicate analyses of soils of known activity (LCS or SRM)-- May be from literature, historical data, manufacturers specification, or actual analytical comparison
5 Standard methods have been modified for high level waste and updated technology. Rapid turnaround (<2 hours), low waste methods are preferred over conventional wet chemistry. Method must be validated by establishing precision and accuracy.
6 U236 (HAMDC = 3600 pCi/g) not analyzed separately
7 Radiochemical Analytical Procedures for Analysis of Environmental Samples, U.S. EPA, March 1979, Memorandum of Understanding with U.S. Department of Energy No. EY-76-A-08-0539
8 "Isotopic Analysis by Gamma Ray Spectra", page 92 -- Modified for High Purity Germanium Detectors
9 Gamma analysis data checked by XRF (for internal use only)
10 Assumed to be in equilibrium with Ac228
11 Modified for higher levels of activity

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Table 3.2.2 Radiochemical Method Performance Criteria for Demonstrating Compliance with Envirocare WAC

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ANALYZE	ASL[1]	HAMDC[2]	PRECISION[3]	ACCURACY[4]	MAX BLANK ACTIVITY	REFERENCES
U234 U2356 U238	E E E	3700 pCi/g 77 pCi/g 2800 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]
Th230 Th232 Th228	E E E	1500 pCi/g 68 pCi/g 67 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]
Ra226	E	200 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]
Ra228	E	67 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]
Cs137	E	56 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]

1 Analytical Support Level -- See SCQ
2 Highest Allowable Minimum Detectable Concentrations (or Activities)
3 Precision established by replicate analyses of soils of known activity (LCS or SRM)
4 Accuracy established by replicate analyses of soils of known activity (LCS or SRM)-- May be from data, manufacturers specification, or actual analytical comparison
5 Standard methods have been modified for high level waste and updated technology. Rapid turnaround (<2 hours), low waste methods are preferred over conventional wet chemistry.
6 U236 (HAMDC = 3600 pCi/g) not analyzed separately
7 Radiochemical Analytical Procedures for Analysis of Environmental Samples, U.S. EPA, March 1979, Memorandum of Understanding with U.S. Department of Energy No. EY-76-A-08-0539
8 "Isotopic Analysis by Gamma Ray Spectra", page 92 -- Modified for High Purity Germanium Detectors
9 XRF may be used for checks for internal use
10 Assumed to be in equilibrium with Ac228

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Table 3.2.3 Radiochemical Method Performance Criteria for Demonstrating Compliance For 40 CFR 61, Subpart H

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ANALYZE	ASL1	HAMDC2	PRECISION 3	ACCURACY 4	MAX BLANK ACTIVITY	Reference
U-234	E	4 pCi/filter	N/A	+/- 15%	<HAMDC	Method 114, Option A-3
U-235/236	E	4 pCi/filter	N/A	+/- 15%	<HAMDC	Method 114, Option A-3
U-238	E	4 pCi/filter	N/A	+/- 15%	<HAMDC	Method 114, Option A-3
Th-228	E	4 pCi/filter	N/A	+/- 15%	<HAMDC	Method 114, Option A-3
Th-230	E	4 pCi/filter	N/A	+/- 15%	<HAMDC	Method 114, Option A-3
Th-232	E	4 pCi/filter	N/A	+/- 15%	<HAMDC	Method 114, Option A-3

1 Analytical Support Level -- See SCQ
2 Highest Allowable Minimum Detectable Concentrations (or Activities)
3 Precision does not apply for an individual air filter
4 Accuracy established by replicate counts of a traceable filter

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Table 3.2.4 Radiochemical Method Performance Criteria for Clearwell, Grey Water Sump, Laboratory Wastewater, and WTS Analysis

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ANALYZE	ASL[1]	HAMDC[2]	PRECISION[3]	ACCURACY[4]	MAX BLANK ACTIVITY	REFERENCES
Total Dissolved Uranium	E	500 ppb	+/- 30%	+/- 30%	<HAMDC	Pulsed Laser Phosphorimetry ASTM D5174-91
Th230 Th232	E E	30 pCi/l 5 pCi/l	+/- 30%	+/- 30%	<HAMDC	
Ra226	E	20 pCi/l	+/- 30%	+/- 30%	<HAMDC	

1 Analytical Support Level -- See SCQ. Note that Level "E" is designated due to higher HAMDCs.
2 Highest Allowable Minimum Detectable Concentrations (or Activities)
3 Precision established by replicate analyses of waters of known activity (LCS or SRM)
4 Accuracy established by replicate analyses of waters of known activity (LCS or SRM)-- May be from data, manufacturers specification, or actual analytical comparison

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Table 3.2.5 Radiochemical Method Performance Criteria for SWM Pond Effluent Analysis

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ANALYZE	ASL[1]	HAMDC[2]	% TRACER RECOVERY	% LCS RECOVERY	MAX BLANK ACTIVITY	REFERENCES
Total Dissolved Uranium	B	0.5 ppb	NA	40-160%	<HAMDC	Pulsed Laser Phosphorimetry ASTM D5174-91

1 Analytical Support Level -- See SCQ.

2 Highest Allowable Minimum Detectable Concentrations (or Activities)

000368

Table 3.2.6 Radiochemical Method QC Criteria for Screening and WAC by Gamma Spectroscopy, EMSL-LV 0539-17, Gamma Spectroscopy, ASL E

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
ECV[1]	Daily	+/- 1KeV	Recalibrate	Use a minimum of four certified peak energies 88 to 1332 KeV
ICV[2]	Start of Batch	90-110%	Recalibrate	Use a minimum of four certified peaks from 42 to 1596 KeV -- Different Source from ECV
MB	Daily	< HAMDC	Check for Contamination	"Background Check"
LCS	Each Batch	70-130% (screen) 85-115% (characterization) 75-125% (low level water samples)[4]	Check for Contamination and Reanalyze	Synthetic material with certified activities for isotopes of interest ~ 5X HAMDC Can be used to concurrently perform ICV or ECV
DUP	Each Batch	70-130% (screen) 85-115% (characterization 75-125% (low level water samples)[4]	Check Homogeneity and Reanalyze Batch	
FCV[3]	End of Batch	90-110%	Recalibrate	Use a minimum of four certified peaks from 42 to 1596 KeV -- Different Source from ECV

1 ECV = Energy Calibration Verification
2 ICV = Initial Calibration Verification
3 FCV = Final Calibration Verification (Same material as ICV)
4 Specification for Clearwell and Storm Water Management Pond

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Appendix A

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Statistical Study CIS & RI/FS Data Presentation & Spreadsheets

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AGENDA:

Statistical Analysis of CIS & RI/FS Data for:

- TCLP Metals
- TCLP VOA
- TCLP Semi-VOA
- TCLP Pesticides
- TCLP Herbicides
- PCB (Total)
- Radionuclides
  - **Individual Limits**
  - **Radiological WAC**
  - **LSA-I**
  - **Depletion**

FOCUS:

- ***Weighted Mean***
- ***Variance***
- ***90% Confidence Limit***
- ***90% Chebyshev Limit***
- ***Number of Samples Required***

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Based on SW846 Chapter 9:

- Calculate Mean (Weighted)
- Calculate Variance
- Use Student 't' Test to Calculate 90% Confidence Interval (See Photocopy)
- Compare to Limit
- Calculate Required Number of Samples Using Equation 8

➔ Assumes Normal Distribution

➔ Allow SQRT and Arcsine (hyperbolic) Transformations

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Typical TCLP Data for Arsenic (ug/L):

pit	tclp	sample_id	qa_type	parameter	validated_result	alidation_qualifie	units
1	Y	063113	NORMAL	Arsenic	1	U	UG/L
1	Y	063072	NORMAL	Arsenic	2.5	-	UG/L
1	Y	063033	NORMAL	Arsenic	1	U	UG/L
1 Count					3		
1 Average					1.5		
1 Var					0.75		
2	Y	063634	NORMAL	Arsenic	1040	-	UG/L
2	Y	063540	NORMAL	Arsenic	160	-	UG/L
2 Count					2		
2 Average					600		
2 Var					387200		
3	Y	063314	NORMAL	Arsenic	61.9	-	UG/L
3	Y	063478	NORMAL	Arsenic	6710	-	UG/L
3	Y	063394	NORMAL	Arsenic	63.7	-	UG/L
3 Count					3		
3 Average					2278.533333		
3 Var					14728423.42		
4	Y	063711	NORMAL	Arsenic	1	U	UG/L
4	Y	063787	NORMAL	Arsenic	1	U	UG/L
4	Y	063854	NORMAL	Arsenic	1	U	UG/L
4 Count					3		
4 Average					1		
4 Var					0		
5	Y	100212		ARSENIC	74.6	J	UG/L
5	Y	100210		ARSENIC	30	UJ	UG/L
5	Y	100213		ARSENIC	30	UJ	UG/L
5	Y	100215		ARSENIC	92.8	J	UG/L
5	Y	100216		ARSENIC	30	U	UG/L

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Weighted Means and Weighted Variances Calculated (ug/L)

Mass Fraction:	0.13	Weighted Average:	0.195	Weighted Variance:	0.0975
Mass Fraction:	0.06	Weighted Average:	36	Weighted Variance:	23232
Mass Fraction:	0.45	Weighted Average:	1025.34	Weighted Variance:	6627790.5
Mass Fraction:	0.15	Weighted Average:	0.15	Weighted Variance:	0

Totals:	1	Weighted Average:	1082.4104	Weighted Variance:	6654705.5	Weighted STD:	2579.671591
					Number Sx's		38
					Weighted Mean		1082.41
					Std Dev		2579.67
					Std Dev*Std Dev		6654705.517
					t.20 (Deg F =#Sx's - 8)		1.310
					t.20*t.20		1.716
					RT (Reg Threshold)		5000
					n (Recommend Sx's)		0.74
					sx		418.48
					CI (Confindence Interval)		1630.62

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Summary of TCLP Metals Data (ug/L):

Sample Number Calculator:													
			As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn	
		N =	38	38	37	28	28	37	38	28	37	35	
		s =	2579.67	2516.6	69.15	892.13	893.83	66.09	1.11	90.67	453.3	272.28	
		x =	1082.41	1409.23	55.33	385.92	770.74	26.02	0.8	48	216.82	390.11	
		RT =	5000	100000	1000	5000	700000	5000	200	1000	5000	375000	(Reg Limit)
		RT - x =	-3917.59	-98590.8	-944.67	-4614.08	-699229	-4973.98	-199.2	-952	-4783.18	-374610	
		CI =	1630.62	1944.04	70.23	608.98	994.56	40.26	1.04	70.67	314.52	450.54	(90% Confidence)
	Chebyshev Level =		9240.04	9367.42	274.00	3207.08	3597.28	235.01	4.31	334.72	1650.28	1251.13	(90% Confidence)
N	F	t.20	n	n	n	n	n	n	n	n	n	n	
1	0												
2	1	3.078	4.107973	0.006173	0.050765	0.354179	1.55E-05	0.001673	0.000294	0.085939	0.085089	5.01E-06	
3	2	1.886	1.542317	0.002318	0.019059	0.132975	5.81E-06	0.000628	0.00011	0.032265	0.031946	1.88E-06	
4	3	1.638	1.163371	0.001748	0.014376	0.100303	4.38E-06	0.000474	8.33E-05	0.024338	0.024097	1.42E-06	
5	4	1.533	1.019001	0.001531	0.012592	0.087856	3.84E-06	0.000415	7.3E-05	0.021318	0.021107	1.24E-06	
6	5	1.476	0.944633	0.001419	0.011673	0.081444	3.56E-06	0.000385	6.76E-05	0.019762	0.019566	1.15E-06	
7	6	1.44	0.899115	0.001351	0.011111	0.07752	3.39E-06	0.000366	6.44E-05	0.01881	0.018624	1.1E-06	
8	7	1.415	0.868167	0.001305	0.010728	0.074851	3.27E-06	0.000353	6.22E-05	0.018162	0.017983	1.06E-06	

Where CI < RT -- No Samples Needed by SW846

When Chebyshev Level < R -- No Samples Needed even with Skewing

Where Sampling is needed use N samples up to when N > n

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Summary of TCLP Metals Data (ug/L):

Sample Number Calculator:													
			As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn	
		N =	38	38	37	28	28	37	38	28	37	35	
		s =	2579.67	2516.6	69.15	892.13	893.83	66.09	1.11	90.67	453.3	272.28	
		x =	1082.41	1409.23	55.33	385.92	770.74	26.02	0.8	48	216.82	390.11	
		RT =	5000	100000	1000	5000	700000	5000	200	1000	5000	375000	(Reg Limit)
		RT - x =	-3917.59	-98590.8	-944.67	-4614.08	-699229	-4973.98	-199.2	-952	-4783.18	-374610	
		CI =	1630.62	1944.04	70.23	608.98	994.56	40.26	1.04	70.67	314.52	450.54	(90% Confidence)
	Chebyshev Level =		9240.04	9367.42	274.00	3207.08	3597.28	235.01	4.31	334.72	1650.28	1251.13	(90% Confidence)
N	F	t.20	n	n	n	n	n	n	n	n	n	n	
1	0												
2	1	3.078	4.107973	0.006173	0.050765	0.354179	1.55E-05	0.001673	0.000294	0.085939	0.085089	5.01E-06	
3	2	1.886	1.542317	0.002318	0.019059	0.132975	5.81E-06	0.000628	0.00011	0.032265	0.031946	1.88E-06	
4	3	1.638	1.163371	0.001748	0.014376	0.100303	4.38E-06	0.000474	8.33E-05	0.024338	0.024097	1.42E-06	
5	4	1.533	1.019001	0.001531	0.012592	0.087856	3.84E-06	0.000415	7.3E-05	0.021318	0.021107	1.24E-06	
6	5	1.476	0.944633	0.001419	0.011673	0.081444	3.56E-06	0.000385	6.76E-05	0.019762	0.019566	1.15E-06	
7	6	1.44	0.899115	0.001351	0.011111	0.07752	3.39E-06	0.000366	6.44E-05	0.01881	0.018624	1.1E-06	
8	7	1.415	0.868167	0.001305	0.010728	0.074851	3.27E-06	0.000353	6.22E-05	0.018162	0.017983	1.06E-06	

Where CI < RT -- No Samples Needed by SW846

When Chebyshev Level < R -- No Samples Needed even with Skewing

Where Sampling is needed use N samples up to when N > n

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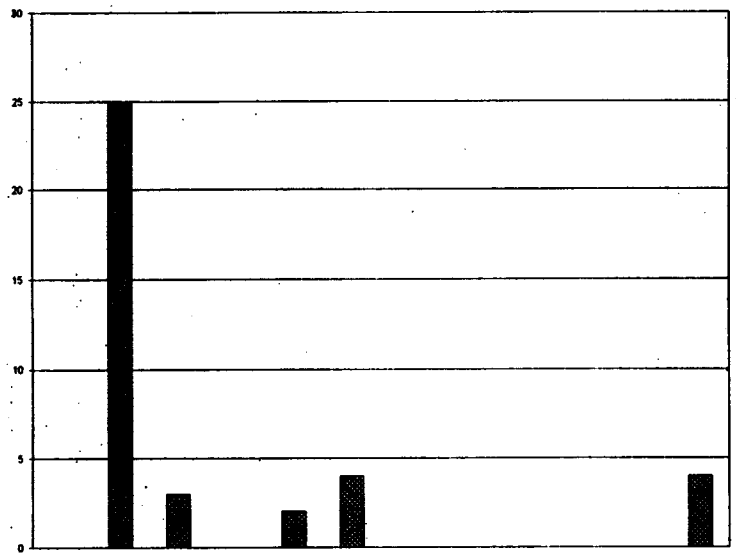
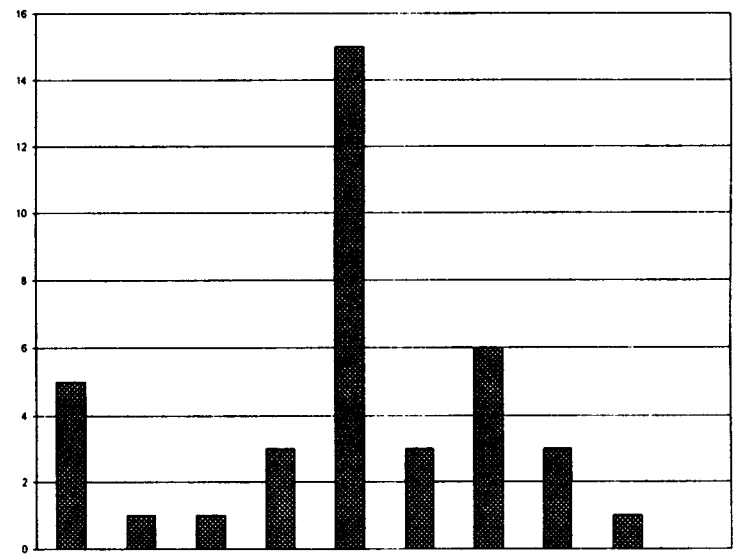
Arsenic Data Transformed:



U Corrected Arsenic



ASINH Transformed Arsenic

Histograms (numbers of points versus equally spaced data bins)

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All TCLP Metals Data Transformed For N Estimation:

Sample Number Calculator:														
			As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn		
		N =	38	38	37	28	28	37	38	28	37	35		
		s =	1.97	0.86	1.12	0.76	1.67	1.19	0.55	2.04	0.65	0.8		
		x =	4.45	7.08	3.81	5.46	6.37	2.67	0.57	2.72	5.07	6.23		
		RT =	9.21034	12.20607	7.600903	9.21034	14.15198	9.21034	5.991471	7.600903	9.21034	13.52783	(Reg Limit)	
		RT - x =	-4.76034	-5.12607	-3.7909	-3.75034	-7.78198	-6.54034	-5.42147	-4.8809	-4.14034	-7.29783		
		CI =	4.87	7.26	4.05	5.65	6.78	2.92	0.69	3.23	5.21	6.41	(90% Confidence)	
	Chebyshev Level =		10.68	9.80	7.35	7.86	11.65	6.43	2.31	9.17	7.13	8.76	(90% Confidence)	
N	F	t.20	n	n	n	n	n	n	n	n	n	n		
1	0													
2	1	3.078	1.622533	0.266664	0.826967	0.389066	0.436304	0.313639	0.097505	1.654997	0.233503	0.113849		
3	2	1.886	0.609172	0.100118	0.31048	0.146073	0.163808	0.117754	0.036608	0.62136	0.087667	0.042744		
4	3	1.638	0.459499	0.075519	0.234196	0.110183	0.123561	0.088822	0.027613	0.468692	0.066128	0.032242		
5	4	1.533	0.402477	0.066147	0.205133	0.09651	0.108227	0.0778	0.024187	0.410529	0.057921	0.028241		
6	5	1.476	0.373103	0.06132	0.190162	0.089466	0.100329	0.072122	0.022421	0.380568	0.053694	0.02618		
7	6	1.44	0.355125	0.058365	0.180999	0.085155	0.095494	0.068646	0.021341	0.362231	0.051107	0.024918		
8	7	1.415	0.342901	0.056356	0.174769	0.082224	0.092207	0.066284	0.020606	0.349762	0.049348	0.024061		

NOTE: Units not meaningful in Transformed Data
Only Relative Values Meaningful

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All TCLP Metals Data Transformed For N Estimation:

Sample Number Calculator:														
			As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn		
		N =	38	38	37	28	28	37	38	28	37	35		
		s =	1.97	0.86	1.12	0.76	1.67	1.19	0.55	2.04	0.65	0.8		
		x =	4.45	7.08	3.81	5.46	6.37	2.67	0.57	2.72	5.07	6.23		
		RT =	9.21034	12.20607	7.600903	9.21034	14.15198	9.21034	5.991471	7.600903	9.21034	13.52783	(Reg Limit)	
		RT - x =	-4.76034	-5.12607	-3.7909	-3.75034	-7.78198	-6.54034	-5.42147	-4.8809	-4.14034	-7.29783		
		CI =	4.87	7.26	4.05	5.65	6.78	2.92	0.69	3.23	5.21	6.41	(90% Confidence)	
	Chebyshev Level =		10.68	9.80	7.35	7.86	11.65	6.43	2.31	9.17	7.13	8.76	(90% Confidence)	
N	F	t.20	n	n	n	n	n	n	n	n	n	n		
1	0													
2	1	3.078	1.622533	0.266664	0.826967	0.389066	0.436304	0.313639	0.097505	1.654997	0.233503	0.113849		
3	2	1.886	0.609172	0.100118	0.31048	0.146073	0.163808	0.117754	0.036608	0.62136	0.087667	0.042744		
4	3	1.638	0.459499	0.075519	0.234196	0.110183	0.123561	0.088822	0.027613	0.468692	0.066128	0.032242		
5	4	1.533	0.402477	0.066147	0.205133	0.09651	0.108227	0.0778	0.024187	0.410529	0.057921	0.028241		
6	5	1.476	0.373103	0.06132	0.190162	0.089466	0.100329	0.072122	0.022421	0.380568	0.053694	0.02618		
7	6	1.44	0.355125	0.058365	0.180999	0.085155	0.095494	0.068646	0.021341	0.362231	0.051107	0.024918		
8	7	1.415	0.342901	0.056356	0.174769	0.082224	0.092207	0.066284	0.020606	0.349762	0.049348	0.024061		

NOTE: Units not meaningful in Transformed Data
Only Relative Values Meaningful

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INTERNATIONAL TECHNOLOGY CORPORATION

Typical TCLP VOA Data (ug/L):

Sample Number Calculator:									
			12DCA	BENZ	CTC	3CEE	VC		
		N =	35	36	35	36	35		
		s =	2.72	3.63	2.71	6.62	4.82		
		x =	10.3	4.07	10.18	14.81	37.74		
		RT =	500	500	500	500	200	(Reg Limit)	
		RT - x =	-489.7	-495.93	-489.82	-485.19	-162.26		
		CI =	10.91	4.87	10.78	16.25	38.81	(90% Confidence)	
	Chebyshev Level =		18.90	15.55	18.75	35.74	52.98	(90% Confidence)	
N	F	t.20	n	n	n	n	n		
1	0								
2	1	3.078	0.000292	0.000508	0.00029	0.001764	0.00836		
3	2	1.886	0.00011	0.000191	0.000109	0.000662	0.003139		
4	3	1.638	8.28E-05	0.000144	8.21E-05	0.000499	0.002368		
5	4	1.533	7.25E-05	0.000126	7.19E-05	0.000437	0.002074		
6	5	1.476	6.72E-05	0.000117	6.67E-05	0.000406	0.001922		
7	6	1.44	6.4E-05	0.000111	6.35E-05	0.000386	0.00183		
8	7	1.415	6.18E-05	0.000107	6.13E-05	0.000373	0.001767		
9	8	1.397	6.02E-05	0.000105	5.97E-05	0.000363	0.001722		

000328

INTERNATIONAL TECHNOLOGY CORPORATION

Typical TCLP Semi-VOA and Pesticide Data (ug/L):

Sample Number Calculator:										
			Endrin	Hepta	Hepta EP	24DNT	NBENZ	PCP		
		N =	39	39	38	39	36	26		
		s =	0.04	0.02	0.02	7.03	1.48	2.34		
		x =	0.07	0.03	0.03	10.88	9.52	49.44		
		RT =	20	8	8	130	2000	100000	(Reg Limit)	
		RT - x =	-19.93	-7.97	-7.97	-119.12	-1990.48	-99950.6		
		CI =	0.08	0.04	0.04	12.35	9.85	50.05	(90% Confidence)	
	Chebyshev Level =		0.20	0.09	0.09	33.11	14.20	56.84	(90% Confidence)	
N	F	t.20	n	n	n	n	n	n		
1	0									
2	1	3.078	3.82E-05	5.97E-05	5.97E-05	0.032997	5.24E-06	5.19E-09		
3	2	1.886	1.43E-05	2.24E-05	2.24E-05	0.012389	1.97E-06	1.95E-09		
4	3	1.638	1.08E-05	1.69E-05	1.69E-05	0.009345	1.48E-06	1.47E-09		
5	4	1.533	9.47E-06	1.48E-05	1.48E-05	0.008185	1.3E-06	1.29E-09		
6	5	1.476	8.78E-06	1.37E-05	1.37E-05	0.007588	1.2E-06	1.19E-09		
7	6	1.44	8.35E-06	1.31E-05	1.31E-05	0.007222	1.15E-06	1.14E-09		
8	7	1.415	8.07E-06	1.26E-05	1.26E-05	0.006974	1.11E-06	1.1E-09		

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Herbicides and PCB's:

- Data Limited for TCLP Herbicides but Totals are 'U'
- Herbicides not Manufactured or Formulated at Site
- Total PCB data all Below 50 ppm Action Limit

000380

INTERNATIONAL TECHNOLOGY CORPORATION

Conclusions for Chemical Data:

One Well Composited Sample per Production Bin (4-6 Rail Cars) for Arsenic

This gives 6-15 Independent Samples per Train Load of 40 to 60 cars

No Sampling Needed for Other Chemical Parameters

000381

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INTERNATIONAL TECHNOLOGY CORPORATION

Minor Radionuclides Individual Limits (pCi/g):

			Cs137	Np237	Pu238	Pu239/24	Ru106	Sr90	Tc99		
		N =	90	49	82	83	90	90	90		
		s =	16.71	2.7	0.48	3.1	5.08	21.53	359.89		
		x =	4.62	5.75	0.93	1.22	4.12	5.75	244.93		
		RT =	560	2000	1000	1000	19000	20000	10000	(Envirocare Limit)	
		RT - x =	-555.38	-1994.25	-999.07	-998.78	-18995.9	-19994.3	-9755.07		
		90% CI =	6.89	6.25	1	1.66	4.81	8.57	293.83	(90% Confidence)	
	Chebyshev Level =		57.46	14.29	2.45	11.02	20.18	73.83	1383.00	(90% Confidence)	
N	F	t.20	n	n	n	n	n	n	n		
1	0										
2	1	3.078	0.008576	1.74E-05	2.19E-06	9.13E-05	6.78E-07	1.1E-05	0.012895		
3	2	1.886	0.00322	6.52E-06	8.21E-07	3.43E-05	2.54E-07	4.12E-06	0.004841		
4	3	1.638	0.002429	4.92E-06	6.19E-07	2.58E-05	1.92E-07	3.11E-06	0.003652		
5	4	1.533	0.002127	4.31E-06	5.42E-07	2.26E-05	1.68E-07	2.72E-06	0.003199		
6	5	1.476	0.001972	3.99E-06	5.03E-07	2.1E-05	1.56E-07	2.53E-06	0.002965		
7	6	1.44	0.001877	3.8E-06	4.79E-07	2E-05	1.48E-07	2.4E-06	0.002822		
8	7	1.415	0.001813	3.67E-06	4.62E-07	1.93E-05	1.43E-07	2.32E-06	0.002725		

INTERNATIONAL TECHNOLOGY CORPORATION

Major Radionuclides (pCi/g):

			Th228	Th230	Th232	Ra226	Ra228	U234	U235	U238	Utot	
		N =	83	86	83	49	49	81	83	85	81	
		s =	385.09	3684.77	147.93	141.29	68.79	1804.52	822.68	7026.51	8694.04	
		x =	173.43	3113.98	77.52	125.47	78.41	814.29	154.13	3108.26	4120.22	
		RT =	NA	15000	680	2000	670	NA	NA	NA	110000	(Envirocare Limit)
		RT - x =	NA	-11886	-602.48	-1874.53	-591.59	NA	NA	NA	-105880	
		90% CI =	3625.15	3626.15	98.45	151.77	91.22	1072.74	270.53	4090.64	5365.51	(90% Confidence)
	Chebyshev Level =		1391.19	14766.25	545.32	572.27	295.94	6520.68	2755.67	25328.04	31613.19	(90% Confidence)
N	F	t.20	n	n	n	n	n	n	n	n	n	
1	0											
2	1	3.078	NA	0.910511	0.571169	0.053824	0.128099	NA	NA	NA	0.063878	
3	2	1.886	NA	0.341847	0.214442	0.020208	0.048094	NA	NA	NA	0.023983	
4	3	1.638	NA	0.257855	0.161754	0.015243	0.036277	NA	NA	NA	0.01809	
5	4	1.533	NA	0.225856	0.141681	0.013351	0.031776	NA	NA	NA	0.015845	
6	5	1.476	NA	0.209373	0.131341	0.012377	0.029457	NA	NA	NA	0.014689	
7	6	1.44	NA	0.199284	0.125012	0.01178	0.028037	NA	NA	NA	0.013981	
8	7	1.415	NA	0.192425	0.120709	0.011375	0.027072	NA	NA	NA	0.0135	
9	8	1.397	NA	0.18756	0.117658	0.011087	0.026388	NA	NA	NA	0.013159	
10	9	1.393	NA	0.186488	0.116985	0.011024	0.026237	NA	NA	NA	0.013083	

000383

'U' Corrected Data

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000013

INTERNATIONAL TECHNOLOGY CORPORATION

000384

WAC Calculations (from Weighted Means Only):

			Th230	Th232	Ra226	Ra228	U234	U235	U238	U(Depl)
		s =	3684.77	147.93	141.29	68.79	1804.52	822.68	7026.51	7301.023
		x =	3113.98	77.52	125.47	78.41	814.29	154.13	3108.26	4076.68
		RT =	15000	680	2000	670	37000	770	28000	110000
WAC Contribution:			0.207599	0.114	0.062735	0.11703				0.037061

Major Radionuclides

Minor Radionuclides

Cs137	Np237	Pu238	Pu239/24	Ru106	Sr90	Tc99	Total WAC:
16.71	2.7	0.48	3.1	5.08	21.53	359.89	
4.62	5.75	0.93	1.22	4.12	5.75	244.93	
560	2000	1000	1000	19000	20000	10000	
0.00825	0.002875	0.00093	0.00122	0.000217	0.000288	0.024493	0.576696587

Activity Units pCi/g

INTERNATIONAL TECHNOLOGY CORPORATION

Sx Number	Pit	Tc99 Activity (pCi/g)	Sr90 Activity (pCi/g)	Pu238 Activity (pCi/g)	Pu239/240 Activity (pCi/g)	Ru106 Activity (pCi/g)	Np237 Activity (pCi/g)	WAC Contribution
PS-01-002	1	0.5	0.2	0.05	0.05	0.05	0.05	0.000187632
PS-01-017	1	0.5	0.25	0.05	0.05	0.05	0.05	0.000190132
PS-01-034	1	1	0.15	0.05	0.05	0.05	0.05	0.000235132
PS-01-049	1	15	0.3	0.05	0.05	0.05	0.15	0.001692632
PS-01-060	1	1	0.3	0.05	0.05	0.05	0.05	0.000242632
	1 Count							5
	1 Average							0.000509632
	1 Var							4.37973E-07
PS-02-002	2	618	0.5	0.1	0.6	0.3	0.2	0.062640789
PS-02-009	2	11	0.15	0.1	0.05	0.025	0.1	0.001308816
PS-02-019	2	14	0.25	0.05	0.05	0.05	0.15	0.001590132
PS-02-028	2	0.5	0.45	0.05	0.05	0.05	0.05	0.000200132
PS-02-040	2	1	0.3	0.05	0.05	0.05	0.05	0.000242632
	2 Count							5
	2 Average							0.0131965
	2 Var							0.000764368

Tc, Sr, Pu, Ru, Np Contributions to WAC (from Data Points with Variance):

			Weighted		Weighted	
Mass Fraction:		0.13	Average:	6.625E-05	Variance:	5.694E-08
			Weighted		Weighted	
Mass Fraction:		0.06	Average:	0.0007918	Variance:	4.586E-05

		Weighted		Weighted		Weighted
Totals:	1	Average:	0.033207	Variance:	0.0018953	STD: 0.0435352
					Number Sx's	49
					Weighted Mean	0.033
					Std Dev	0.044
					Std Dev*Std Dev	0.0019
					t.20 (Deg F =#Sx's - 8)	1.303
					t.20*t.20	1.698
					RT (Reg Threshold)	1
					n (Recommend Sx's)	0.00
					sx	0.01
					90% CI (Confidence Interval)	0.041

Contribution <0.041 with 90% Confidence

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INTERNATIONAL TECHNOLOGY CORPORATION

WAC Calculation Directly from Pit Sample Data Using U, Th, Ra, and Cs Activities (pCi/g):

Sx Number	Pit	Cs Activity (pCi/g) 5 V	234 Activity (pCi/g) 34	U235 Activity (pCi/g) 35	U238 Activity (pCi/g) 38	Th230 Activity (pCi/g) 230	Th228 Activity (pCi/g) 228	Th232 Activity (pCi/g) 232
063661	1	0.1 UJ	830 J	47.3 J	915 J	5460 -	355 UD	130 UD
063071	1	0.15 DU	441 -	64 R	623 C	4220 -	131 -	131 -
063100	1	0.1 UJ	423 -	19.6 -	445 -	5270 -	305 U	210 U
063112	1	0.1 UJ	600 -	35.6 J	1342 -	245 DU	395 DU	245 DU
	1 Count							
	1							
	1 Var							
063630	2	0.63 UJD	1651 -	130 -	1861 -	18400 -	616 -	170 DU
063632	2	0.15 UJ	250 -	18.5 -	279 -	2630 -	697 -	268 -
	2 Count							
	2							
	2 Var							
063308	3	0.1 UJ	154 F	23.6 -	663 -	3.28 J	1.48 J	1.2 -
063310	3	0.25 DU	473 F	48.6 -	1740 -	3.81 -	1.85 DU	0.75 DU
063474	3	0.15 UJD	946 -	89.2 -	880 -	5770 J	410 U	180 U
063476	3	0.2 UJ	991 -	36.1 -	922 -	4780 -	427 -	272 -
	3 Count							
	3							
	3 Var							

Mass Fraction:	0.13	Weighted Average:	0.0799219	Weighted Variance:	0.0032573
Mass Fraction:	0.06	Weighted Average:	0.1019952	Weighted Variance:	0.1037512
Mass Fraction:	0.43	Weighted Average:	0.2455955	Weighted Variance:	0.1066899

		Weighted		Weighted		Weighted	
Totals:	1	Average:	0.5438191	Variance:	0.2237723	STD:	0.4730458
					Number Sx's		39
					Weighted Mean		0.54
					Std Dev		0.47
					Std Dev* Std Dev		0.224
					t.20 (Deg F =# Sx's - 8)		1.310
					t.20*t.20		1.716
					RT (Reg Threshold)		670
					n (Recommend Sx's)		0.00
					sx		0.08
					CI (90% Confindence Interval)		0.64
					90% Chebyshev Limit		2

000386

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Number of Samples for WAC @ 0.959:

Sample Number Calculator:						
			WAC	WAC	WAC	WAC
		s =	0.47	0.47	0.47	0.47
		x =	0.7	0.6	0.54	0.5
		RT =	0.959	0.959	0.959	0.959
		RT - x =	-0.259	-0.359	-0.419	-0.459
N	F	t.20	n	n	n	n
1	0					
2	1	3.078	31.19848	16.23843	11.92079	9.933621
3	2	1.886	11.71331	6.096635	4.475598	3.729527
4	3	1.638	8.835355	4.598695	3.375946	2.813184
5	4	1.533	7.738922	4.028015	2.957004	2.464079
6	5	1.476	7.174124	3.734045	2.741198	2.284247
7	6	1.44	6.828435	3.554118	2.609112	2.174179
8	7	1.415	6.593395	3.431782	2.519304	2.099342
9	8	1.397	6.426714	3.345027	2.455616	2.046271
10	9	1.393	6.389964	3.325899	2.441574	2.03457

Run U, Th, Ra, and Cs -- Set WAC @ 0.959

Requires Four Samples or Less

000387

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000388

LSA-I "Factor":

Calculation Complex but Can be Reduced to:

$$\sum_{i=1}^{n} \frac{a_i}{A_{2i}} < 10^{-6}$$

Where:

a_i = Specific activity of Radionuclide "i" in Curies/g

A_{2i} = A_2 Factor (from 49 CFR) for Radionuclide "i" in Curies

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LSA-I Factor (from Weighted Means):

			Th228	Th230	Th232	Ra226	Ra228	U234
		s =	385.09	3684.77	147.93	141.29	68.79	1804.52
a(i) (pCi/g)		x =	173.43	3113.98	77.52	125.47	78.41	814.29
a(i) (Ci/g)			1.7343E-10	3.11E-09	7.75E-11	1.25E-10	7.841E-11	8.14E-10
A2 Factor(Ci):			1.08E-02	5.41E-03	NA	0.541	1.06E+00	2.70E-02
a(i)/A(i) (Ci/g)			1.60583E-08	5.76E-07		2.32E-10	7.397E-11	3.02E-08

U235	U238	Sr90	Ru106	Pu238	Pu239	Np237	Cs137	Tc99		
822.68	7026.51	21.53	5.08	0.48	3.1	2.7	16.71	359.89		
154.13	3108.26	5.75	4.12	0.93	1.22	5.75	4.62	244.93	7.91281E-09	Activity (Ci/g):
1.54E-10	3.11E-09	5.75E-12	4.12E-12	9.3E-13	1.22E-12	5.75E-12	4.62E-12	2.45E-10		
NA	NA	2.7	5.41	5.41E-03	5.41E-03	5.41E-03	13.5	24.3		
		2.13E-12	7.62E-13	1.72E-10	2.26E-10	1.06E-09	3.42E-13	1.01E-11	6.23594E-07	Sum of Factors (Ci/g)
							A2/g x 10E-6 =		1.2689E-08	

Note that Contribution from Tc, Sr, Pu, Np 3 or more Orders of Magnitude below Max of LSA-I Factor

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LSA-I Factor (from Data Points with Variance):

Number Sx's	39
Weighted Mean	5.24274E-07
Std Dev	6.84816E-07
Std Dev* Std Dev	4.68974E-13
t.20 (Deg F =#Sx's - 8)	1.28900E+00
t.20*t.20	1.66152E+00
RT (Reg Threshold)	1.00000E-06
n (Recommend Sx's)	3.44302E+00
sx	1.09658E-07
CI (90% Confindence Interval)	6.65623E-07
90% Chebyshev Limit	2.68985E-06

From U, Th, Ra, Cs, Tc, Sr, Pu, Ru, Np

Number Sx's	39
Weighted Mean	5.24266E-07
Std Dev	6.84817E-07
Std Dev* Std Dev	4.68974E-13
t.20 (Deg F =#Sx's - 8)	1.28900E+00
t.20*t.20	1.66152E+00
RT (Reg Threshold)	1.00000E-06
n (Recommend Sx's)	3.44291E+00
sx	1.09658E-07
CI (90% Confindence Interval)	6.65615E-07
90% Chebyshev Limit	2.68985E-06

From U, Th, Ra, Cs

Difference Occurs only in 5th Decimal Place!

000390

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Number of Samples Required for LSA-I Calculations:

Sample Number Calculator:				
		LSAI - Factor		
		N =	39	
		s =	6.85E-07	
		x =	5.24E-07	
		RT =	0.000001	
		RT - x =	-4.8E-07	
		90% CI =	7.66E-07	
	Chebyshev Level =		2.69E-06	
N	F	t.20	n	
1	0			
2	1	3.078	19.62025	
3	2	1.886	7.366321	
4	3	1.638	5.55642	
5	4	1.533	4.86689	
6	5	1.476	4.511697	
7	6	1.44	4.294298	
8	7	1.415	4.146485	
9	8	1.397	4.041663	
10	9	1.393	4.018551	

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Depletion Issues:

- Questions About Data
- Questions About Actual Mean Depletion

SW846 Does Allow Reasonable Estimates

000022

000392

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Number of Samples Estimated by:

U235 Ratio ~ 0.005

STD ~ 0.0004

		s =	0.0004	0.0004	0.0004	0.0004
		x =	0.0065	0.006	0.005	0.004
		RT =	0.007	0.007	0.007	0.007
		RT - x =	-0.0005	-0.001	-0.002	-0.003
N	F	t.20	n	n	n	n
1	0					
2	1	3.078	6.063414	1.515853	0.378963	0.168428
3	2	1.886	2.276477	0.569119	0.14228	0.063235
4	3	1.638	1.717148	0.429287	0.107322	0.047699
5	4	1.533	1.504057	0.376014	0.094004	0.041779
6	5	1.476	1.394289	0.348572	0.087143	0.03873
7	6	1.44	1.327104	0.331776	0.082944	0.036864
8	7	1.415	1.281424	0.320356	0.080089	0.035595
9	8	1.397	1.24903	0.312257	0.078064	0.034695
10	9	1.393	1.241887	0.310472	0.077618	0.034497

000393

T-1730

Three Samples or Fewer are Needed

INTERNATIONAL TECHNOLOGY CORPORATION

Summary:

Five Samples or Less per Container are Required for U, Th, Ra, & Cs to Calculate:

- **Individual Activities**
- **Total WAC**
- **LSA-I**
- **Depletion**

One Sample per Production Bin Equals

6-10 Samples per Trainload.

000394

Sample Number Calculator:														
			As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn		
		N =	38	38	37	28	28	37	38	28	37	35		
		s =	2579.67	2516.6	69.15	892.13	893.83	66.09	1.11	90.67	453.3	272.28		
		x =	1082.41	1409.23	55.33	385.92	770.74	26.02	0.8	48	216.82	390.11		
		RT =	5000	100000	1000	5000	700000	5000	200	1000	5000	375000	(Reg Limit)	
		RT - x =	-3917.59	-98590.8	-944.67	-4614.08	-699229	-4973.98	-199.2	-952	-4783.18	-374610		
		CI =	1630.62	1944.04	70.23	608.98	994.56	40.26	1.04	70.67	314.52	450.54	(90% Confidence)	
	Chebyshev Level =		9240.04	9367.42	274.00	3207.08	3597.28	235.01	4.31	334.72	1650.28	1251.13	(90% Confidence)	
N	F	t.20	n	n	n	n	n	n	n	n	n	n		
1	0													
2	1	3.078	4.107973	0.006173	0.050765	0.354179	1.55E-05	0.001673	0.000294	0.085939	0.085089	5.01E-06		
3	2	1.886	1.542317	0.002318	0.019059	0.132975	5.81E-06	0.000628	0.00011	0.032265	0.031946	1.88E-06		
4	3	1.638	1.163371	0.001748	0.014376	0.100303	4.38E-06	0.000474	8.33E-05	0.024338	0.024097	1.42E-06		
5	4	1.533	1.019001	0.001531	0.012592	0.087856	3.84E-06	0.000415	7.3E-05	0.021318	0.021107	1.24E-06		
6	5	1.476	0.944633	0.001419	0.011673	0.081444	3.56E-06	0.000385	6.76E-05	0.019762	0.019566	1.15E-06		
7	6	1.44	0.899115	0.001351	0.011111	0.07752	3.39E-06	0.000366	6.44E-05	0.01881	0.018624	1.1E-06		
8	7	1.415	0.868167	0.001305	0.010728	0.074851	3.27E-06	0.000353	6.22E-05	0.018162	0.017983	1.06E-06		
9	8	1.397	0.84622	0.001272	0.010457	0.072959	3.19E-06	0.000345	6.06E-05	0.017703	0.017528	1.03E-06		
10	9	1.393	0.841381	0.001264	0.010397	0.072542	3.17E-06	0.000343	6.03E-05	0.017602	0.017428	1.03E-06		
11	10	1.372	0.816204	0.001226	0.010086	0.070371	3.08E-06	0.000332	5.84E-05	0.017075	0.016906	9.94E-07		
12	11	1.363	0.805531	0.00121	0.009954	0.069451	3.04E-06	0.000328	5.77E-05	0.016852	0.016685	9.81E-07		
13	12	1.356	0.797278	0.001198	0.009852	0.068739	3E-06	0.000325	5.71E-05	0.016679	0.016514	9.71E-07		
14	13	1.35	0.790238	0.001187	0.009765	0.068132	2.98E-06	0.000322	5.66E-05	0.016532	0.016368	9.63E-07		
15	14	1.345	0.784395	0.001179	0.009693	0.067629	2.96E-06	0.000319	5.62E-05	0.01641	0.016247	9.56E-07		
16	15	1.341	0.779737	0.001172	0.009636	0.067227	2.94E-06	0.000317	5.58E-05	0.016312	0.016151	9.5E-07		
17	16	1.337	0.775092	0.001165	0.009578	0.066827	2.92E-06	0.000316	5.55E-05	0.016215	0.016055	9.44E-07		
18	17	1.333	0.770461	0.001158	0.009521	0.066427	2.9E-06	0.000314	5.52E-05	0.016118	0.015959	9.39E-07		
19	18	1.33	0.766997	0.001153	0.009478	0.066129	2.89E-06	0.000312	5.49E-05	0.016046	0.015887	9.34E-07		
20	19	1.328	0.764692	0.001149	0.00945	0.06593	2.88E-06	0.000311	5.48E-05	0.015997	0.015839	9.32E-07		
21	20	1.325	0.761241	0.001144	0.009407	0.065632	2.87E-06	0.00031	5.45E-05	0.015925	0.015768	9.27E-07		
ncalc1.xls														

000395

1730

000025

Current Limits ASINH

Sample Number Calculator:														
			As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn		
		N =	38	38	37	28	28	37	38	28	37	35		
		s =	1.97	0.86	1.12	0.76	1.67	1.19	0.55	2.04	0.65	0.8		
		x =	4.45	7.08	3.81	5.46	6.37	2.67	0.57	2.72	5.07	6.23		
		RT =	9.21034	12.20607	7.600903	9.21034	14.15198	9.21034	5.991471	7.600903	9.21034	13.52783	(Reg Limit)	
		RT - x =	-4.76034	-5.12607	-3.7909	-3.75034	-7.78198	-6.54034	-5.42147	-4.8809	-4.14034	-7.29783		
		CI =	4.87	7.26	4.05	5.65	6.78	2.92	0.69	3.23	5.21	6.41	(90% Confidence)	
	Chebyshev Level =		10.68	9.80	7.35	7.86	11.65	6.43	2.31	9.17	7.13	8.76	(90% Confidence)	
N	F	t.20	n	n	n	n	n	n	n	n	n	n		
1	0													
2	1	3.078	1.622533	0.266664	0.826967	0.389066	0.436304	0.313639	0.097505	1.654997	0.233503	0.113849		
3	2	1.886	0.609172	0.100118	0.31048	0.146073	0.163808	0.117754	0.036608	0.62136	0.087667	0.042744		
4	3	1.638	0.459499	0.075519	0.234196	0.110183	0.123561	0.088822	0.027613	0.468692	0.066128	0.032242		
5	4	1.533	0.402477	0.066147	0.205133	0.09651	0.108227	0.0778	0.024187	0.410529	0.057921	0.028241		
6	5	1.476	0.373103	0.06132	0.190162	0.089466	0.100329	0.072122	0.022421	0.380568	0.053694	0.02618		
7	6	1.44	0.355125	0.058365	0.180999	0.085155	0.095494	0.068646	0.021341	0.362231	0.051107	0.024918		
8	7	1.415	0.342901	0.056356	0.174769	0.082224	0.092207	0.066284	0.020606	0.349762	0.049348	0.024061		
9	8	1.397	0.334233	0.054931	0.170351	0.080145	0.089876	0.064608	0.020086	0.34092	0.0481	0.023452		
10	9	1.393	0.332322	0.054617	0.169376	0.079687	0.089362	0.064239	0.019971	0.338971	0.047825	0.023318		
11	10	1.372	0.322377	0.052983	0.164308	0.077303	0.086688	0.062316	0.019373	0.328828	0.046394	0.02262		
12	11	1.363	0.318162	0.05229	0.16216	0.076292	0.085555	0.061501	0.01912	0.324528	0.045787	0.022325		
13	12	1.356	0.314902	0.051754	0.160498	0.07551	0.084678	0.060871	0.018924	0.321203	0.045318	0.022096		
14	13	1.35	0.312122	0.051297	0.159081	0.074843	0.083931	0.060334	0.018757	0.318367	0.044918	0.021901		
15	14	1.345	0.309814	0.050918	0.157905	0.07429	0.08331	0.059888	0.018618	0.316013	0.044586	0.021739		
16	15	1.341	0.307974	0.050616	0.156967	0.073849	0.082815	0.059532	0.018508	0.314136	0.044321	0.02161		
17	16	1.337	0,306139	0.050314	0.156032	0.073409	0.082322	0.059177	0.018397	0.312265	0.044057	0.021481		
18	17	1.333	0.30431	0.050014	0.1551	0.07297	0.08183	0.058824	0.018287	0.310399	0.043794	0.021353		
19	18	1.33	0.302942	0.049789	0.154402	0.072642	0.081462	0.058559	0.018205	0.309003	0.043597	0.021257		
20	19	1.328	0.302032	0.049639	0.153938	0.072424	0.081217	0.058383	0.01815	0.308075	0.043466	0.021193		
21	20	1.325	0.300669	0.049415	0.153244	0.072097	0.080851	0.05812	0.018069	0.306684	0.04327	0.021097		
ncalc1.xls														

000396

000026

Arsenic U Adjusted

1730

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Arsenic	1	U
1	Y	063072	NORMAL	Arsenic	2.5	-
1	Y	063033	NORMAL	Arsenic	1	U
1 Count					3	
1 Average					1.5	
1 Var					0.75	
2	Y	063634	NORMAL	Arsenic	1040	-
2	Y	063540	NORMAL	Arsenic	160	-
2 Count					2	
2 Average					600	
2 Var					387200	
3	Y	063314	NORMAL	Arsenic	61.9	-
3	Y	063478	NORMAL	Arsenic	6710	-
3	Y	063394	NORMAL	Arsenic	63.7	-
3 Count					3	
3 Average					2278.533333	
3 Var					14728423.42	
4	Y	063711	NORMAL	Arsenic	1	U
4	Y	063787	NORMAL	Arsenic	1	U
4	Y	063854	NORMAL	Arsenic	1	U
4 Count					3	
4 Average					1	
4 Var					0	
5	Y	100212		ARSENIC	74.6	J
5	Y	100210		ARSENIC	30	UJ
5	Y	100213		ARSENIC	30	UJ
5	Y	100215		ARSENIC	92.8	J
5	Y	100216		ARSENIC	30	U
5	Y	100217		ARSENIC	6	UJ
5	Y	100218		ARSENIC	6	UJ
5	Y	100219		ARSENIC	30	UJ
5	Y	100214		ARSENIC	30	UJ
5 Count					9	
5 Average					36.6	
5 Var					836.62	
6	Y	100225		ARSENIC	400	J
6	Y	100232		ARSENIC	489	J
6	Y	100231		ARSENIC	456	J
6	Y	100230		ARSENIC	1050	J
6	Y	100229		ARSENIC	1350	J
6	Y	100228		ARSENIC	403	J
6	Y	100226		ARSENIC	349	J
6	Y	100233		ARSENIC	452	J
6	Y	100227		ARSENIC	120	-
6 Count					9	
6 Average					563.2222222	
6 Var					147499.6944	
BURN PIT	Y	063164	NORMAL	Arsenic	4.8	-
BURN PIT	Y	063205	NORMAL	Arsenic	150	-
BURN PIT Count					2	
BURN PIT Average					77.4	
BURN PIT Var					10541.52	
CLEARWELL	Y	098531		ARSENIC	42.5	UJ
CLEARWELL	Y	098526		ARSENIC	42.5	UJ
CLEARWELL	Y	098527		ARSENIC	42.5	UJ
CLEARWELL	Y	098528		ARSENIC	42.5	UJ
CLEARWELL	Y	098530		ARSENIC	42.5	UJ
CLEARWELL	Y	098532		ARSENIC	42.5	UJ
CLEARWELL	Y	098529		ARSENIC	42.5	UJ
CLEARWELL Count					7	
CLEARWELL Average					42.5	
CLEARWELL Var					0	
Grand Count					38	
Grand Average					366.6263158	
Grand Var					1220220.228	

000397

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.13	Average:	0.195	Variance:	0.0975		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	36	Variance:	23232		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.45	Average:	1025.34	Variance:	6627790.541		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.15	Average:	0.15	Variance:	0		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.12	Average:	4.392	Variance:	100.3944		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.02	Average:	11.26444444	Variance:	2949.993889		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	4.644	Variance:	632.4912		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.01	Average:	0.425	Variance:	0		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	1082.410444	Variance:	6654705.517	STD:	2579.671591
						Number Sx's		38
						Weighted Mean		1082.41
						Std Dev		2579.67
						Std Dev* Std Dev		6654705.517
						t.20 (Deg F = #Sx's - 8)		1.310
						t.20*t.20		1.716
						RT (Reg Threshold)		5000
						n (Recommend Sx's)		0.74
						sx		418.48
						CI (Confindence Interval)		1630.62

000398

000028

As ASINH Transformed

1730

pit	tclp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Arsenic	0.881373587	U
1	Y	063072	NORMAL	Arsenic	1.647231146	-
1	Y	063033	NORMAL	Arsenic	0.881373587	U
1 Count					3	
1 Average					1.13665944	
1 Var					0.1955126	
2	Y	063634	NORMAL	Arsenic	7.640123404	-
2	Y	063540	NORMAL	Arsenic	5.768330761	-
2 Count					2	
2 Average					6.704227083	
2 Var					1.751803848	
3	Y	063314	NORMAL	Arsenic	4.818732601	-
3	Y	063478	NORMAL	Arsenic	9.504501416	-
3	Y	063394	NORMAL	Arsenic	4.847393349	-
3 Count					3	
3 Average					6.390209122	
3 Var					7.27431773	
4	Y	063711	NORMAL	Arsenic	0.881373587	U
4	Y	063787	NORMAL	Arsenic	0.881373587	U
4	Y	063854	NORMAL	Arsenic	0.881373587	U
4 Count					3	
4 Average					0.881373587	
4 Var					2.22045E-16	
5	Y	100212		ARSENIC	5.005332607	J
5	Y	100210		ARSENIC	4.094622224	UJ
5	Y	100213		ARSENIC	4.094622224	UJ
5	Y	100215		ARSENIC	5.223622849	J
5	Y	100216		ARSENIC	4.094622224	U
5	Y	100217		ARSENIC	2.491779853	UJ
5	Y	100218		ARSENIC	2.491779853	UJ
5	Y	100219		ARSENIC	4.094622224	UJ
5	Y	100214		ARSENIC	4.094622224	UJ
5 Count					9	
5 Average					3.965069587	
5 Var					0.886398522	
6	Y	100225		ARSENIC	6.68461329	J
6	Y	100232		ARSENIC	6.885510716	J
6	Y	100231		ARSENIC	6.815641192	J
6	Y	100230		ARSENIC	7.64969285	J
6	Y	100229		ARSENIC	7.901007189	J
6	Y	100228		ARSENIC	6.692085282	J
6	Y	100226		ARSENIC	6.548221155	J
6	Y	100233		ARSENIC	6.806830584	J
6	Y	100227		ARSENIC	5.480656284	-
6 Count					9	
6 Average					6.82936206	
6 Var					0.470382386	
BURN PIT	Y	063164	NORMAL	Arsenic	2.272441327	-
BURN PIT	Y	063205	NORMAL	Arsenic	5.703793586	-
BURN PIT Count					2	
BURN PIT Average					3.988117456	
BURN PIT Var					5.88708916	
CLEARWELL	Y	098531		ARSENIC	4.442789636	UJ
CLEARWELL	Y	098526		ARSENIC	4.442789636	UJ
CLEARWELL	Y	098527		ARSENIC	4.442789636	UJ
CLEARWELL	Y	098528		ARSENIC	4.442789636	UJ
CLEARWELL	Y	098530		ARSENIC	4.442789636	UJ
CLEARWELL	Y	098532		ARSENIC	4.442789636	UJ
CLEARWELL	Y	098529		ARSENIC	4.442789636	UJ
CLEARWELL Count					7	
CLEARWELL Average					4.442789636	
CLEARWELL Var					0	
Grand Count					38	
Grand Average					4.6015481	
Grand Var					4.828434122	

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.13	Average:	0.14776573	Variance:	0.02541664			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.40225362	Variance:	0.10510823			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.45	Average:	2.8755941	Variance:	3.27344298			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.15	Average:	0.13220604	Variance:	3.3307E-17			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.12	Average:	0.47580835	Variance:	0.10636782			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.02	Average:	0.13658724	Variance:	0.00940765			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.23928705	Variance:	0.35322535			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.01	Average:	0.0444279	Variance:	0			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	4.45393003	Variance:	3.87296867	STD:	1.967985942	
						Number Sx's		38	
						Weighted Mean		4.45	(arsinh)
						Std Dev		1.97	(arsinh)
						Std Dev* Std Dev		3.873	
						t.20 (Deg F = #Sx's - 8)		1.310	
						t.20*t.20		1.716	
						RT (Reg Threshold)		9.210340382	(arsinh)
						n (Recommend Sx's)		0.29	
						sx		0.32	
						CI (Confindence Interval)		4.87	

000400

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Barium	1900	-
1	Y	063072	NORMAL	Barium	1580	-
1	Y	063033	NORMAL	Barium	1270	-
1 Count					3	
1 Average					1583.333333	
1 Var					99233.33333	
2	Y	063634	NORMAL	Barium	45.1	-
2	Y	063540	NORMAL	Barium	51	-
2 Count					2	
2 Average					48.05	
2 Var					17.405	
3	Y	063314	NORMAL	Barium	584	-
3	Y	063478	NORMAL	Barium	107	-
3	Y	063394	NORMAL	Barium	486	-
3 Count					3	
3 Average					392.3333333	
3 Var					63462.33333	
4	Y	063711	NORMAL	Barium	2790	-
4	Y	063787	NORMAL	Barium	12800	-
4	Y	063854	NORMAL	Barium	735	U
4 Count					3	
4 Average					5441.666667	
4 Var					41664558.33	
5	Y	100212		BARIUM	539	-
5	Y	100210		BARIUM	306	-
5	Y	100213		BARIUM	844	-
5	Y	100215		BARIUM	219	-
5	Y	100216		BARIUM	732	-
5	Y	100217		BARIUM	591	-
5	Y	100218		BARIUM	718	-
5	Y	100219		BARIUM	883	-
5	Y	100214		BARIUM	620	-
5 Count					9	
5 Average					605.7777778	
5 Var					50808.94444	
6	Y	100225		BARIUM	754	-
6	Y	100232		BARIUM	3220	-
6	Y	100231		BARIUM	1110	-
6	Y	100230		BARIUM	2730	-
6	Y	100229		BARIUM	966	-
6	Y	100228		BARIUM	1560	-
6	Y	100226		BARIUM	1470	-
6	Y	100233		BARIUM	1020	-
6	Y	100227		BARIUM	1260	-
6 Count					9	
6 Average					1565.555556	
6 Var					714861.7778	
BURN PIT	Y	063164	NORMAL	Barium	1290	-
BURN PIT	Y	063205	NORMAL	Barium	1500	-
BURN PIT Count					2	
BURN PIT Average					1395	
BURN PIT Var					22050	
CLEARWELL	Y	098531		BARIUM	529	J
CLEARWELL	Y	098526		BARIUM	4880	J
CLEARWELL	Y	098527		BARIUM	2430	J
CLEARWELL	Y	098528		BARIUM	1600	J
CLEARWELL	Y	098530		BARIUM	1610	J
CLEARWELL	Y	098532		BARIUM	2090	J
CLEARWELL	Y	098529		BARIUM	870	J
CLEARWELL Count					7	
CLEARWELL Average					2001.285714	
CLEARWELL Var					2040038.238	
Grand Count					38	
Grand Average					1644.45	
Grand Var					4473288.257	

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.13	Average:	205.8333333	Variance:	12900.33333		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	2.883	Variance:	1.0443		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.45	Average:	176.55	Variance:	28558.05		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.15	Average:	816.25	Variance:	6249683.75		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.12	Average:	72.69333333	Variance:	6097.073333		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.02	Average:	31.31111111	Variance:	14297.23556		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	83.7	Variance:	1323		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.01	Average:	20.01285714	Variance:	20400.38238		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	1409.233635	Variance:	6333260.869	STD:	2516.597081
						Number Sx's		38
						Weighted Mean		1409.23
						Std Dev		2516.60
						Std Dev* Std Dev		6333260.869
						t.20 (Deg F = #Sx's - 8)		1.310
						t.20*t.20		1.716
						RT (Reg Threshold)		100000
						n (Recommend Sx's)		0.00
						sx		408.25
						CI (Confindence Interval)		1944.04

000402

000032

Barium ASINH

1730

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Barium	8.242756415	-
1	Y	063072	NORMAL	Barium	8.058327407	-
1	Y	063033	NORMAL	Barium	7.839919515	-
1 Count					3	
1 Average					8.047001112	
1 Var					0.040665606	
2	Y	063634	NORMAL	Barium	4.502152314	-
2	Y	063540	NORMAL	Barium	4.625068916	-
2 Count					2	
2 Average					4.563610615	
2 Var					0.007554246	
3	Y	063314	NORMAL	Barium	7.063048896	-
3	Y	063478	NORMAL	Barium	5.36599785	-
3	Y	063394	NORMAL	Barium	6.879356863	-
3 Count					3	
3 Average					6.436134537	
3 Var					0.867330086	
4	Y	063711	NORMAL	Barium	8.626944087	-
4	Y	063787	NORMAL	Barium	10.15034763	-
4	Y	063854	NORMAL	Barium	7.293018143	U
4 Count					3	
4 Average					8.690103287	
4 Var					2.044074766	
5	Y	100212		BARIUM	6.982863612	-
5	Y	100210		BARIUM	6.416734952	-
5	Y	100213		BARIUM	7.431300026	-
5	Y	100215		BARIUM	6.082224123	-
5	Y	100216		BARIUM	7.288928161	-
5	Y	100217		BARIUM	7.074963914	-
5	Y	100218		BARIUM	7.269617235	-
5	Y	100219		BARIUM	7.476472702	-
5	Y	100214		BARIUM	7.122867309	-
5 Count					9	
5 Average					7.016219115	
5 Var					0.221296455	
6	Y	100225		BARIUM	7.318539988	-
6	Y	100232		BARIUM	8.770283843	-
6	Y	100231		BARIUM	7.705262678	-
6	Y	100230		BARIUM	8.605204102	-
6	Y	100229		BARIUM	7.566311283	-
6	Y	100228		BARIUM	8.045588384	-
6	Y	100226		BARIUM	7.986164976	-
6	Y	100233		BARIUM	7.620705327	-
6	Y	100227		BARIUM	7.832014338	-
6 Count					9	
6 Average					7.938897213	
6 Var					0.229963041	
BURN PIT	Y	063164	NORMAL	Barium	7.855544828	-
BURN PIT	Y	063205	NORMAL	Barium	8.006367679	-
BURN PIT Count					2	
BURN PIT Average					7.930956253	
BURN PIT Var					0.011373766	
CLEARWELL	Y	098531		BARIUM	6.964136506	J
CLEARWELL	Y	098526		BARIUM	9.18604769	J
CLEARWELL	Y	098527		BARIUM	8.488793759	J
CLEARWELL	Y	098528		BARIUM	8.070906186	J
CLEARWELL	Y	098530		BARIUM	8.077136735	J
CLEARWELL	Y	098532		BARIUM	8.338066583	J
CLEARWELL	Y	098529		BARIUM	7.461640723	J
CLEARWELL Count					7	
CLEARWELL Average					8.083818312	
CLEARWELL Var					0.514093427	
Grand Count					38	
Grand Average					7.518200676	
Grand Var					1.215929883	

000403

Barium ASINH

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.13	Average:	1.046110145	Variance:	0.005286529			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.273816637	Variance:	0.000453255			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.45	Average:	2.896260541	Variance:	0.390298539			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.15	Average:	1.303515493	Variance:	0.306611215			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.12	Average:	0.841946294	Variance:	0.026555575			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.02	Average:	0.158777944	Variance:	0.004599261			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.475857375	Variance:	0.000682426			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.01	Average:	0.080838183	Variance:	0.005140934			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	7.077122612	Variance:	0.739627733	STD:	0.860016124	
						Number Sx's		38	
						Weighted Mean		7.08	(asinh)
						Std Dev		0.86	(asinh)
						Std Dev* Std Dev		0.740	
						t.20 (Deg F = #Sx's - 8)		1.310	
						t.20*t.20		1.716	
						RT (Reg Threshold)		12.20607265	
						n (Recommend Sx's)		0.05	
						ex		0.14	
						CI (Confindence Interval)		7.26	(asinh)

000404

000034

pit	tclp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Cadmium	10.8	-
1	Y	063072	NORMAL	Cadmium	4.6	-
1	Y	063033	NORMAL	Cadmium	2	U
1 Count					3	
1 Average					5.8	
1 Var					20.44	
2	Y	063634	NORMAL	Cadmium	34.2	J
2	Y	063540	NORMAL	Cadmium	20.7	-
2 Count					2	
2 Average					27.45	
2 Var					91.125	
3	Y	063314	NORMAL	Cadmium	12.7	J
3	Y	063478	NORMAL	Cadmium	61.5	-
3	Y	063394	NORMAL	Cadmium	204	-
3 Count					3	
3 Average					92.73333333	
3 Var					9880.563333	
4	Y	063711	NORMAL	Cadmium	13.3	-
4	Y	063787	NORMAL	Cadmium	104	J
4	Y	063854	NORMAL	Cadmium	70.6	J
4 Count					3	
4 Average					62.63333333	
4 Var					2104.223333	
5	Y	100212		CADMIUM	2.5	UJ
5	Y	100210		CADMIUM	7.8	J
5	Y	100213		CADMIUM	2.5	UJ
5	Y	100215		CADMIUM	5.6	J
5	Y	100217		CADMIUM	0.5	UJ
5	Y	100218		CADMIUM	0.5	UJ
5	Y	100219		CADMIUM	2.5	UJ
5	Y	100214		CADMIUM	2.5	UJ
5 Count					8	
5 Average					3.05	
5 Var					6.182857143	
6	Y	100225		CADMIUM	5	UJ
6	Y	100232		CADMIUM	10	UJ
6	Y	100231		CADMIUM	5	UJ
6	Y	100230		CADMIUM	50	UJ
6	Y	100229		CADMIUM	50	UJ
6	Y	100228		CADMIUM	5	UJ
6	Y	100226		CADMIUM	5	UJ
6	Y	100233		CADMIUM	5	UJ
6	Y	100227		CADMIUM	5	UJ
6 Count					9	
6 Average					15.55555556	
6 Var					384.0277778	
BURN PIT	Y	063164	NORMAL	Cadmium	20.3	J
BURN PIT	Y	063205	NORMAL	Cadmium	13	J
BURN PIT Count					2	
BURN PIT Average					16.65	
BURN PIT Var					26.645	
CLEARWELL	Y	098531		CADMIUM	6.6	J
CLEARWELL	Y	098526		CADMIUM	34	J
CLEARWELL	Y	098527		CADMIUM	12.4	J
CLEARWELL	Y	098528		CADMIUM	2.5	UJ
CLEARWELL	Y	098530		CADMIUM	17.4	J
CLEARWELL	Y	098532		CADMIUM	7.6	J
CLEARWELL	Y	098529		CADMIUM	9	J
CLEARWELL Count					7	
CLEARWELL Average					12.78571429	
CLEARWELL Var					109.4614286	
Grand Count					37	
Grand Average					22.31351351	
Grand Var					1461.237868	

Cadmium U Adjusted

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.13	Average:	0.754	Variance:	2.6572		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	1.647	Variance:	5.4675		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.45	Average:	41.73	Variance:	4446.2535		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.15	Average:	9.395	Variance:	315.6335		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.12	Average:	0.366	Variance:	0.74194286		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.02	Average:	0.31111111	Variance:	7.68055556		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	0.999	Variance:	1.5987		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.01	Average:	0.12785714	Variance:	1.09461429		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	55.3299683	Variance:	4781.12751	STD:	69.1456977
						Number Sx's		37
						Weighted Mean		55.33
						Std Dev		69.15
						Std Dev* Std Dev		4781.128
						t.20 (Deg F = #Sx's - 8)		1.311
						t.20*t.20		1.719
						RT (Reg Threshold)		1000
						n (Recommend Sx's)		0.01
						sx		11.37
						CI (Confidence Interval)		70.23

000406

000036

Cadmium ASINH

1730

pit	tclp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Cadmium	3.074829803	-
1	Y	063072	NORMAL	Cadmium	2.230814179	-
1	Y	063033	NORMAL	Cadmium	1.443635475	U
1 Count					3	
1 Average					2.249759819	
1 Var					0.665467937	
2	Y	063634	NORMAL	Cadmium	4.225586497	J
2	Y	063540	NORMAL	Cadmium	3.723863815	-
2 Count					2	
2 Average					3.974725156	
2 Var					0.125862825	
3	Y	063314	NORMAL	Cadmium	3.236295586	J
3	Y	063478	NORMAL	Cadmium	4.812250447	-
3	Y	063394	NORMAL	Cadmium	6.011273182	-
3 Count					3	
3 Average					4.686606405	
3 Var					1.936964983	
4	Y	063711	NORMAL	Cadmium	3.282321537	-
4	Y	063787	NORMAL	Cadmium	5.337561193	J
4	Y	063854	NORMAL	Cadmium	4.950227478	J
4 Count					3	
4 Average					4.523370069	
4 Var					1.192657947	
5	Y	100212		CADMIUM	1.647231146	UJ
5	Y	100210		CADMIUM	2.751354954	J
5	Y	100213		CADMIUM	1.647231146	UJ
5	Y	100215		CADMIUM	2.423792044	J
5	Y	100217		CADMIUM	0.481211825	UJ
5	Y	100218		CADMIUM	0.481211825	UJ
5	Y	100219		CADMIUM	1.647231146	UJ
5	Y	100214		CADMIUM	1.647231146	UJ
5 Count					8	
5 Average					1.590811904	
5 Var					0.645124754	
6	Y	100225		CADMIUM	2.312438341	UJ
6	Y	100232		CADMIUM	2.99822295	UJ
6	Y	100231		CADMIUM	2.312438341	UJ
6	Y	100230		CADMIUM	4.605270171	UJ
6	Y	100229		CADMIUM	4.605270171	UJ
6	Y	100228		CADMIUM	2.312438341	UJ
6	Y	100226		CADMIUM	2.312438341	UJ
6	Y	100233		CADMIUM	2.312438341	UJ
6	Y	100227		CADMIUM	2.312438341	UJ
6 Count					9	
6 Average					2.898154816	
6 Var					0.967110254	
BURN PIT	Y	063164	NORMAL	Cadmium	3.704374179	J
BURN PIT	Y	063205	NORMAL	Cadmium	3.259572556	J
BURN PIT Count					2	
BURN PIT Average					3.481973368	
BURN PIT Var					0.098924242	
CLEARWELL	Y	098531		CADMIUM	2.585907253	J
CLEARWELL	Y	098526		CADMIUM	4.219723898	J
CLEARWELL	Y	098527		CADMIUM	3.212465613	J
CLEARWELL	Y	098528		CADMIUM	1.647231146	UJ
CLEARWELL	Y	098530		CADMIUM	3.550442102	J
CLEARWELL	Y	098532		CADMIUM	2.725595849	J
CLEARWELL	Y	098529		CADMIUM	2.893443986	J
CLEARWELL Count					7	
CLEARWELL Average					2.976401407	
CLEARWELL Var					0.653344079	
Grand Count					37	
Grand Average					2.944251469	
Grand Var					1.654605105	

000407

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.13	Average:	0.29246878	Variance:	0.08651083			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.23848351	Variance:	0.00755177			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.45	Average:	2.10897288	Variance:	0.87163424			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.15	Average:	0.67850551	Variance:	0.17889869			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.12	Average:	0.19089743	Variance:	0.07741497			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.02	Average:	0.0579631	Variance:	0.01974221			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.2089184	Variance:	0.00593545			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.01	Average:	0.02976401	Variance:	0.00653344			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	3.80597362	Variance:	1.25422161	STD:	1.11992036	
						Number Sx's		37	
						Weighted Mean		3.81	(asinh)
						Std Dev		1.12	(asinh)
						Std Dev* Std Dev		1.254	
						t.20 (Deg F = #Sx's - 8)		1.311	
						t.20*t.20		1.719	
						RT (Req Threshold)		7.60090271	(asinh)
						n (Recommend Sx's)		0.15	
						sx		0.18	
						CI (Confidence Interval)		4.05	(asinh)

000408

000038

Chromium U Adjusted

1730

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063033	NORMAL	Chromium	88.2	-
1	Y	063113	NORMAL	Chromium	92.8	-
1	Y	063072	NORMAL	Chromium	123	-
1 Count					3	
1 Average					101.3333333	
1 Var					357.3733333	
2	Y	063634	NORMAL	Chromium	79.7	J
2	Y	063540	NORMAL	Chromium	74.4	-
2 Count					2	
2 Average					77.05	
2 Var					14.045	
3	Y	063478	NORMAL	Chromium	159	-
3	Y	063394	NORMAL	Chromium	142	-
3	Y	063314	NORMAL	Chromium	83.5	J
3 Count					3	
3 Average					128.1666667	
3 Var					1568.583333	
4	Y	063854	NORMAL	Chromium	1070	U
4	Y	063787	NORMAL	Chromium	4520	-
4	Y	063711	NORMAL	Chromium	215	-
4 Count					3	
4 Average					1935	
4 Var					5194425	
5	Y	100217		CHROMIUM	1	UJ
5	Y	100218		CHROMIUM	21.6	J
5	Y	100215		CHROMIUM	36.4	J
5	Y	100219		CHROMIUM	10.6	J
5	Y	100210		CHROMIUM	18	J
5	Y	100212		CHROMIUM	20.6	UJ
5	Y	100213		CHROMIUM	5.2	UJ
5	Y	100214		CHROMIUM	5	UJ
5 Count					8	
5 Average					14.8	
5 Var					136.1371429	
BURN PIT	Y	063164	NORMAL	Chromium	158	J
BURN PIT	Y	063205	NORMAL	Chromium	194	J
BURN PIT Count					2	
BURN PIT Average					176	
BURN PIT Var					648	
CLEARWELL	Y	098527		CHROMIUM	5	UJ
CLEARWELL	Y	098528		CHROMIUM	5	UJ
CLEARWELL	Y	098526		CHROMIUM	29.6	J
CLEARWELL	Y	098529		CHROMIUM	17.1	J
CLEARWELL	Y	098530		CHROMIUM	5	UJ
CLEARWELL	Y	098531		CHROMIUM	36	J
CLEARWELL	Y	098532		CHROMIUM	5	UJ
CLEARWELL Count					7	
CLEARWELL Average					14.67142857	
CLEARWELL Var					176.302381	
Grand Count					28	
Grand Average					257.8821429	
Grand Var					737893.7052	

NOTE: NO VALID CHROMIUM DATA EXISTS FOR PIT 6. DATA NORMALIZED TO EXISTING DATA.

000409

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.132653061	Average:	13.44217687	Variance:	47.40666667		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06122449	Average:	4.717346939	Variance:	0.859897959		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.459183673	Average:	58.85204082	Variance:	720.2678571		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.153061224	Average:	296.1734694	Variance:	795065.051		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.12244898	Average:	1.812244898	Variance:	16.66985423		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06122449	Average:	10.7755102	Variance:	39.67346939		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.010204082	Average:	0.149708455	Variance:	1.799003887		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	385.9224976	Variance:	795891.7278	STD:	892.127641
						Number Sx's		28
						Weighted Mean		385.92
						Std Dev		892.13
						Std Dev* Std Dev		795891.728
						t.20 (Deg F = #Sx's - 7)		1.323
						t.20*t.20		1.750
						RT (Reg Threshold)		5000
						n (Recommend Sx's)		0.07
						sx		168.60
						CI (Confidence Interval)		608.98

000410

pit	tclp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063033	NORMAL	Chromium	5.172786279	-
1	Y	063113	NORMAL	Chromium	5.223622849	-
1	Y	063072	NORMAL	Chromium	5.50534806	-
1 Count					3	
1 Average					5.300585729	
1 Var					0.032091798	
2	Y	063634	NORMAL	Chromium	5.071456121	J
2	Y	063540	NORMAL	Chromium	5.002648284	-
2 Count					2	
2 Average					5.037052202	
2 Var					0.002367259	
3	Y	063478	NORMAL	Chromium	5.762061271	-
3	Y	063394	NORMAL	Chromium	5.648986636	-
3	Y	063314	NORMAL	Chromium	5.118029667	J
3 Count					3	
3 Average					5.509692525	
3 Var					0.118246314	
4	Y	063854	NORMAL	Chromium	7.668561326	U
4	Y	063787	NORMAL	Chromium	9.109414466	-
4	Y	063711	NORMAL	Chromium	6.063790617	-
4 Count					3	
4 Average					7.613922136	
4 Var					2.321195238	
5	Y	100217		CHROMIUM	0.881373587	UJ
5	Y	100218		CHROMIUM	3.766375902	J
5	Y	100215		CHROMIUM	4.287904587	J
5	Y	100219		CHROMIUM	3.056218783	J
5	Y	100210		CHROMIUM	3.584289652	J
5	Y	100212		CHROMIUM	3.719026859	UJ
5	Y	100213		CHROMIUM	2.35092572	UJ
5	Y	100214		CHROMIUM	2.312438341	UJ
5 Count					8	
5 Average					2.994819179	
5 Var					1.212855204	
BURN PIT	Y	063164	NORMAL	Chromium	5.755752228	J
BURN PIT	Y	063205	NORMAL	Chromium	5.961011982	J
BURN PIT Count					2	
BURN PIT Average					5.858382105	
BURN PIT Var					0.021065783	
CLEARWELL	Y	098527		CHROMIUM	2.312438341	UJ
CLEARWELL	Y	098528		CHROMIUM	2.312438341	UJ
CLEARWELL	Y	098526		CHROMIUM	4.081206756	J
CLEARWELL	Y	098529		CHROMIUM	3.533079514	J
CLEARWELL	Y	098530		CHROMIUM	2.312438341	UJ
CLEARWELL	Y	098531		CHROMIUM	4.276858964	J
CLEARWELL	Y	098532		CHROMIUM	2.312438341	UJ
CLEARWELL Count					7	
CLEARWELL Average					3.020128371	
CLEARWELL Var					0.828613118	
Grand Count					28	
Grand Average					4.362961493	
Grand Var					3.322039588	

NOTE: NO VALID CHROMIUM DATA EXISTS FOR PIT 6. DATA NORMALIZED TO EXISTING DATA.

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.13265306	Average:	0.70313892	Variance:	0.00425708			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06122449	Average:	0.30839095	Variance:	0.00014493			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.45918367	Average:	2.52996085	Variance:	0.05429678			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.15306122	Average:	1.16539625	Variance:	0.35528499			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.12244898	Average:	0.36671255	Variance:	0.14851288			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06122449	Average:	0.35867646	Variance:	0.00128974			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.01020408	Average:	0.03081764	Variance:	0.00845524			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	5.46309362	Variance:	0.57224163	STD:	0.756466544	
						Number Sx's		28	
						Weighted Mean		5.46	(asinh)
						Std Dev		0.76	(asinh)
						Std Dev* Std Dev		0.572	
						t.20 (Deg F = #Sx's - 7)		1.323	
						t.20*t.20		1.750	
						RT (Reg Threshold)		9.210340382	(asinh)
						n (Recommend Sx's)		0.07	
						sx		0.14	
						CI (Confidence Interval)		5.65	(asinh)

000412

Copper U Adjusted

1730

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Copper	41.5	-
1	Y	063072	NORMAL	Copper	71	-
1	Y	063033	NORMAL	Copper	38.2	-
1 Count					3	
1 Average					50.23333333	
1 Var					326.1633333	
2	Y	063540	NORMAL	Copper	56.7	-
2	Y	063634	NORMAL	Copper	430	-
2 Count					2	
2 Average					243.35	
2 Var					69676.445	
3	Y	063478	NORMAL	Copper	2260	-
3	Y	063314	NORMAL	Copper	44.4	-
3	Y	063394	NORMAL	Copper	1070	-
3 Count					3	
3 Average					1124.8	
3 Var					1229473.12	
4	Y	063787	NORMAL	Copper	1300	-
4	Y	063854	NORMAL	Copper	309.5	U
4	Y	063711	NORMAL	Copper	105	-
4 Count					3	
4 Average					571.5	
4 Var					408489.25	
5	Y	100210		COPPER	2470	-
5	Y	100212		COPPER	490	-
5	Y	100213		COPPER	550	-
5	Y	100214		COPPER	321	-
5	Y	100219		COPPER	2280	-
5	Y	100215		COPPER	86.1	J
5	Y	100216		COPPER	143	-
5	Y	100217		COPPER	118	-
5	Y	100218		COPPER	130	-
5 Count					9	
5 Average					732.0111111	
5 Var					897633.1011	
BURN PIT	Y	063164	NORMAL	Copper	53.2	J
BURN PIT Count					1	
BURN PIT Average					53.2	
BURN PIT Var					#DIV/0!	
CLEARWELL	Y	098527		COPPER	48.2	J
CLEARWELL	Y	098528		COPPER	18.2	J
CLEARWELL	Y	098529		COPPER	491	J
CLEARWELL	Y	098530		COPPER	1050	-
CLEARWELL	Y	098531		COPPER	1870	-
CLEARWELL	Y	098532		COPPER	39	J
CLEARWELL	Y	098526		COPPER	2240	-
CLEARWELL Count					7	
CLEARWELL Average					822.3428571	
CLEARWELL Var					854753.6762	
Grand Count					28	
Grand Average					647.2857143	
Grand Var					680923.3939	

NOTE: INSUFFICIENT DATA FOR BURN PIT AND PIT 6. OTHER DATA NORMALIZED TO 100%.

000413

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.14130435	Average:	7.09818841	Variance:	46.0882971		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06521739	Average:	15.8706522	Variance:	4544.11598		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.48913043	Average:	550.173913	Variance:	601372.722		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.16304348	Average:	93.1793478	Variance:	66601.5082		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.13043478	Average:	95.4797101	Variance:	117082.578		
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0	Average:	0	Variance:	0		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.01086957	Average:	8.93850932	Variance:	9290.80083		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	770.740321	Variance:	798937.813	STD:	893.8332134
						Number Sx's		28
						Weighted Mean		770.74
						Std Dev		893.83
						Std Dev* Std Dev		798937.813
						t.20 (Deg F = #Sx's - 8)		1.325
						t.20*t.20		1.756
						RT (Reg Threshold)		700000
						n (Recommend Sx's)		0.00
						sx		168.92
						CI (Confidence Interval)		994.56

000414

Copper ASNH

1730

pit	tolp	sample_id	qa_type	parameter	validated_result	validation_qualifier
1	Y	063113	NORMAL	Copper	4.418985735	-
1	Y	063072	NORMAL	Copper	4.955876647	-
1	Y	063033	NORMAL	Copper	4.336153974	-
1 Count					3	
1 Average					4.570338786	
1 Var					0.113194857	
2	Y	063540	NORMAL	Copper	4.730999145	-
2	Y	063634	NORMAL	Copper	6.756933741	-
2 Count					2	
2 Average					5.743966443	
2 Var					2.052205494	
3	Y	063478	NORMAL	Copper	8.416267322	-
3	Y	063314	NORMAL	Copper	4.486513442	-
3	Y	063394	NORMAL	Copper	7.668561326	-
3 Count					3	
3 Average					6.85711403	
3 Var					4.354576425	
4	Y	063787	NORMAL	Copper	7.863266872	-
4	Y	063854	NORMAL	Copper	6.428107883	U
4	Y	063711	NORMAL	Copper	5.347130206	-
4 Count					3	
4 Average					6.54616832	
4 Var					1.593189631	
5	Y	100210		COPPER	8.505120651	-
5	Y	100212		COPPER	6.887553613	-
5	Y	100213		COPPER	7.003066285	-
5	Y	100214		COPPER	6.46459073	-
5	Y	100219		COPPER	8.425077951	-
5	Y	100215		COPPER	5.148690314	J
5	Y	100216		COPPER	5.656004036	-
5	Y	100217		COPPER	5.463849759	-
5	Y	100218		COPPER	5.560696424	-
5 Count					9	
5 Average					6.568294418	
5 Var					1.572906211	
BURN PIT	Y	063164	NORMAL	Copper	4.667293897	J
BURN PIT Count					1	
BURN PIT Average					4.667293897	
BURN PIT Var					#DIV/0!	
CLEARWELL	Y	098527		COPPER	4.568613793	J
CLEARWELL	Y	098528		COPPER	3.595322661	J
CLEARWELL	Y	098529		COPPER	6.889592345	J
CLEARWELL	Y	098530		COPPER	7.64969285	-
CLEARWELL	Y	098531		COPPER	8.226840962	-
CLEARWELL	Y	098532		COPPER	4.356873152	J
CLEARWELL	Y	098526		COPPER	8.407378375	-
CLEARWELL Count					7	
CLEARWELL Average					6.242044877	
CLEARWELL Var					4.064709619	
Grand Count					28	
Grand Average					6.174466218	
Grand Var					2.398071228	

NOTE: INSUFFICIENT DATA FOR BURN PIT AND PIT 6. OTHER DATA NORMALIZED TO 100%.

000415

000045

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.141304348	Average:	0.645808741	Variance:	0.015994925			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.065217391	Average:	0.374606507	Variance:	0.133839489			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.489130435	Average:	3.354023167	Variance:	2.12995586			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.163043478	Average:	1.067310052	Variance:	0.259759179			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.130434783	Average:	0.856734055	Variance:	0.20516168			
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0	Average:	0	Variance:	0			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.010869565	Average:	0.067848314	Variance:	0.044181626			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	6.366330836	Variance:	2.788892759	STD:	1.669997832	
						Number Sx's		28	
						Weighted Mean		6.37	(asinh)
						Std Dev		1.67	(asinh)
						Std Dev* Std Dev		2.789	
						t.20 (Deg F = #Sx's - 8)		1.325	
						t.20*t.20		1.756	
						RT (Reg Threshold)		14.15198279	(asinh)
						n (Recommend Sx's)		0.08	
						sx		0.32	
						CI (Confidence Interval)		6.78	(asinh)

416

000046

Lead U Adjusted

1730

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Lead	1.75	U
1	Y	063072	NORMAL	Lead	9.2	-
1	Y	063033	NORMAL	Lead	1.6	UJ
1 Count					3	
1 Average					4.183333333	
1 Var					18.88083333	
2	Y	063634	NORMAL	Lead	1	U
2	Y	063540	NORMAL	Lead	5.8	-
2 Count					2	
2 Average					3.4	
2 Var					11.52	
3	Y	063314	NORMAL	Lead	22	-
3	Y	063478	NORMAL	Lead	3.6	-
3	Y	063394	NORMAL	Lead	1.75	U
3 Count					3	
3 Average					9.116666667	
3 Var					125.3408333	
4	Y	063711	NORMAL	Lead	18.6	-
4	Y	063787	NORMAL	Lead	3.6	-
4	Y	063854	NORMAL	Lead	2.8	U
4 Count					3	
4 Average					8.333333333	
4 Var					79.21333333	
5	Y	100212		LEAD	35	UJ
5	Y	100210		LEAD	35	UJ
5	Y	100213		LEAD	35	UJ
5	Y	100215		LEAD	35	UJ
5	Y	100217		LEAD	7	UJ
5	Y	100218		LEAD	17.7	J
5	Y	100219		LEAD	35	UJ
5	Y	100214		LEAD	35	UJ
5 Count					8	
5 Average					29.3375	
5 Var					118.11125	
6	Y	100225		LEAD	461	J
6	Y	100232		LEAD	545	J
6	Y	100231		LEAD	474	J
6	Y	100230		LEAD	1160	J
6	Y	100229		LEAD	1480	J
6	Y	100228		LEAD	433	J
6	Y	100226		LEAD	291	J
6	Y	100233		LEAD	498	J
6	Y	100227		LEAD	70	UJ
6 Count					9	
6 Average					601.3333333	
6 Var					192610	
BURN PIT	Y	063164	NORMAL	Lead	5.9	-
BURN PIT	Y	063205	NORMAL	Lead	124	-
BURN PIT Count					2	
BURN PIT Average					64.95	
BURN PIT Var					6973.805	
CLEARWELL	Y	098531		LEAD	35	UJ
CLEARWELL	Y	098526		LEAD	35	UJ
CLEARWELL	Y	098527		LEAD	123	J
CLEARWELL	Y	098528		LEAD	35	UJ
CLEARWELL	Y	098530		LEAD	35	UJ
CLEARWELL	Y	098532		LEAD	35	UJ
CLEARWELL	Y	098529		LEAD	35	UJ
CLEARWELL Count					7	
CLEARWELL Average					47.57142857	
CLEARWELL Var					1106.285714	
Grand Count					37	
Grand Average					167.0621622	
Grand Var					105811.9012	

417

~~000047~~

Lead U Adjusted

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.13	Average:	0.543833333	Variance:	2.454508333		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	0.204	Variance:	0.6912		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.45	Average:	4.1025	Variance:	56.403375		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.15	Average:	1.25	Variance:	11.882		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.12	Average:	3.5205	Variance:	14.17335		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.02	Average:	12.02666667	Variance:	3852.2		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	3.897	Variance:	418.4283		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.01	Average:	0.475714286	Variance:	11.06285714		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	26.02021429	Variance:	4367.29559	STD:	66.08551725
						Number Sx's		37
						Weighted Mean		26.02
						Std Dev		66.09
						Std Dev* Std Dev		4367.296
						t.20 (Deg F = #Sx's - 8)		1.311
						t.20*t.20		1.719
						RT (Reg Threshold)		5000
						n (Recommend Sx's)		0.00
						sx		10.86
						CI (Confidence Interval)		40.26

000418

Lead ASINH

1730

pit	tclp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Lead	1.325897767	U
1	Y	063072	NORMAL	Lead	2.91529135	-
1	Y	063033	NORMAL	Lead	1.248983328	UJ
1 Count					3	
1 Average					1.830057481	
1 Var					0.884778369	
2	Y	063634	NORMAL	Lead	0.881373587	U
2	Y	063540	NORMAL	Lead	2.458355225	-
2 Count					2	
2 Average					1.669864406	
2 Var					1.243435544	
3	Y	063314	NORMAL	Lead	3.784705763	-
3	Y	063478	NORMAL	Lead	1.992835765	-
3	Y	063394	NORMAL	Lead	1.325897767	U
3 Count					3	
3 Average					2.367813098	
3 Var					1.616890191	
4	Y	063711	NORMAL	Lead	3.617030606	-
4	Y	063787	NORMAL	Lead	1.992835765	-
4	Y	063854	NORMAL	Lead	1.753228901	U
4 Count					3	
4 Average					2.454365091	
4 Var					1.028196188	
5	Y	100212		LEAD	4.248699261	UJ
5	Y	100210		LEAD	4.248699261	UJ
5	Y	100213		LEAD	4.248699261	UJ
5	Y	100215		LEAD	4.248699261	UJ
5	Y	100217		LEAD	2.644120761	UJ
5	Y	100218		LEAD	3.567508849	J
5	Y	100219		LEAD	4.248699261	UJ
5	Y	100214		LEAD	4.248699261	UJ
5 Count					8	
5 Average					3.962978147	
5 Var					0.340800014	
6	Y	100225		LEAD	6.8265464	J
6	Y	100232		LEAD	6.993933817	J
6	Y	100231		LEAD	6.854355615	J
6	Y	100230		LEAD	7.74932265	J
6	Y	100229		LEAD	7.992944661	J
6	Y	100228		LEAD	6.763886242	J
6	Y	100226		LEAD	6.3664734	J
6	Y	100233		LEAD	6.903748266	J
6	Y	100227		LEAD	4.941693439	UJ
6 Count					9	
6 Average					6.821433832	
6 Var					0.75184773	
BURN PIT	Y	063164	NORMAL	Lead	2.475205219	-
BURN PIT	Y	063205	NORMAL	Lead	5.513445005	-
BURN PIT Count					2	
BURN PIT Average					3.994325112	
BURN PIT Var					4.615450497	
CLEARWELL	Y	098531		LEAD	4.248699261	UJ
CLEARWELL	Y	098526		LEAD	4.248699261	UJ
CLEARWELL	Y	098527		LEAD	5.50534806	J
CLEARWELL	Y	098528		LEAD	4.248699261	UJ
CLEARWELL	Y	098530		LEAD	4.248699261	UJ
CLEARWELL	Y	098532		LEAD	4.248699261	UJ
CLEARWELL	Y	098529		LEAD	4.248699261	UJ
CLEARWELL Count					7	
CLEARWELL Average					4.428220518	
CLEARWELL Var					0.225595172	
Grand Count					37	
Grand Average					4.199442144	
Grand Var					3.73010921	

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.13	Average:	0.23790747	Variance:	0.11502119			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.10019186	Variance:	0.07460613			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.45	Average:	1.06551589	Variance:	0.72760059			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.15	Average:	0.36815476	Variance:	0.15422943			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.12	Average:	0.47555738	Variance:	0.040896			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.02	Average:	0.13642868	Variance:	0.01503695			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.23965951	Variance:	0.27692703			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.01	Average:	0.04428221	Variance:	0.00225595			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	2.66769776	Variance:	1.40657327	STD:	1.18599042	
						Number Sx's		37	
						Weighted Mean		2.67	(asinh)
						Std Dev		1.19	(asinh)
						Std Dev* Std Dev		1.407	
						t.20 (Deg F = #Sx's - 8)		1.311	
						t.20*t.20		1.719	
						RT (Reg Threshold)		9.21034038	(asinh)
						n (Recommend Sx's)		0.06	
						sx		0.19	
						CI (Confidence Interval)		2.92	(asinh)

Mercury U Adjusted

1730

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Mercury	0.1	U
1	Y	063072	NORMAL	Mercury	0.1	U
1	Y	063033	NORMAL	Mercury	0.1	U
1 Count					3	
1 Average					0.1	
1 Var					0	
2	Y	063634	NORMAL	Mercury	0.1	UJ
2	Y	063540	NORMAL	Mercury	0.1	UJ
2 Count					2	
2 Average					0.1	
2 Var					0	
3	Y	063394	NORMAL	Mercury	2.6	J
3	Y	063314	NORMAL	Mercury	0.1	UJ
3	Y	063478	NORMAL	Mercury	1.1	J
3	Y	063394	NORMAL	Mercury	1.539	J
3 Count					4	
3 Average					1.33475	
3 Var					1.074096917	
4	Y	063854	NORMAL	Mercury	0.1	UJ
4	Y	063711	NORMAL	Mercury	0.1	U
4	Y	063787	NORMAL	Mercury	0.1	U
4 Count					3	
4 Average					0.1	
4 Var					0	
5	Y	100210		MERCURY	7.3	-
5	Y	100212		MERCURY	0.16	-
5	Y	100214		MERCURY	0.12	-
5	Y	100215		MERCURY	1.8	-
5	Y	100217		MERCURY	0.12	-
5	Y	100218		MERCURY	0.12	-
5	Y	100219		MERCURY	0.26	-
5	Y	100213		MERCURY	0.34	-
5 Count					8	
5 Average					1.2775	
5 Var					6.246564286	
6	Y	100225		MERCURY	0.4	-
6	Y	100232		MERCURY	0.4	-
6	Y	100231		MERCURY	0.4	-
6	Y	100230		MERCURY	0.4	-
6	Y	100229		MERCURY	0.4	-
6	Y	100228		MERCURY	0.4	-
6	Y	100226		MERCURY	0.4	-
6	Y	100233		MERCURY	0.4	-
6	Y	100227		MERCURY	0.4	-
6 Count					9	
6 Average					0.4	
6 Var					8.32667E-17	
BURN PIT	Y	063164	NORMAL	Mercury	0.1	U
BURN PIT	Y	063205	NORMAL	Mercury	0.1	U
BURN PIT Count					2	
BURN PIT Average					0.1	
BURN PIT Var					0	
CLEARWELL	Y	098530		MERCURY	0.035	U
CLEARWELL	Y	098526		MERCURY	0.02	U
CLEARWELL	Y	098527		MERCURY	0.025	U
CLEARWELL	Y	098529		MERCURY	0.045	U
CLEARWELL	Y	098531		MERCURY	0.04	U
CLEARWELL	Y	098532		MERCURY	0.035	U
CLEARWELL	Y	098528		MERCURY	0.035	U
CLEARWELL Count					7	
CLEARWELL Average					0.033571429	
CLEARWELL Var					7.2619E-05	
Grand Count					38	
Grand Average					0.536684211	
Grand Var					1.560370492	

000421

000051

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.13	Average:	0.013	Variance:	0		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	0.006	Variance:	0		
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.45	Average:	0.6006375	Variance:	0.483343613		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.15	Average:	0.015	Variance:	0		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.12	Average:	0.1533	Variance:	0.749587714		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.02	Average:	0.008	Variance:	1.66533E-18		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	0.006	Variance:	0		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.01	Average:	0.000335714	Variance:	7.2619E-07		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	0.802273214	Variance:	1.232932053	STD:	1.110374735
						Number Sx's		38
						Weighted Mean		0.80
						Std Dev		1.11
						Std Dev* Std Dev		1.233
						t.20 (Deg F = #Sx's - 8)		1.310
						t.20*t.20		1.716
						RT (Reg Threshold)		200
						n (Recommend Sx's)		0.00
						sx		0.18
						CI (Confidence Interval)		1.04

000422

Mercury ASINH

1730

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Mercury	0.099834079	U
1	Y	063072	NORMAL	Mercury	0.099834079	U
1	Y	063033	NORMAL	Mercury	0.099834079	U
1 Count					3	
1 Average					0.099834079	
1 Var					1.73472E-18	
2	Y	063634	NORMAL	Mercury	0.099834079	UJ
2	Y	063540	NORMAL	Mercury	0.099834079	UJ
2 Count					2	
2 Average					0.099834079	
2 Var					0	
3	Y	063394	NORMAL	Mercury	1.683743144	J
3	Y	063314	NORMAL	Mercury	0.099834079	UJ
3	Y	063478	NORMAL	Mercury	0.95034693	J
3	Y	063394	NORMAL	Mercury	1.216203632	J
3 Count					4	
3 Average					0.987531946	
3 Var					0.442130334	
4	Y	063854	NORMAL	Mercury	0.099834079	UJ
4	Y	063711	NORMAL	Mercury	0.099834079	U
4	Y	063787	NORMAL	Mercury	0.099834079	U
4 Count					3	
4 Average					0.099834079	
4 Var					1.73472E-18	
5	Y	100210		MERCURY	2.685680168	-
5	Y	100212		MERCURY	0.15932508	-
5	Y	100214		MERCURY	0.11971385	-
5	Y	100215		MERCURY	1.35044074	-
5	Y	100217		MERCURY	0.11971385	-
5	Y	100218		MERCURY	0.11971385	-
5	Y	100219		MERCURY	0.257156349	-
5	Y	100213		MERCURY	0.333768352	-
5 Count					8	
5 Average					0.64318903	
5 Var					0.853277219	
6	Y	100225		MERCURY	0.39003532	-
6	Y	100232		MERCURY	0.39003532	-
6	Y	100231		MERCURY	0.39003532	-
6	Y	100230		MERCURY	0.39003532	-
6	Y	100229		MERCURY	0.39003532	-
6	Y	100228		MERCURY	0.39003532	-
6	Y	100226		MERCURY	0.39003532	-
6	Y	100233		MERCURY	0.39003532	-
6	Y	100227		MERCURY	0.39003532	-
6 Count					9	
6 Average					0.39003532	
6 Var					5.55112E-17	
BURN PIT	Y	063164	NORMAL	Mercury	0.099834079	U
BURN PIT	Y	063205	NORMAL	Mercury	0.099834079	U
BURN PIT Count					2	
BURN PIT Average					0.099834079	
BURN PIT Var					0	
CLEARWELL	Y	098530		MERCURY	0.034992858	U
CLEARWELL	Y	098526		MERCURY	0.019998667	U
CLEARWELL	Y	098527		MERCURY	0.024997397	U
CLEARWELL	Y	098529		MERCURY	0.044984826	U
CLEARWELL	Y	098531		MERCURY	0.039989341	U
CLEARWELL	Y	098532		MERCURY	0.034992858	U
CLEARWELL	Y	098528		MERCURY	0.034992858	U
CLEARWELL Count					7	
CLEARWELL Average					0.033564115	
CLEARWELL Var					7.25417E-05	
Grand Count					38	
Grand Average					0.364190724	
Grand Var					0.295858321	

000423

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.13	Average:	0.01297843	Variance:	2.25514E-19			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.005990045	Variance:	0			
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.45	Average:	0.444389376	Variance:	0.19895865			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.15	Average:	0.014975112	Variance:	2.60209E-19			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.12	Average:	0.077182684	Variance:	0.102393266			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.02	Average:	0.007800706	Variance:	1.11022E-18			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.005990045	Variance:	0			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.01	Average:	0.000335641	Variance:	7.25417E-07			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	0.569642038	Variance:	0.301352642	STD:	0.548955956	
						Number Sx's		38	
						Weighted Mean		0.57	(asinh)
						Std Dev		0.55	(asinh)
						Std Dev* Std Dev		0.301	
						t.20 (Deg F = #Sx's - 8)		1.310	
						t.20*t.20		1.716	
						RT (Reg Threshold)		5.991470797	(asinh)
						n (Recommend Sx's)		0.02	
						sx		0.09	
						CI (Confidence Interval)		0.69	(asinh)

000424

Selenium U Adjusted

1730

pit	tclp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063033	NORMAL	Selenium	1	UJ
1	Y	063113	NORMAL	Selenium	1	UJ
1	Y	063072	NORMAL	Selenium	2.1	J
1 Count					3	
1 Average					1.366666667	
1 Var					0.403333333	
2	Y	063634	NORMAL	Selenium	25.5	J
2	Y	063540	NORMAL	Selenium	23.7	J
2 Count					2	
2 Average					24.6	
2 Var					1.62	
3	Y	063478	NORMAL	Selenium	218	J
3	Y	063394	NORMAL	Selenium	5	UJ
3	Y	063314	NORMAL	Selenium	1	UJ
3 Count					3	
3 Average					74.66666667	
3 Var					15412.33333	
4	Y	063854	NORMAL	Selenium	1	UJ
4	Y	063787	NORMAL	Selenium	1	UJ
4	Y	063711	NORMAL	Selenium	1	U
4 Count					3	
4 Average					1	
4 Var					0	
5	Y	100217		SELENIUM	11	UJ
5	Y	100218		SELENIUM	11	UJ
5	Y	100215		SELENIUM	55	UJ
5	Y	100219		SELENIUM	55	UJ
5	Y	100210		SELENIUM	55	UJ
5	Y	100212		SELENIUM	55	UJ
5	Y	100213		SELENIUM	55	UJ
5	Y	100214		SELENIUM	55	UJ
5 Count					8	
5 Average					44	
5 Var					414.8571429	
BURN PIT	Y	063164	NORMAL	Selenium	1	UJ
BURN PIT	Y	063205	NORMAL	Selenium	190	-
BURN PIT Count					2	
BURN PIT Average					95.5	
BURN PIT Var					17860.5	
CLEARWELL	Y	098527		SELENIUM	62.5	UJ
CLEARWELL	Y	098528		SELENIUM	62.5	UJ
CLEARWELL	Y	098526		SELENIUM	62.5	UJ
CLEARWELL	Y	098529		SELENIUM	62.5	UJ
CLEARWELL	Y	098530		SELENIUM	62.5	UJ
CLEARWELL	Y	098531		SELENIUM	62.5	UJ
CLEARWELL	Y	098532		SELENIUM	62.5	UJ
CLEARWELL Count					7	
CLEARWELL Average					62.5	
CLEARWELL Var					0	
Grand Count					28	
Grand Average					45.02857143	
Grand Var					2734.669524	
NOTE: NO VALID DATA EXISTS FOR PIT 6. DATA NORMALIZED TO DATA AVAILABLE						

000425

000055

Selenium U Adjusted

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.13265306	Average:	0.18129252	Variance:	0.0535034		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06122449	Average:	1.50612245	Variance:	0.09918367		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.45918367	Average:	34.2857143	Variance:	7077.09184		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.15306122	Average:	0.15306122	Variance:	0		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.12244898	Average:	5.3877551	Variance:	50.7988338		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06122449	Average:	5.84693878	Variance:	1093.5		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.01020408	Average:	0.6377551	Variance:	0		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	47.9986395	Variance:	8221.54336	STD:	90.6727266
						Number Sx's		28
						Weighted Mean		48.00
						Std Dev		90.67
						Std Dev* Std Dev		8221.543
						t.20 (Deg F = #Sx's - 7)		1.323
						t.20*t.20		1.750
						RT (Reg Threshold)		1000
						n (Recommend Sx's)		0.02
						sx		17.14
						CI (Confindence Interval)		70.67

000426

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063033	NORMAL	Selenium	0.881373587	UJ
1	Y	063113	NORMAL	Selenium	0.881373587	UJ
1	Y	063072	NORMAL	Selenium	1.487482837	J
1 Count					3	
1 Average					1.063410004	
1 Var					0.122456141	
2	Y	063634	NORMAL	Selenium	3.932209879	J
2	Y	063540	NORMAL	Selenium	3.859067017	J
2 Count					2	
2 Average					3.895638448	
2 Var					0.002674939	
3	Y	063478	NORMAL	Selenium	6.077647504	J
3	Y	063394	NORMAL	Selenium	2.312438341	UJ
3	Y	063314	NORMAL	Selenium	0.881373587	UJ
3 Count					3	
3 Average					3.090486477	
3 Var					7.204334831	
4	Y	063854	NORMAL	Selenium	0.881373587	UJ
4	Y	063787	NORMAL	Selenium	0.881373587	UJ
4	Y	063711	NORMAL	Selenium	0.881373587	U
4 Count					3	
4 Average					0.881373587	
4 Var					2.22045E-16	
5	Y	100217		SELENIUM	3.093102195	UJ
5	Y	100218		SELENIUM	3.093102195	UJ
5	Y	100215		SELENIUM	4.700563	UJ
5	Y	100219		SELENIUM	4.700563	UJ
5	Y	100210		SELENIUM	4.700563	UJ
5	Y	100212		SELENIUM	4.700563	UJ
5	Y	100213		SELENIUM	4.700563	UJ
5	Y	100214		SELENIUM	4.700563	UJ
5 Count					8	
5 Average					4.298697799	
5 Var					0.553699337	
BURN PIT	Y	063164	NORMAL	Selenium	0.881373587	UJ
BURN PIT	Y	063205	NORMAL	Selenium	5.940178178	-
BURN PIT Count					2	
BURN PIT Average					3.410775882	
BURN PIT Var					12.79575194	
CLEARWELL	Y	098527		SELENIUM	4.828377731	UJ
CLEARWELL	Y	098528		SELENIUM	4.828377731	UJ
CLEARWELL	Y	098526		SELENIUM	4.828377731	UJ
CLEARWELL	Y	098529		SELENIUM	4.828377731	UJ
CLEARWELL	Y	098530		SELENIUM	4.828377731	UJ
CLEARWELL	Y	098531		SELENIUM	4.828377731	UJ
CLEARWELL	Y	098532		SELENIUM	4.828377731	UJ
CLEARWELL Count					7	
CLEARWELL Average					4.828377731	
CLEARWELL Var					0	
Grand Count					28	
Grand Average					3.49881662	
Grand Var					3.248397855	

NOTE: NO VALID DATA EXISTS FOR PIT 6. DATA NORMALIZED TO DATA AVAILABLE

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.13265306	Average:	0.14371765	Variance:	0.01624418			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06122449	Average:	0.23850848	Variance:	0.00016377			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.45918367	Average:	1.41910093	Variance:	3.30811293			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.15306122	Average:	0.13490412	Variance:	3.3986E-17			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.12244898	Average:	0.52637116	Variance:	0.06779992			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06122449	Average:	0.20882301	Variance:	0.78341338			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.01020408	Average:	0.04926916	Variance:	0			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	2.72069452	Variance:	4.17573419	STD:	2.04346133	
						Number Sx's		28	
						Weighted Mean		2.72	(asinh)
						Std Dev		2.04	(asinh)
						Std Dev* Std Dev		4.176	
						t.20 (Deg F = #Sx's - 7)		1.323	
						t.20*t.20		1.750	
						RT (Reg Threshold)		7.60090271	(asinh)
						n (Recommend Sx's)		0.31	
						sx		0.39	
						CI (Confindence Interval)		3.23	(asinh)

000428

000058

Silver U Adjusted

1730

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Silver	87.7	-
1	Y	063072	NORMAL	Silver	68.4	-
1	Y	063033	NORMAL	Silver	85.7	-
1 Count					3	
1 Average					80.6	
1 Var					112.63	
2	Y	063634	NORMAL	Silver	46.4	J
2	Y	063540	NORMAL	Silver	57.4	-
2 Count					2	
2 Average					51.9	
2 Var					60.5	
3	Y	063314	NORMAL	Silver	67.6	J
3	Y	063478	NORMAL	Silver	111	-
3	Y	063394	NORMAL	Silver	103	-
3 Count					3	
3 Average					93.86666667	
3 Var					533.4533333	
4	Y	063711	NORMAL	Silver	133	-
4	Y	063787	NORMAL	Silver	2340	-
4	Y	063854	NORMAL	Silver	565	U
4 Count					3	
4 Average					1012.666667	
4 Var					1368016.333	
5	Y	100212		SILVER	7.5	UJ
5	Y	100210		SILVER	7.5	UJ
5	Y	100213		SILVER	7.5	UJ
5	Y	100215		SILVER	7.5	UJ
5	Y	100217		SILVER	1.5	UJ
5	Y	100218		SILVER	1.5	UJ
5	Y	100219		SILVER	7.5	UJ
5	Y	100214		SILVER	7.5	UJ
5 Count					8	
5 Average					6	
5 Var					7.714285714	
6	Y	100225		SILVER	40.9	-
6	Y	100232		SILVER	43.4	J
6	Y	100231		SILVER	34.4	J
6	Y	100230		SILVER	96.2	-
6	Y	100229		SILVER	104	-
6	Y	100228		SILVER	37.3	J
6	Y	100226		SILVER	15	UJ
6	Y	100233		SILVER	40.3	-
6	Y	100227		SILVER	15	UJ
6 Count					9	
6 Average					47.38888889	
6 Var					1008.023611	
BURN PIT	Y	063164	NORMAL	Silver	121	J
BURN PIT	Y	063205	NORMAL	Silver	121	J
BURN PIT Count					2	
BURN PIT Average					121	
BURN PIT Var					0	
CLEARWELL	Y	098531		SILVER	13.2	UJ
CLEARWELL	Y	098526		SILVER	10	UJ
CLEARWELL	Y	098527		SILVER	49.4	J
CLEARWELL	Y	098528		SILVER	10	UJ
CLEARWELL	Y	098530		SILVER	10	UJ
CLEARWELL	Y	098532		SILVER	10	UJ
CLEARWELL	Y	098529		SILVER	10	UJ
CLEARWELL Count					7	
CLEARWELL Average					16.08571429	
CLEARWELL Var					217.2247619	
Grand Count					37	
Grand Average					121.4675676	
Grand Var					149452.1745	

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.13	Average:	10.478	Variance:	14.6419		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	3.114	Variance:	3.63		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.45	Average:	42.24	Variance:	240.054		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.15	Average:	151.9	Variance:	205202.45		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.12	Average:	0.72	Variance:	0.925714286		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.02	Average:	0.947777778	Variance:	20.16047222		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06	Average:	7.26	Variance:	0		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.01	Average:	0.160857143	Variance:	2.172247619		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	216.8206349	Variance:	205484.0343	STD:	453.3034683
						Number Sx's		37
						Weighted Mean		216.82
						Std Dev		453.30
						Std Dev* Std Dev		205484.034
						t.20 (Deg F = #Sx's - 8)		1.311
						t.20*t.20		1.719
						RT (Reg Threshold)		5000
						n (Recommend Sx's)		0.02
						sx		74.52
						CI (Confindence Interval)		314.52

000430

000060

Silver ASINH

1730

pit	tclp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Silver	5.167101583	-
1	Y	063072	NORMAL	Silver	4.918573436	-
1	Y	063033	NORMAL	Silver	5.144034044	-
1 Count					3	
1 Average					5.076569687	
1 Var					0.018855139	
2	Y	063634	NORMAL	Silver	4.530562739	J
2	Y	063540	NORMAL	Silver	4.743267353	-
2 Count					2	
2 Average					4.636915046	
2 Var					0.022621627	
3	Y	063314	NORMAL	Silver	4.906809867	J
3	Y	063478	NORMAL	Silver	5.402697672	-
3	Y	063394	NORMAL	Silver	5.327899733	-
3 Count					3	
3 Average					5.21246909	
3 Var					0.071469354	
4	Y	063711	NORMAL	Silver	5.583510442	-
4	Y	063787	NORMAL	Silver	8.451053435	-
4	Y	063854	NORMAL	Silver	7.029973695	U
4 Count					3	
4 Average					7.021512524	
4 Var					2.055754398	
5	Y	100212		SILVER	2.712465305	UJ
5	Y	100210		SILVER	2.712465305	UJ
5	Y	100213		SILVER	2.712465305	UJ
5	Y	100215		SILVER	2.712465305	UJ
5	Y	100217		SILVER	1.194763217	UJ
5	Y	100218		SILVER	1.194763217	UJ
5	Y	100219		SILVER	2.712465305	UJ
5	Y	100214		SILVER	2.712465305	UJ
5 Count					8	
5 Average					2.333039783	
5 Var					0.49358992	
6	Y	100225		SILVER	4.404426659	-
6	Y	100232		SILVER	4.463739323	J
6	Y	100231		SILVER	4.231414941	J
6	Y	100230		SILVER	5.259603551	-
6	Y	100229		SILVER	5.337561193	-
6	Y	100228		SILVER	4.312320148	J
6	Y	100226		SILVER	3.402306645	UJ
6	Y	100233		SILVER	4.389652546	-
6	Y	100227		SILVER	3.402306645	UJ
6 Count					9	
6 Average					4.355925739	
6 Var					0.453942312	
BURN PIT	Y	063164	NORMAL	Silver	5.488954801	J
BURN PIT	Y	063205	NORMAL	Silver	5.488954801	J
BURN PIT Count					2	
BURN PIT Average					5.488954801	
BURN PIT Var					0	
CLEARWELL	Y	098531		SILVER	3.274795735	UJ
CLEARWELL	Y	098526		SILVER	2.99822295	UJ
CLEARWELL	Y	098527		SILVER	4.593200033	J
CLEARWELL	Y	098528		SILVER	2.99822295	UJ
CLEARWELL	Y	098530		SILVER	2.99822295	UJ
CLEARWELL	Y	098532		SILVER	2.99822295	UJ
CLEARWELL	Y	098529		SILVER	2.99822295	UJ
CLEARWELL Count					7	
CLEARWELL Average					3.265587217	
CLEARWELL Var					0.35334314	
Grand Count					37	
Grand Average					4.132706866	
Grand Var					2.237133	

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.13	Average:	0.65995406	Variance:	0.00245117			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.2782149	Variance:	0.0013573			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.45	Average:	2.34561109	Variance:	0.03216121			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.15	Average:	1.05322688	Variance:	0.30836316			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.12	Average:	0.27996477	Variance:	0.05923079			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.02	Average:	0.08711851	Variance:	0.00907885			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06	Average:	0.32933729	Variance:	0			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.01	Average:	0.03265587	Variance:	0.00353343			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	5.06608338	Variance:	0.4161759	STD:	0.645116968	
						Number Sx's		37	
						Weighted Mean		5.07	(asinh)
						Std Dev		0.65	(asinh)
						Std Dev* Std Dev		0.416	
						t.20 (Deg F = #Sx's - 8)		1.311	
						t.20*t.20		1.719	
						RT (Reg Threshold)		9.210340382	(asinh)
						n (Recommend Sx's)		0.04	
						gx		0.11	
						CI (Confindence Interval)		5.21	(asinh)

000432

00006.

Zinc U Adjusted

1730

pit	tolp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Zinc	26.8	-
1	Y	063072	NORMAL	Zinc	144	-
1	Y	063033	NORMAL	Zinc	5.2	U
1 Count					3	
1 Average					58.66666667	
1 Var					5577.973333	
2	Y	063634	NORMAL	Zinc	117	J
2	Y	063540	NORMAL	Zinc	150	J
2 Count					2	
2 Average					133.5	
2 Var					544.5	
3	Y	063394	NORMAL	Zinc	411	J
3	Y	063478	NORMAL	Zinc	547	-
3	Y	063314	NORMAL	Zinc	279	-
3 Count					3	
3 Average					412.3333333	
3 Var					17957.33333	
4	Y	063854	NORMAL	Zinc	533	J
4	Y	063711	NORMAL	Zinc	167	-
4	Y	063787	NORMAL	Zinc	1270	J
4 Count					3	
4 Average					656.6666667	
4 Var					315622.3333	
5	Y	100212		ZINC	134	J
5	Y	100213		ZINC	218	J
5	Y	100215		ZINC	208	J
5	Y	100217		ZINC	122	J
5	Y	100218		ZINC	274	J
5	Y	100219		ZINC	386	J
5	Y	100214		ZINC	197	J
5	Y	100210		ZINC	610	J
5 Count					8	
5 Average					268.625	
5 Var					25904.83929	
6	Y	100225		ZINC	514	J
6	Y	100232		ZINC	2600	J
6	Y	100231		ZINC	1310	J
6	Y	100230		ZINC	2260	J
6	Y	100229		ZINC	971	J
6	Y	100228		ZINC	1810	J
6	Y	100226		ZINC	1430	J
6	Y	100233		ZINC	779	J
6	Y	100227		ZINC	1240	J
6 Count					9	
6 Average					1434.888889	
6 Var					465752.8611	
BURN PIT	Y	063164	NORMAL	Zinc	513	-
BURN PIT Count					1	
BURN PIT Average					513	
BURN PIT Var					#DIV/0!	
CLEARWELL	Y	098531		ZINC	712	J
CLEARWELL	Y	098526		ZINC	486	J
CLEARWELL	Y	098527		ZINC	1230	J
CLEARWELL	Y	098528		ZINC	223	J
CLEARWELL	Y	098530		ZINC	530	J
CLEARWELL	Y	098532		ZINC	731	J
CLEARWELL	Y	098529		ZINC	350	J
CLEARWELL Count					7	
CLEARWELL Average					608.8571429	
CLEARWELL Var					108096.8095	
Grand Count					36	
Grand Average					652.4444444	
Grand Var					392154.0048	
NOTE: INSUFFICIENT VALID DATA EXISTS FOR BURN PIT. DATA NORMALIZED TO DATA AVAILABLE						

000433

units								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.13829787	Average:	8.11347518	Variance:	771.421844		
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.06382979	Average:	8.5212766	Variance:	34.7553191		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.4787234	Average:	197.393617	Variance:	8596.59574		
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.15957447	Average:	104.787234	Variance:	50365.266		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.12765957	Average:	34.2925532	Variance:	3307.00076		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.0212766	Average:	30.5295508	Variance:	9909.63534		
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
UG/L								
			Weighted		Weighted			
	Mass Fraction:	0.0106383	Average:	6.47720365	Variance:	1149.96606		
			Weighted		Weighted		Weighted	
	Totals:	1	Average:	390.114911	Variance:	74134.641	STD:	272.276773
						Number Sx's		35
						Weighted Mean		390.11
						Std Dev		272.28
						Std Dev* Std Dev		74134.641
						t.20 (Deg F = #Sx's - 7)		1.313
						t.20*t.20		1.724
						RT (Reg Threshold)		375000
						n (Recommend Sx's)		0.00
						sx		46.02
						CI (Confidence Interval)		450.54

000434

pit	tclp	sample id	qa type	parameter	validated result	validation qualifier
1	Y	063113	NORMAL	Zinc	3.98189696	-
1	Y	063072	NORMAL	Zinc	5.662972536	-
1	Y	063033	NORMAL	Zinc	2.35092572	U
1 Count					3	
1 Average					3.998598405	
1 Var					2.742622732	
2	Y	063634	NORMAL	Zinc	5.455339378	J
2	Y	063540	NORMAL	Zinc	5.703793586	J
2 Count					2	
2 Average					5.579566482	
2 Var					0.030864747	
3	Y	063394	NORMAL	Zinc	6.711741875	J
3	Y	063478	NORMAL	Zinc	6.997596819	-
3	Y	063314	NORMAL	Zinc	6.324362174	-
3 Count					3	
3 Average					6.677900289	
3 Var					0.114170161	
4	Y	063854	NORMAL	Zinc	6.971669485	J
4	Y	063711	NORMAL	Zinc	5.811149957	-
4	Y	063787	NORMAL	Zinc	7.839919515	J
4 Count					3	
4 Average					6.874246319	
4 Var					1.036094935	
5	Y	100212		ZINC	5.591000903	J
5	Y	100213		ZINC	6.077647504	J
5	Y	100215		ZINC	6.030691039	J
5	Y	100217		ZINC	5.497185021	J
5	Y	100218		ZINC	6.306278617	J
5	Y	100219		ZINC	6.648986228	J
5	Y	100214		ZINC	5.976357351	J
5	Y	100210		ZINC	7.10660681	J
5 Count					8	
5 Average					6.154344184	
5 Var					0.282374935	
6	Y	100225		ZINC	6.935371392	J
6	Y	100232		ZINC	8.556413942	J
6	Y	100231		ZINC	7.870929742	J
6	Y	100230		ZINC	8.416267322	J
6	Y	100229		ZINC	7.571473914	J
6	Y	100228		ZINC	8.194229381	J
6	Y	100226		ZINC	7.958577026	J
6	Y	100233		ZINC	7.351158638	J
6	Y	100227		ZINC	7.816014002	J
6 Count					9	
6 Average					7.852270595	
6 Var					0.264309231	
BURN PIT	Y	063164	NORMAL	Zinc	6.933423976	-
BURN PIT Count					1	
BURN PIT Average					6.933423976	
BURN PIT Var					#DIV/0!	
CLEARWELL	Y	098531		ZINC	7.261225585	J
CLEARWELL	Y	098526		ZINC	6.879356863	J
CLEARWELL	Y	098527		ZINC	7.807916794	J
CLEARWELL	Y	098528		ZINC	6.100323979	J
CLEARWELL	Y	098530		ZINC	6.966025077	J
CLEARWELL	Y	098532		ZINC	7.287561108	J
CLEARWELL	Y	098529		ZINC	6.551082376	J
CLEARWELL Count					7	
CLEARWELL Average					6.979070255	
CLEARWELL Var					0.304541067	
Grand Count					36	
Grand Average					6.652874239	
Grand Var					1.516633084	
NOTE: INSUFFICIENT VALID DATA EXISTS FOR BURN PIT. DATA NORMALIZED TO DATA AVAILABLE						

units									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.13829787	Average:	0.55299765	Variance:	0.37929889			
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.06382979	Average:	0.35614254	Variance:	0.00197009			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.4787234	Average:	3.19686716	Variance:	0.05465593			
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.15957447	Average:	1.0969542	Variance:	0.1653343			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.12765957	Average:	0.78566096	Variance:	0.03604786			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.0212766	Average:	0.16706959	Variance:	0.0056236			
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
UG/L									
			Weighted		Weighted				
	Mass Fraction:	0.0106383	Average:	0.07424543	Variance:	0.0032398			
			Weighted		Weighted		Weighted		
	Totals:	1	Average:	6.22993753	Variance:	0.64617047	STD:	0.80384729	
						Number Sx's		35	
						Weighted Mean		6.23	(asinh)
						Std Dev		0.80	(asinh)
						Std Dev* Std Dev		0.646	
						t.20 (Deg F = #Sx's - 7)		1.313	
						t.20*t.20		1.724	
						RT (Reg Threshold)		15.8304136	(asinh)
						n (Recommend Sx's)		0.01	
						sx		0.14	
						CI (Confidence Interval)		6.41	(asinh)

000436

000066

Sample Number Calculator:									
			12DCA	BENZ	CTC	3CEE	VC		
		N =	35	36	35	36	35		
		s =	2.72	3.63	2.71	6.62	4.82		
		x=	10.3	4.07	10.18	14.81	37.74		
		RT =	500	500	500	500	200	(Reg Limit)	
		RT - x=	-489.7	-495.93	-489.82	-485.19	-162.26		
		CI =	10.91	4.87	10.78	16.25	38.81	(90% Confidence)	
	Chebyshev Level =		18.90	15.55	18.75	35.74	52.98	(90% Confidence)	
N	F	t.20	n	n	n	n	n		
1	0								
2	1	3.078	0.000292	0.000508	0.00029	0.001764	0.00836		
3	2	1.886	0.00011	0.000191	0.000109	0.000662	0.003139		
4	3	1.638	8.28E-05	0.000144	8.21E-05	0.000499	0.002368		
5	4	1.533	7.25E-05	0.000126	7.19E-05	0.000437	0.002074		
6	5	1.476	6.72E-05	0.000117	6.67E-05	0.000406	0.001922		
7	6	1.44	6.4E-05	0.000111	6.35E-05	0.000386	0.00183		
8	7	1.415	6.18E-05	0.000107	6.13E-05	0.000373	0.001767		
9	8	1.397	6.02E-05	0.000105	5.97E-05	0.000363	0.001722		
10	9	1.393	5.99E-05	0.000104	5.94E-05	0.000361	0.001712		
11	10	1.372	5.81E-05	0.000101	5.76E-05	0.00035	0.001661		
12	11	1.363	5.73E-05	9.95E-05	5.69E-05	0.000346	0.001639		
13	12	1.356	5.67E-05	9.85E-05	5.63E-05	0.000342	0.001623		
14	13	1.35	5.62E-05	9.76E-05	5.58E-05	0.000339	0.001608		
15	14	1.345	5.58E-05	9.69E-05	5.54E-05	0.000337	0.001596		
16	15	1.341	5.55E-05	9.63E-05	5.5E-05	0.000335	0.001587		
17	16	1.337	5.51E-05	9.58E-05	5.47E-05	0.000333	0.001577		
18	17	1.333	5.48E-05	9.52E-05	5.44E-05	0.000331	0.001568		
19	18	1.33	5.46E-05	9.48E-05	5.41E-05	0.000329	0.001561		
20	19	1.328	5.44E-05	9.45E-05	5.4E-05	0.000328	0.001556		
21	20	1.325	5.42E-05	9.41E-05	5.37E-05	0.000327	0.001549		
		12DCA =	1,2-Dichloroethane						
		BENZ=	Benzene						
		CTC=	Carbon Tetrachloride						
		3CEE=	Trichloroethene						
		VC=	Vinyl Chloride						

000437

1730

1,2-Dichloroethane U Adj.

pit	twp	sample id	qa type	parameter	validated result	validation qualifier	units								
1	Y	063065	NORMAL	1,2-Dichloroethane	10	U	UG/L								
1	Y	063024	NORMAL	1,2-Dichloroethane	2.5	U	UG/L								
1	Y	063108	NORMAL	1,2-Dichloroethane	2.5	U	UG/L								
1 Count					3					Weighted		Weighted			
1 Average					5			Mass Fraction:	0.236363636	Average:	1.181818182	Variance:	4.431818182		
1 Var					18.75										
2	Y	063525	NORMAL	1,2-Dichloroethane	2.5	UJ	UG/L								
2	Y	063621	NORMAL	1,2-Dichloroethane	2.5	UJ	UG/L								
2 Count					2					Weighted		Weighted			
2 Average					2.5			Mass Fraction:	0.109090909	Average:	0.272727273	Variance:	0		
2 Var					0										
3	Y	063359	NORMAL	1,2-Dichloroethane	2.5	U	UG/L								
3 Count					1					Weighted		Weighted			
3 Average					2.5			Mass Fraction:	0	Average:	0	Variance:			
3 Var					#DIV/0!										
4	Y	063753	NORMAL	1,2-Dichloroethane	2.5	U	UG/L								
4	Y	063830	NORMAL	1,2-Dichloroethane	2.5	U	UG/L								
4 Count					2					Weighted		Weighted			
4 Average					2.5			Mass Fraction:	0.272727273	Average:	0	Variance:	1.363636364		
4 Var					0										
5	Y	100213		1,2-DICHLOROETHANE	5	-	UG/L								
5	Y	100212		1,2-DICHLOROETHANE	5	-	UG/L								
5	Y	100210		1,2-DICHLOROETHANE	5	-	UG/L								
5	Y	100214		1,2-DICHLOROETHANE	5	-	UG/L								
5	Y	100216		1,2-DICHLOROETHANE	5	-	UG/L								
5	Y	100217		1,2-DICHLOROETHANE	5	-	UG/L								
5	Y	100218		1,2-DICHLOROETHANE	25	-	UG/L								
5	Y	100219		1,2-DICHLOROETHANE	5	-	UG/L								
5	Y	100215		1,2-DICHLOROETHANE	5	-	UG/L								
5	Y	100211		1,2-DICHLOROETHANE	5	-	UG/L								
5 Count					10					Weighted		Weighted			
5 Average					7			Mass Fraction:	0.218181818	Average:	8.727272727	Variance:	0.545454545		
5 Var					40										
6	Y	100225		1,2-DICHLOROETHANE	2.5	UJ	UG/L								
6	Y	100232		1,2-DICHLOROETHANE	2.5	UJ	UG/L								
6	Y	100231		1,2-DICHLOROETHANE	2.5	UJ	UG/L								
6	Y	100230		1,2-DICHLOROETHANE	2.5	UJ	UG/L								
6	Y	100228		1,2-DICHLOROETHANE	2.5	UJ	UG/L								
6	Y	100226		1,2-DICHLOROETHANE	2.5	UJ	UG/L								
6	Y	100233		1,2-DICHLOROETHANE	2.5	UJ	UG/L								
6	Y	100227		1,2-DICHLOROETHANE	2.5	UJ	UG/L								
6 Count					8					Weighted		Weighted			
6 Average					2.5			Mass Fraction:	0.036363636	Average:	0	Variance:	0.145454545		
6 Var					0										
BURN PIT	Y	063180	NORMAL	1,2-Dichloroethane	4	J	UG/L								
BURN PIT	Y	063137	NORMAL	1,2-Dichloroethane	2.5	UJ	UG/L								
BURN PIT					2					Weighted		Weighted			
BURN PIT					3.25			Mass Fraction:	0.109090909	Average:	0.122727273	Variance:	0.272727273		
BURN PIT					1.125										
CLEARWEL	Y	098526		1,2-DICHLOROETHANE	2.5	U	UG/L								
CLEARWEL	Y	098527		1,2-DICHLOROETHANE	2.5	U	UG/L								
CLEARWEL	Y	098528		1,2-DICHLOROETHANE	2.5	U	UG/L								
CLEARWEL	Y	098529		1,2-DICHLOROETHANE	2.5	U	UG/L								
CLEARWEL	Y	098530		1,2-DICHLOROETHANE	2.5	U	UG/L								
CLEARWEL	Y	098532		1,2-DICHLOROETHANE	2.5	U	UG/L								
CLEARWEL	Y	098531		1,2-DICHLOROETHANE	2.5	U	UG/L								
CLEARWEL					7					Weighted		Weighted			
CLEARWEL					2.5			Mass Fraction:	0.018181818	Average:	0	Variance:	0.636363636		
CLEARWEL					0										
Grand					35										
Grand					4.042857143					Weighted		Weighted		Weighted	
Grand Var					15.81428571			Totals:	1	Average:	10.30454545	Variance:	7.395454545	STD:	2.719458502
													Number Sx's		35
													Weighted Mean		10.30
													Std Dev		2.72
													Std Dev * Std Dev		7.395
NOTE: INSUFFICIENT DATA FROM PIT 3. OTHER DATA NORMALIZED													t.20 (Deg F = #Sx's - 7)		1.313
													t.20*t.20		1.724
													RT (Reg Threshold)		500
													n (Recommend Sx's)		0.00
													sx		0.46
													CI (Confindence Interval)		10.91

000068

000068

pit	valp	sample id	qa type	parameter	validated result	validation qualifier	units								
1	Y	063106	NORMAL	Benzene	2.5	U	UG/L								
1	Y	063065	NORMAL	Benzene	10	U	UG/L								
1	Y	063024	NORMAL	Benzene	2.5	U	UG/L								
1 Count					3					Weighted		Weighted			
1					5			Mass Fraction:	0.23636364	Average:	1.18181818	Variance:	4.43181818		
1 Var					18.75										
2	Y	063525	NORMAL	Benzene	2.5	UJ	UG/L								
2	Y	063621	NORMAL	Benzene	2.5	U	UG/L								
2 Count					2					Weighted		Weighted			
2					2.5			Mass Fraction:	0.10909091	Average:	0.27272727	Variance:	0		
2 Var					0										
3	Y	063359	NORMAL	Benzene	2.5	U	UG/L								
3 Count					1					Weighted		Weighted			
3					2.5			Mass Fraction:	0	Average:	0	Variance:			
3 Var					#DIV/0!										
4	Y	063686	NORMAL	Benzene	2.5	U	UG/L								
4	Y	063753	NORMAL	Benzene	2.5	U	UG/L								
4	Y	063830	NORMAL	Benzene	2.5	U	UG/L								
4 Count					3					Weighted		Weighted			
4					2.5			Mass Fraction:	0.27272727	Average:	0.68181818	Variance:	0		
4 Var					0										
5	Y	100212		BENZENE	5	-	UG/L								
5	Y	100211		BENZENE	5	-	UG/L								
5	Y	100213		BENZENE	5	-	UG/L								
5	Y	100214		BENZENE	5	-	UG/L								
5	Y	100219		BENZENE	5	-	UG/L								
5	Y	100216		BENZENE	5	-	UG/L								
5	Y	100217		BENZENE	5	-	UG/L								
5	Y	100218		BENZENE	25	-	UG/L								
5	Y	100215		BENZENE	5	-	UG/L								
5	Y	100210		BENZENE	5	-	UG/L								
5 Count					10					Weighted		Weighted			
5					7			Mass Fraction:	0.21818182	Average:	1.52727273	Variance:	8.72727273		
5 Var					40										
6	Y	100232		BENZENE	2.5	UJ	UG/L								
6	Y	100231		BENZENE	2.5	UJ	UG/L								
6	Y	100230		BENZENE	2.5	UJ	UG/L								
6	Y	100228		BENZENE	2.5	UJ	UG/L								
6	Y	100227		BENZENE	2.5	UJ	UG/L								
6	Y	100226		BENZENE	2.5	UJ	UG/L								
6	Y	100233		BENZENE	2.5	UJ	UG/L								
6	Y	100229		BENZENE	2.5	UJ	UG/L								
6 Count					8					Weighted		Weighted			
6					2.5			Mass Fraction:	0.03636364	Average:	0.09090909	Variance:	0		
6 Var					0										
BURN PI	Y	063180	NORMAL	Benzene	2.5	U	UG/L								
BURN PI	Y	063137	NORMAL	Benzene	2.5	UJ	UG/L								
BURN PI					2					Weighted		Weighted			
BURN PI					2.5			Mass Fraction:	0.10909091	Average:	0.27272727	Variance:	0		
BURN PI					0										
CLEAR	Y	098532		BENZENE	2.5	U	UG/L								
CLEAR	Y	098526		BENZENE	2.5	U	UG/L								
CLEAR	Y	098527		BENZENE	2.5	U	UG/L								
CLEAR	Y	098528		BENZENE	2.5	U	UG/L								
CLEAR	Y	098529		BENZENE	2.5	U	UG/L								
CLEAR	Y	098531		BENZENE	2.5	U	UG/L								
CLEAR	Y	098530		BENZENE	2.5	U	UG/L								
CLEAR					7					Weighted		Weighted			
CLEAR					2.5			Mass Fraction:	0.01818182	Average:	0.04545455	Variance:	0		
CLEAR					0										
Grand					36										
Grand					3.958333333					Weighted		Weighted		Weighted	
Grand					15.49107143			Totals:	1	Average:	4.07272727	Variance:	13.1590909	STD:	3.62754613

Number Sx's	36
Weighted Mean	4.07
Std Dev	3.63
Std Dev * Std Dev	13.159
t.20 (Deg F = #Sx's - 7)	1.311
t.20*t.20	1.719
RT (Reg Threshold)	500
n (Resommend Sx's)	0.00
ex	0.60
CI (Confindence Interval)	4.87

NOTE: INSUFFICIENT DATA FROM PIT 3, OTHER DATA NORMALIZED

000439

1730

000069

Carbon Tet U Adjusted

pit	tolp	sample id	qc type	parameter	validated result	validation qualifier	units								
1	Y	063065	NORMAL	Carbon Tetrachloride	10	U	UG/L								
1	Y	063024	NORMAL	Carbon Tetrachloride	2.5	U	UG/L								
1	Y	063108	NORMAL	Carbon Tetrachloride	2.5	U	UG/L								
1 Count					3					Weighted		Weighted			
1					5			Mass Fraction:	0.236363636	Average:	1.181818182	Variance:	4.431818182		
1 Var					18.75										
2	Y	063525	NORMAL	Carbon Tetrachloride	2.5	UJ	UG/L								
2	Y	063621	NORMAL	Carbon Tetrachloride	2.5	UJ	UG/L								
2 Count					2					Weighted		Weighted			
2					2.5			Mass Fraction:	0.109090909	Average:	0.272727273	Variance:	0		
2 Var					0										
3	Y	063359	NORMAL	Carbon Tetrachloride	2.5	U	UG/L								
3 Count					1					Weighted		Weighted			
3					2.5			Mass Fraction:	0	Average:	0	Variance:			
3 Var					#DIV/0!										
4	Y	063753	NORMAL	Carbon Tetrachloride	2.5	U	UG/L								
4	Y	063830	NORMAL	Carbon Tetrachloride	2.5	U	UG/L								
4 Count					2					Weighted		Weighted			
4					2.5			Mass Fraction:	0.272727273	Average:	0	Variance:	1.363636364		
4 Var					0										
5	Y	100213		CARBON	5	-	UG/L								
5	Y	100212		CARBON	5	-	UG/L								
5	Y	100210		CARBON	5	-	UG/L								
5	Y	100214		CARBON	5	-	UG/L								
5	Y	100216		CARBON	5	-	UG/L								
5	Y	100217		CARBON	5	-	UG/L								
5	Y	100218		CARBON	25	-	UG/L								
5	Y	100219		CARBON	5	-	UG/L								
5	Y	100215		CARBON	5	-	UG/L								
5	Y	100211		CARBON	5	-	UG/L								
5 Count					10					Weighted		Weighted			
5					7			Mass Fraction:	0.218181818	Average:	8.727272727	Variance:	0.545454545		
5 Var					40										
6	Y	100225		CARBON	2.5	UJ	UG/L								
6	Y	100232		CARBON	2.5	UJ	UG/L								
6	Y	100231		CARBON	2.5	UJ	UG/L								
6	Y	100230		CARBON	2.5	UJ	UG/L								
6	Y	100228		CARBON	2.5	UJ	UG/L								
6	Y	100226		CARBON	2.5	UJ	UG/L								
6	Y	100233		CARBON	2.5	UJ	UG/L								
6	Y	100227		CARBON	2.5	UJ	UG/L								
6 Count					8					Weighted		Weighted			
6					2.5			Mass Fraction:	0.036363636	Average:	0	Variance:	0.090909091		
6 Var					0										
BURN PIT	Y	063180	NORMAL	Carbon Tetrachloride	2.5	U	UG/L								
BURN PIT	Y	063137	NORMAL	Carbon Tetrachloride	2.5	UJ	UG/L								
BURN PIT					2					Weighted		Weighted			
BURN PIT					2.5			Mass Fraction:	0.109090909	Average:	0	Variance:	0.272727273		
BURN PIT					0										
CLEARW	Y	098526		CARBON	2.5	U	UG/L								
CLEARW	Y	098527		CARBON	2.5	U	UG/L								
CLEARW	Y	098528		CARBON	2.5	U	UG/L								
CLEARW	Y	098529		CARBON	2.5	U	UG/L								
CLEARW	Y	098530		CARBON	2.5	U	UG/L								
CLEARW	Y	098532		CARBON	2.5	U	UG/L								
CLEARW	Y	098531		CARBON	2.5	U	UG/L								
CLEARW					7					Weighted		Weighted			
CLEARW					2.5			Mass Fraction:	0.018181818	Average:	0	Variance:	0.636363636		
CLEARW					0										
Grand					35										
Grand					4					Weighted		Weighted		Weighted	
Grand Var					15.88235294			Totals:	1	Average:	10.18181818	Variance:	7.340909091	STD:	2.709411207

Number Sx's	35
Weighted Mean	10.18
Std Dev	2.71
Std Dev * Std Dev	7.341
t.20 (Deg F = #Sx's - 7)	1.313
t.20*t.20	1.724
RT (Reg Threshold)	500
n (Recommend Sx's)	0.00
sx	0.46
CI (Confindence Interval)	10.78

NOTE: INSUFFICIENT DATA FROM PIT 3. OTHER DATA NORMALIZED

000440

000070

Trichloroethene U Adj.

pit	rejp	sample id	qa type	parameter	validated result	validation qualifier	units								
1	Y	063108	NORMAL	Trichloroethene	2.5	U	UG/L								
1	Y	063065	NORMAL	Trichloroethene	10	U	UG/L								
1	Y	063024	NORMAL	Trichloroethene	2.5	U	UG/L								
1 Count					3					Weighted		Weighted			
1 Average					5			Mass Fraction:	0.23636364	Average:	1.18181818	Variance:	4.43181818		
1 Var					18.75										
2	Y	063525	NORMAL	Trichloroethene	2.5	UJ	UG/L								
2	Y	063621	NORMAL	Trichloroethene	2.5	U	UG/L								
2 Count					2					Weighted		Weighted			
2 Average					2.5			Mass Fraction:	0.10909091	Average:	0.27272727	Variance:	0		
2 Var					0										
3	Y	063359	NORMAL	Trichloroethene	2.5	U	UG/L								
3 Count					1					Weighted		Weighted			
3 Average					2.5			Mass Fraction:	0	Average:	0	Variance:			
3 Var					#DIV/0!										
4	Y	063666	NORMAL	Trichloroethene	2.5	UJ	UG/L								
4	Y	063753	NORMAL	Trichloroethene	13		UG/L								
4	Y	063830	NORMAL	Trichloroethene	20	U	UG/L								
4 Count					3			Mass Fraction:	0.27272727	Weighted Average:	3.77272727	Weighted Variance:	37.7954545		
4 Average					13.83333333										
4 Var					138.5833333										
5	Y	100212		TRICHLOROETHENE	5		UG/L								
5	Y	100211		TRICHLOROETHENE	5		UG/L								
5	Y	100213		TRICHLOROETHENE	5		UG/L								
5	Y	100214		TRICHLOROETHENE	5		UG/L								
5	Y	100219		TRICHLOROETHENE	5		UG/L								
5	Y	100216		TRICHLOROETHENE	5		UG/L								
5	Y	100217		TRICHLOROETHENE	5		UG/L								
5	Y	100218		TRICHLOROETHENE	25		UG/L								
5	Y	100215		TRICHLOROETHENE	5		UG/L								
5	Y	100210		TRICHLOROETHENE	5		UG/L								
5 Count					10					Weighted		Weighted			
5 Average					7			Mass Fraction:	0.21818182	Average:	8.72727273	Variance:	0.65454545		
5 Var					40										
6	Y	100232		TRICHLOROETHENE	3	J	UG/L								
6	Y	100231		TRICHLOROETHENE	16	J	UG/L								
6	Y	100230		TRICHLOROETHENE	2.5	UJ	UG/L								
6	Y	100228		TRICHLOROETHENE	2.5	UJ	UG/L								
6	Y	100227		TRICHLOROETHENE	2.5	UJ	UG/L								
6	Y	100225		TRICHLOROETHENE	2.5	UJ	UG/L								
6	Y	100233		TRICHLOROETHENE	2.5	UJ	UG/L								
6	Y	100226		TRICHLOROETHENE	2.5	UJ	UG/L								
6 Count					8					Weighted		Weighted			
6 Average					4.25			Mass Fraction:	0.03636364	Average:	0.82077922	Variance:	0.07272727		
6 Var					22.57142857										
BURN PIT	Y	063180	NORMAL	Trichloroethene	2	J	UG/L								
BURN PIT	Y	063137	NORMAL	Trichloroethene	2.5	UJ	UG/L								
BURN PIT Count					2					Weighted		Weighted			
BURN PIT Average					2.25			Mass Fraction:	0.10909091	Average:	0.01363636	Variance:	0.27272727		
BURN PIT Var					0.125										
CLEARWELL	Y	098532		TRICHLOROETHENE	2.5	U	UG/L								
CLEARWELL	Y	098526		TRICHLOROETHENE	2.5	U	UG/L								
CLEARWELL	Y	098527		TRICHLOROETHENE	5	J	UG/L								
CLEARWELL	Y	098528		TRICHLOROETHENE	2.5	U	UG/L								
CLEARWELL	Y	098529		TRICHLOROETHENE	2.5	U	UG/L								
CLEARWELL	Y	098531		TRICHLOROETHENE	2.5	U	UG/L								
CLEARWELL	Y	098530		TRICHLOROETHENE	2.5	U	UG/L								
CLEARWELL Count					7					Weighted		Weighted			
CLEARWELL Average					2.857142857			Mass Fraction:	0.01818182	Average:	0.01623377	Variance:	0.65454545		
CLEARWELL Var					0.892857143										
Grand Count					36										
Grand Average					5.347222222					Weighted		Weighted		Weighted	
Grand Var					33.66884921			Totals:	1	Average:	14.9051948	Variance:	43.8818182	STD:	6.6243353
													Number Sx's		36
													Weighted Mean		14.81
													Std Dev		6.62
													Std Dev* Std Dev		43.882
													t.20 (Deg F = #Sx's - 7)		1.311
													t.20*t.20		1.719
													RT (Req Threshold)		500
													n (Recommend Sx's)		0.00
													sx		1.10
													CI (Confindence Interval)		18.25

NOTE: INSUFFICIENT DATA FROM PIT 3, OTHER DATA NORMALIZED

000441

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Vinyl Chloride U Adj.

pit	tele	sample id	qa type	parameter	validated result	validation qualifier	units								
1	Y	083065	NORMAL	Vinyl chloride	20	U	UG/L								
1	Y	083024	NORMAL	Vinyl chloride	5	U	UG/L								
1	Y	083108	NORMAL	Vinyl chloride	5	U	UG/L								
1 Count					3					Weighted		Weighted			
1 Average					10			Mass Fraction	0.236363636	Average:	2.363636364	Variance:	17.72727273		
1 Var					75										
2	Y	083525	NORMAL	Vinyl chloride	2.5	UJ	UG/L								
2	Y	083621	NORMAL	Vinyl chloride	5	U	UG/L								
2 Count					2					Weighted		Weighted			
2 Average					3.75			Mass Fraction	0.109090909	Average:	0.409090909	Variance:	0.340909091		
2 Var					3.125										
3	Y	083359	NORMAL	Vinyl chloride	5	U	UG/L								
3 Count					1					Weighted		Weighted			
3 Average					5			Mass Fraction	0	Average:	0	Variance:			
3 Var					#DIV/0!										
4	Y	083753	NORMAL	Vinyl chloride	5	U	UG/L								
4	Y	083830	NORMAL	Vinyl chloride	5	U	UG/L								
4 Count					2					Weighted		Weighted			
4 Average					5			Mass Fraction	0.272727273	Average:	0	Variance:	2.727272727		
4 Var					0										
5	Y	100213		VINYL CHLORIDE	10	-	UG/L								
5	Y	100212		VINYL CHLORIDE	10	-	UG/L								
5	Y	100210		VINYL CHLORIDE	10	-	UG/L								
5	Y	100214		VINYL CHLORIDE	10	-	UG/L								
5	Y	100216		VINYL CHLORIDE	10	-	UG/L								
5	Y	100217		VINYL CHLORIDE	10	-	UG/L								
5	Y	100218		VINYL CHLORIDE	50	-	UG/L								
5	Y	100219		VINYL CHLORIDE	10	-	UG/L								
5	Y	100215		VINYL CHLORIDE	10	-	UG/L								
5	Y	100211		VINYL CHLORIDE	10	-	UG/L								
5 Count					10					Weighted		Weighted			
5 Average					14			Mass Fraction	0.218181818	Average:	34.90909091	Variance:	1.090909091		
5 Var					160										
6	Y	100225		VINYL CHLORIDE	5	UJ	UG/L								
6	Y	100232		VINYL CHLORIDE	5	UJ	UG/L								
6	Y	100231		VINYL CHLORIDE	5	UJ	UG/L								
6	Y	100230		VINYL CHLORIDE	5	UJ	UG/L								
6	Y	100228		VINYL CHLORIDE	5	UJ	UG/L								
6	Y	100226		VINYL CHLORIDE	5	UJ	UG/L								
6	Y	100233		VINYL CHLORIDE	5	UJ	UG/L								
6	Y	100227		VINYL CHLORIDE	5	UJ	UG/L								
6 Count					8					Weighted		Weighted			
6 Average					5			Mass Fraction	0.036363636	Average:	0	Variance:	0.145454545		
6 Var					0										
BURN PIT	Y	083190	NORMAL	Vinyl chloride	4	J	UG/L								
BURN PIT	Y	083137	NORMAL	Vinyl chloride	5	UJ	UG/L								
BURN PIT Count					2					Weighted		Weighted			
BURN PIT Average					4.5			Mass Fraction	0.109090909	Average:	0.054545455	Variance:	0.545454545		
BURN PIT Var					0.5										
CLEARWELL	Y	096526		VINYL CHLORIDE	5	U	UG/L								
CLEARWELL	Y	096527		VINYL CHLORIDE	5	U	UG/L								
CLEARWELL	Y	096528		VINYL CHLORIDE	5	U	UG/L								
CLEARWELL	Y	096529		VINYL CHLORIDE	5	U	UG/L								
CLEARWELL	Y	096530		VINYL CHLORIDE	5	U	UG/L								
CLEARWELL	Y	096532		VINYL CHLORIDE	5	U	UG/L								
CLEARWELL	Y	096531		VINYL CHLORIDE	5	U	UG/L								
CLEARWELL Count					7					Weighted		Weighted			
CLEARWELL Average					5			Mass Fraction	0.018181818	Average:	0	Variance:	0.636363636		
CLEARWELL Var					0										
Grand Count					35										
Grand Average					7.9					Weighted		Weighted		Weighted	
Grand Var					64.35			Totals:	1	Average:	37.73636364	Variance:	23.21363636	STD:	4.818053172

Number Sx's	35
Weighted Mean	37.74
Std Dev	4.82
Std Dev * Std Dev	23.214
t.20 (Deg F = #Sx's - 7)	1.313
t.20*t.20	1.724
RT (Reg Threshold)	200
n (Recommend Sx's)	0.00
sx	0.81
CI (Confindence Interval)	38.81

NOTE: INSUFFICIENT DATA FROM PIT 3. OTHER DATA NORMALIZED

000442

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Sample Number Calculator:										
			Endrin	Hepta	Hepta EP	24DNT	NBENZ	PCP		
		N =	39	39	38	39	36	26		
		s =	0.04	0.02	0.02	7.03	1.48	2.34		
		x =	0.07	0.03	0.03	10.88	9.52	49.44		
		RT =	20	8	8	130	2000	100000	(Reg Limit)	
		RT - x =	-19.93	-7.97	-7.97	-119.12	-1990.48	-99950.6		
		CI =	0.08	0.04	0.04	12.35	9.85	50.05	(90% Confidence)	
	Chebyshev	Level =	0.20	0.09	0.09	33.11	14.20	56.84	(90% Confidence)	
N	F	t.20	n	n	n	n	n	n		
1	0									
2	1	3.078	3.82E-05	5.97E-05	5.97E-05	0.032997	5.24E-06	5.19E-09		
3	2	1.886	1.43E-05	2.24E-05	2.24E-05	0.012389	1.97E-06	1.95E-09		
4	3	1.638	1.08E-05	1.69E-05	1.69E-05	0.009345	1.48E-06	1.47E-09		
5	4	1.533	9.47E-06	1.48E-05	1.48E-05	0.008185	1.3E-06	1.29E-09		
6	5	1.476	8.78E-06	1.37E-05	1.37E-05	0.007588	1.2E-06	1.19E-09		
7	6	1.44	8.35E-06	1.31E-05	1.31E-05	0.007222	1.15E-06	1.14E-09		
8	7	1.415	8.07E-06	1.26E-05	1.26E-05	0.006974	1.11E-06	1.1E-09		
9	8	1.397	7.86E-06	1.23E-05	1.23E-05	0.006797	1.08E-06	1.07E-09		
10	9	1.393	7.82E-06	1.22E-05	1.22E-05	0.006758	1.07E-06	1.06E-09		
11	10	1.372	7.58E-06	1.19E-05	1.19E-05	0.006556	1.04E-06	1.03E-09		
12	11	1.363	7.48E-06	1.17E-05	1.17E-05	0.00647	1.03E-06	1.02E-09		
13	12	1.356	7.41E-06	1.16E-05	1.16E-05	0.006404	1.02E-06	1.01E-09		
14	13	1.35	7.34E-06	1.15E-05	1.15E-05	0.006348	1.01E-06	9.99E-10		
15	14	1.345	7.29E-06	1.14E-05	1.14E-05	0.006301	1E-06	9.92E-10		
16	15	1.341	7.24E-06	1.13E-05	1.13E-05	0.006263	9.94E-07	9.86E-10		
17	16	1.337	7.2E-06	1.13E-05	1.13E-05	0.006226	9.88E-07	9.8E-10		
18	17	1.333	7.16E-06	1.12E-05	1.12E-05	0.006189	9.82E-07	9.74E-10		
19	18	1.33	7.13E-06	1.11E-05	1.11E-05	0.006161	9.78E-07	9.7E-10		
20	19	1.328	7.1E-06	1.11E-05	1.11E-05	0.006142	9.75E-07	9.67E-10		
21	20	1.325	7.07E-06	1.11E-05	1.11E-05	0.006115	9.71E-07	9.62E-10		
		Hepta = Heptachlor								
		Hepta EP = Heptachlor Epoxide								
		24DNT = 2,4-Dinitrotoluene								
		NBENZ = Nitrobenzene								
		PCP = Pentachlorophenol								

000443

1730

Endrin U Adjusted

pit	tclp	sample_id	qc_type	parameter	validated_result	validation_qualifier	units								
1	Y	063113	NORMAL	Endrin	0.25	U	UG/L								
1	Y	063033	NORMAL	Endrin	0.05	UJ	UG/L								
1	Y	063072	NORMAL	Endrin	0.05	U	UG/L								
1 Count					3					Weighted		Weighted			
1 Average					0.116666667			Mass Fraction:	0.13	Average:	0.01516667	Variance:	0.00173333		
1 Var					0.013333333										
2	Y	063634	NORMAL	Endrin	0.05	UJ	UG/L								
2	Y	063540	NORMAL	Endrin	0.05	UJ	UG/L								
2 Count					2					Weighted		Weighted			
2 Average					0.05			Mass Fraction:	0.06	Average:	0.003	Variance:	0		
2 Var					0										
3	Y	063394	NORMAL	Endrin	0.05	UJ	UG/L								
3	Y	063478	NORMAL	Endrin	0.05	UJ	UG/L								
3	Y	063314	NORMAL	Endrin	0.05	U	UG/L								
3 Count					3					Weighted		Weighted			
3 Average					0.05			Mass Fraction:	0.45	Average:	0.0225	Variance:	0		
3 Var					0										
4	Y	063654	NORMAL	Endrin	0.05	U	UG/L								
4	Y	063787	NORMAL	Endrin	0.05	U	UG/L								
4	Y	063711	NORMAL	Endrin	0.1	UJ	UG/L								
4 Count					3					Weighted		Weighted			
4 Average					0.066666667			Mass Fraction:	0.15	Average:	0.01	Variance:	0.000125		
4 Var					0.000833333										
5	Y	100219DL		ENDRIN	0.092	-	UG/L								
5	Y	100217DL		ENDRIN	0.095	-	UG/L								
5	Y	100215DL		ENDRIN	0.096	-	UG/L								
5	Y	100216DL		ENDRIN	0.094	-	UG/L								
5	Y	100210DL		ENDRIN	0.088	-	UG/L								
5	Y	100211DL		ENDRIN	0.09	-	UG/L								
5	Y	100212DL		ENDRIN	0.089	-	UG/L								
5	Y	100213DL		ENDRIN	0.099	-	UG/L								
5	Y	100214DL		ENDRIN	0.098	-	UG/L								
5	Y	100218DL		ENDRIN	0.09	-	UG/L								
5 Count					10					Weighted		Weighted			
5 Average					0.0921			Mass Fraction:	0.12	Average:	0.011052	Variance:	3.8253E-06		
5 Var					3.18778E-05										
6	Y	100227		ENDRIN	0.079	-	UG/L								
6	Y	100226		ENDRIN	0.097	-	UG/L								
6	Y	100228		ENDRIN	0.095	-	UG/L								
6	Y	100229		ENDRIN	0.09	-	UG/L								
6	Y	100230		ENDRIN	0.089	-	UG/L								
6	Y	100231		ENDRIN	0.1	-	UG/L								
6	Y	100232		ENDRIN	0.12	-	UG/L								
6	Y	100233		ENDRIN	0.089	-	UG/L								
6	Y	100225		ENDRIN	0.091	-	UG/L								
6 Count					9					Weighted		Weighted			
6 Average					0.094444444			Mass Fraction:	0.02	Average:	0.00188889	Variance:	2.5506E-06		
6 Var					0.000127528										
BURN_PIT	Y	063205	NORMAL	Endrin	0.05	U	UG/L								
BURN_PIT	Y	063164	NORMAL	Endrin	0.05	UJ	UG/L								
BURN_PIT Count					2					Weighted		Weighted			
BURN_PIT					0.05			Mass Fraction:	0.06	Average:	0.003	Variance:	0		
BURN_PIT Var					0										
CLEARWELL	Y	098532		ENDRIN	0.051	UJ	UG/L								
CLEARWELL	Y	098526		ENDRIN	0.052	UJ	UG/L								
CLEARWELL	Y	098527		ENDRIN	0.04645	UJ	UG/L								
CLEARWELL	Y	098528		ENDRIN	0.051	UJ	UG/L								
CLEARWELL	Y	098529		ENDRIN	0.05	UJ	UG/L								
CLEARWELL	Y	098531		ENDRIN	0.047	UJ	UG/L								
CLEARWELL	Y	098530		ENDRIN	0.0505	UJ	UG/L								
CLEARWELL					7					Weighted		Weighted			
CLEARWELL					0.049707143			Mass Fraction:	0.01	Average:	0.00049707	Variance:	4.542E-08		
CLEARWELL Var					4.54202E-08										
Grand Count					39										
Grand Average					0.077408974					Weighted		Weighted		Weighted	

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Grand Var					0.00131679			Totals:	1	Average:	0.06710463	Variance:	0.00186475	STD:	0.0431828
													Number Sx's		39
													Weighted Mean		0.07
													Std Dev		0.04
													Std Dev^ Std Dev		0.00186
													t.20 (Deg F =#Sx's - 6)		1.310
													t.20*t.20		1.716
													RT (Reg Threshold)		20
													n (Recommend Sx's)		0.80
													sx		0.01
													CI (Confindence Interval)		0.08

000445

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000075

pit	tclp	sample_id	parameter	validated_result	validation_qualifier	units
4	Y	063787	Endrin	.2	Z	UG/L
4	Y	063711	Endrin	.5	Z	UG/L
3	Y	063394	Endrin	.2	Z	UG/L
2	Y	063634	Endrin	.1	Z	UG/L
1	Y	063113	Endrin	.1	Z	UG/L
1	Y	063072	Endrin	.2	Z	UG/L
1	Y	063072	Endrin	1	Z	UG/L

000446

000076

pit	tclp	sample_id	qa_type	parameter	validated_result	validation_qualifier	units								
1	Y	063113	NORMAL	Heptachlor	0.125	U	UG/L								
1	Y	063033	NORMAL	Heptachlor	0.025	UJ	UG/L								
1	Y	063072	NORMAL	Heptachlor	0.025	U	UG/L								
1 Count					3					Weighted		Weighted			
1 Average					0.058333333			Mass Fraction:	0.13	Average:	0.00758333	Variance:	0.00043333		
1 Var					0.003333333										
2	Y	063634	NORMAL	Heptachlor	0.025	UJ	UG/L								
2	Y	063540	NORMAL	Heptachlor	0.025	UJ	UG/L								
2 Count					2					Weighted		Weighted			
2 Average					0.025			Mass Fraction:	0.06	Average:	0.0015	Variance:	0		
2 Var					0										
3	Y	063394	NORMAL	Heptachlor	0.025	UJ	UG/L								
3	Y	063478	NORMAL	Heptachlor	0.025	UJ	UG/L								
3	Y	063314	NORMAL	Heptachlor	0.025	U	UG/L								
3 Count					3					Weighted		Weighted			
3 Average					0.025			Mass Fraction:	0.45	Average:	0.01125	Variance:	0		
3 Var					0										
4	Y	063854	NORMAL	Heptachlor	0.025	U	UG/L								
4	Y	063787	NORMAL	Heptachlor	0.025	U	UG/L								
4	Y	063711	NORMAL	Heptachlor	0.05	UJ	UG/L								
4 Count					3					Weighted		Weighted			
4 Average					0.033333333			Mass Fraction:	0.15	Average:	0.005	Variance:	0.00003125		
4 Var					0.000208333										
5	Y	100219DL		HEPTACHLOR	0.046	-	UG/L								
5	Y	100217DL		HEPTACHLOR	0.048	-	UG/L								
5	Y	100215DL		HEPTACHLOR	0.049	-	UG/L								
5	Y	100216DL		HEPTACHLOR	0.047	-	UG/L								
5	Y	100210DL		HEPTACHLOR	0.044	-	UG/L								
5	Y	100211DL		HEPTACHLOR	0.04	-	UG/L								
5	Y	100212DL		HEPTACHLOR	0.044	-	UG/L								
5	Y	100213DL		HEPTACHLOR	0.05	-	UG/L								
5	Y	100214DL		HEPTACHLOR	0.049	-	UG/L								
5	Y	100218DL		HEPTACHLOR	0.045	-	UG/L								
5 Count					10					Weighted		Weighted			
5 Average					0.0461			Mass Fraction:	0.12	Average:	0.005532	Variance:	1.052E-06		
5 Var					8.76667E-06										
6	Y	100227		HEPTACHLOR	0.04	-	UG/L								
6	Y	100226		HEPTACHLOR	0.049	-	UG/L								
6	Y	100228		HEPTACHLOR	0.049	-	UG/L								
6	Y	100229		HEPTACHLOR	0.045	-	UG/L								
6	Y	100230		HEPTACHLOR	0.045	-	UG/L								
6	Y	100231		HEPTACHLOR	0.051	-	UG/L								
6	Y	100232		HEPTACHLOR	0.052	-	UG/L								
6	Y	100233		HEPTACHLOR	0.044	-	UG/L								
6	Y	100225		HEPTACHLOR	0.045	-	UG/L								
6 Count					9					Weighted		Weighted			
6 Average					0.047555556			Mass Fraction:	0.02	Average:	0.00095111	Variance:	7.7556E-07		
6 Var					3.87778E-05										
BURN_PIT	Y	063205	NORMAL	Heptachlor	0.025	U	UG/L								
BURN_PIT	Y	063164	NORMAL	Heptachlor	0.025	UJ	UG/L								
BURN_PIT Count					2					Weighted		Weighted			
BURN_PIT					0.025			Mass Fraction:	0.06	Average:	0.0015	Variance:	0		
BURN_PIT Var					0										
CLEARWELL	Y	098532		HEPTACHLOR	0.02545	UJ	UG/L								
CLEARWELL	Y	098526		HEPTACHLOR	0.0259	UJ	UG/L								
CLEARWELL	Y	098527		HEPTACHLOR	0.0232	UJ	UG/L								
CLEARWELL	Y	098528		HEPTACHLOR	0.0256	UJ	UG/L								
CLEARWELL	Y	098529		HEPTACHLOR	0.025	UJ	UG/L								
CLEARWELL	Y	098531		HEPTACHLOR	0.0235	UJ	UG/L								
CLEARWELL	Y	098530		HEPTACHLOR	0.02535	UJ	UG/L								
CLEARWELL					7					Weighted		Weighted			
CLEARWELL					0.024857143			Mass Fraction:	0.01	Average:	0.00024857	Variance:	1.1404E-08		
CLEARWELL Var					1.14036E-06										

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1730

Grand Count					39										
Grand Average					0.038794872					Weighted		Weighted		Weighted	
Grand Var					0.000332377			Totals:	1	Average:	0.03356502	Variance:	0.00046642	STD:	0.02159681
													Number Sx's		39
													Weighted Mean		0.03
													Std Dev		0.02
													Std Dev* Std Dev		0.000
													t.20 (Deg F =#Sx's - 8)		1.310
													t.20*t.20		1.716
													RT (Reg Threshold)		8
													n (Recommend Sx's)		0.00
													sx		0.00
													CI (Confindence Interval)		0.04

000448

pit	tclp	sample_id	parameter	validated_result	validation_qualifier	units
4	Y	063787	Heptachlor	.1	Z	UG/L
4	Y	063711	Heptachlor	.25	Z	UG/L
3	Y	063394	Heptachlor	.1	Z	UG/L
2	Y	063634	Heptachlor	.05	Z	UG/L
1	Y	063113	Heptachlor	.05	Z	UG/L
1	Y	063072	Heptachlor	.1	Z	UG/L
1	Y	063072	Heptachlor	.5	Z	UG/L

000449

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000073

Heptachlor EP U Adj.

pit	tclp	sample_id	qa_type	parameter	validated_result	validation_qualifier	units								
1	Y	063113	NORMAL	Heptachlor epoxide	0.125	U	UG/L								
1	Y	063033	NORMAL	Heptachlor epoxide	0.025	UJ	UG/L								
1	Y	063072	NORMAL	Heptachlor epoxide	0.025	U	UG/L								
1 Count					3					Weighted		Weighted			
1 Average					0.058333333			Mass Fraction:	0.13	Average:	0.00758333	Variance:	0.00043333		
1 Var					0.003333333										
2	Y	063634	NORMAL	Heptachlor epoxide	0.025	UJ	UG/L								
2	Y	063540	NORMAL	Heptachlor epoxide	0.025	UJ	UG/L								
2 Count					2					Weighted		Weighted			
2 Average					0.025			Mass Fraction:	0.06	Average:	0.0015	Variance:	0		
2 Var					0										
3	Y	063394	NORMAL	Heptachlor epoxide	0.025	UJ	UG/L								
3	Y	063478	NORMAL	Heptachlor epoxide	0.025	UJ	UG/L								
3 Count					2					Weighted		Weighted			
3 Average					0.025			Mass Fraction:	0.45	Average:	0.01125	Variance:	0		
3 Var					0										
4	Y	063654	NORMAL	Heptachlor epoxide	0.025	U	UG/L								
4	Y	063787	NORMAL	Heptachlor epoxide	0.025	U	UG/L								
4	Y	063711	NORMAL	Heptachlor epoxide	0.05	UJ	UG/L								
4 Count					3					Weighted		Weighted			
4 Average					0.033333333			Mass Fraction:	0.15	Average:	0.005	Variance:	0.00003125		
4 Var					0.000208333										
5	Y	100219DL		HEPTACHLOR EPOXIDE	0.046	-	UG/L								
5	Y	100217DL		HEPTACHLOR EPOXIDE	0.048	-	UG/L								
5	Y	100215DL		HEPTACHLOR EPOXIDE	0.049	-	UG/L								
5	Y	100216DL		HEPTACHLOR EPOXIDE	0.047	-	UG/L								
5	Y	100210DL		HEPTACHLOR EPOXIDE	0.044	-	UG/L								
5	Y	100211DL		HEPTACHLOR EPOXIDE	0.04	-	UG/L								
5	Y	100212DL		HEPTACHLOR EPOXIDE	0.044	-	UG/L								
5	Y	100213DL		HEPTACHLOR EPOXIDE	0.05	-	UG/L								
5	Y	100214DL		HEPTACHLOR EPOXIDE	0.049	-	UG/L								
5	Y	100218DL		HEPTACHLOR EPOXIDE	0.045	-	UG/L								
5 Count					10					Weighted		Weighted			
5 Average					0.0461			Mass Fraction:	0.12	Average:	0.005532	Variance:	1.052E-06		
5 Var					8.76667E-06										
6	Y	100227		HEPTACHLOR EPOXIDE	0.04	-	UG/L								
6	Y	100226		HEPTACHLOR EPOXIDE	0.048	-	UG/L								
6	Y	100228		HEPTACHLOR EPOXIDE	0.048	-	UG/L								
6	Y	100229		HEPTACHLOR EPOXIDE	0.045	-	UG/L								
6	Y	100230		HEPTACHLOR EPOXIDE	0.045	-	UG/L								
6	Y	100231		HEPTACHLOR EPOXIDE	0.051	-	UG/L								
6	Y	100232		HEPTACHLOR EPOXIDE	0.062	-	UG/L								
6	Y	100233		HEPTACHLOR EPOXIDE	0.044	-	UG/L								
6	Y	100225		HEPTACHLOR EPOXIDE	0.045	-	UG/L								
6 Count					9					Weighted		Weighted			
6 Average					0.047555556			Mass Fraction:	0.02	Average:	0.00095111	Variance:	7.7556E-07		
6 Var					3.87778E-05										
BURN_PIT	Y	063205	NORMAL	Heptachlor epoxide	0.025	U	UG/L								
BURN_PIT	Y	063164	NORMAL	Heptachlor epoxide	0.025	UJ	UG/L								
BURN_PIT Count					2					Weighted		Weighted			
BURN_PIT					0.025			Mass Fraction:	0.06	Average:	0.0015	Variance:	0		
BURN_PIT Var					0										
CLEARWELL	Y	098532		HEPTACHLOR EPOXIDE	0.02545	UJ	UG/L								
CLEARWELL	Y	098526		HEPTACHLOR EPOXIDE	0.0259	UJ	UG/L								
CLEARWELL	Y	098527		HEPTACHLOR EPOXIDE	0.0232	UJ	UG/L								
CLEARWELL	Y	098528		HEPTACHLOR EPOXIDE	0.0256	UJ	UG/L								
CLEARWELL	Y	098529		HEPTACHLOR EPOXIDE	0.025	UJ	UG/L								
CLEARWELL	Y	098531		HEPTACHLOR EPOXIDE	0.0235	UJ	UG/L								
CLEARWELL	Y	098530		HEPTACHLOR EPOXIDE	0.02535	UJ	UG/L								
CLEARWELL					7					Weighted		Weighted			
CLEARWELL					0.024857143			Mass Fraction:	0.01	Average:	0.00024857	Variance:	1.1404E-08		
CLEARWELL Var					1.14036E-06										
Grand Count					38										
Grand Average					0.039157895					Weighted		Weighted		Weighted	
Grand Var					0.000336062			Totals:	1	Average:	0.03356502	Variance:	0.00046642	STD:	0.02159681

000450

Number Sx's	36
Weighted Mean	0.03
Std Dev	0.02
Std Dev* Std Dev	0.000
t.20 (Deg F = #Sx's - 6)	1.310
t.20*t.20	1.716
RT (Reg Threshold)	0
n (Recommend Sx's)	0.00
sx	0.00
CI (Confindence Interval)	0.04

000451

1730

pit	tclp	sample_id	parameter	validated_result	validation_qualifier	units
4	Y	063787	Heptachlor epoxide	.1	R	UG/L
4	Y	063711	Heptachlor epoxide	.25	R	UG/L
3	Y	063394	Heptachlor epoxide	.1	Z	UG/L
3	Y	063314	Heptachlor epoxide	.05	R	UG/L
2	Y	063634	Heptachlor epoxide	.05	Z	UG/L
1	Y	063113	Heptachlor epoxide	.05	Z	UG/L
1	Y	063072	Heptachlor epoxide	.1	Z	UG/L
1	Y	063072	Heptachlor epoxide	.5	Z	UG/L

000452

000082

pit	tclp	sample_id	qa_type	parameter	validated_result	validation_qualifier	units								
1	Y	063113	NORMAL	2,4-Dinitrotoluene	10	U	UG/L								
1	Y	063072	NORMAL	2,4-Dinitrotoluene	10	U	UG/L								
1	Y	063033	NORMAL	2,4-Dinitrotoluene	10	U	UG/L								
1 Count					3					Weighted		Weighted			
1 Average					10			Mass Fraction:	0.13	Average:	1.3	Variance:	0		
1 Var					0										
2	Y	063634	NORMAL	2,4-Dinitrotoluene	10	UJ	UG/L								
2	Y	063640	NORMAL	2,4-Dinitrotoluene	10	UJ	UG/L								
2 Count					2					Weighted		Weighted			
2 Average					10			Mass Fraction:	0.06	Average:	0.6	Variance:	0		
2 Var					0										
3	Y	063314	NORMAL	2,4-Dinitrotoluene	10	U	UG/L								
3	Y	063478	NORMAL	2,4-Dinitrotoluene	10	UJ	UG/L								
3	Y	063394	NORMAL	2,4-Dinitrotoluene	10	UJ	UG/L								
3 Count					3					Weighted		Weighted			
3 Average					10			Mass Fraction:	0.45	Average:	4.5	Variance:	0		
3 Var					0										
4	Y	063711	NORMAL	2,4-Dinitrotoluene	10	UJ	UG/L								
4	Y	063787	NORMAL	2,4-Dinitrotoluene	5	U	UG/L								
4	Y	063854	NORMAL	2,4-Dinitrotoluene	10	U	UG/L								
4 Count					3					Weighted		Weighted			
4 Average					8.333333333			Mass Fraction:	0.15	Average:	1.25	Variance:	1.25		
4 Var					8.333333333										
5	Y	100212		2,4-DINITROTOLUENE	10	-	UG/L								
5	Y	100211		2,4-DINITROTOLUENE	10	-	UG/L								
5	Y	100213		2,4-DINITROTOLUENE	9	-	UG/L								
5	Y	100215		2,4-DINITROTOLUENE	10	-	UG/L								
5	Y	100216DL		2,4-DINITROTOLUENE	10	-	UG/L								
5	Y	100217		2,4-DINITROTOLUENE	10	-	UG/L								
5	Y	100218		2,4-DINITROTOLUENE	10	-	UG/L								
5	Y	100219		2,4-DINITROTOLUENE	10	-	UG/L								
5	Y	100214		2,4-DINITROTOLUENE	10	-	UG/L								
5	Y	100210		2,4-DINITROTOLUENE	10	-	UG/L								
5 Count					10					Weighted		Weighted			
5 Average					9.9			Mass Fraction:	0.12	Average:	1.188	Variance:	0.012		
5 Var					0.1										
6	Y	100225		2,4-DINITROTOLUENE	5	UJ	UG/L								
6	Y	100233		2,4-DINITROTOLUENE	4.5	UJ	UG/L								
6	Y	100231		2,4-DINITROTOLUENE	5	UJ	UG/L								
6	Y	100230		2,4-DINITROTOLUENE	9	-	UG/L								
6	Y	100229		2,4-DINITROTOLUENE	5	UJ	UG/L								
6	Y	100228		2,4-DINITROTOLUENE	4.5	UJ	UG/L								
6	Y	100226		2,4-DINITROTOLUENE	4.5	UJ	UG/L								
6	Y	100232DL		2,4-DINITROTOLUENE	13	-	UG/L								
6	Y	100227		2,4-DINITROTOLUENE	5	UJ	UG/L								
6 Count					9					Weighted		Weighted			
6 Average					6.166666667			Mass Fraction:	0.02	Average:	0.12333333	Variance:	0.17125		
6 Var					6.5625										
BURN_PIT	Y	063205	NORMAL	2,4-Dinitrotoluene	50	U	UG/L								
BURN_PIT	Y	063164	NORMAL	2,4-Dinitrotoluene	10	UJ	UG/L								
BURN_PIT Count					2					Weighted		Weighted			
BURN_PIT					30			Mass Fraction:	0.06	Average:	1.8	Variance:	48		
BURN_PIT Var					800										
CLEARWELL	Y	098532		2,4-DINITROTOLUENE	12	-	UG/L								
CLEARWELL	Y	098526		2,4-DINITROTOLUENE	10	-	UG/L								
CLEARWELL	Y	098527		2,4-DINITROTOLUENE	13	-	UG/L								
CLEARWELL	Y	098528		2,4-DINITROTOLUENE	12	-	UG/L								
CLEARWELL	Y	098529		2,4-DINITROTOLUENE	12	-	UG/L								
CLEARWELL	Y	098531		2,4-DINITROTOLUENE	11	-	UG/L								
CLEARWELL	Y	098530		2,4-DINITROTOLUENE	12	-	UG/L								
CLEARWELL					7					Weighted		Weighted			
CLEARWELL					11.71428571			Mass Fraction:	0.01	Average:	0.11714286	Variance:	0.00904762		
CLEARWELL Var					0.904761905										
Grand Count					39										
Grand Average					10.29487179					Weighted		Weighted		Weighted	

000453

1730

Grand Var					48.66734143			Totals:	1	Average:	10.6784762	Variance:	49.4422976	STD:	7.03152171
													Number Sx's		39
													Weighted Mean		10.68
													Std Dev		7.03
													Std Dev^ Std Dev		49.44230
													t.20 (Deg F =#Sx's - 8)		1.310
													t.20*t.20		1.716
													RT (Reg Threshold)		130
													n (Recommend Sx's)		0.01
													sx		1.13
													CI (Confindence Interval)		12.35

000454

pit	tclp	sample_id	parameter	validated_result	validation_qualifier	units
4	Y	063854	2,4-Dinitrotoluene	20	R	UG/L
4	Y	063711	2,4-Dinitrotoluene	20	R	UG/L
3	Y	063478	2,4-Dinitrotoluene	20	R	UG/L
2	Y	063634	2,4-Dinitrotoluene	20	Z	UG/L

000455

1730

000085

Nitrobenzene U Adjusted

pit	tdp	sample_id	qa_type	parameter	validated_result	validation_qualifier	units								
1	Y	063072	NORMAL	Nitrobenzene	10	U	UG/L								
1	Y	063033	NORMAL	Nitrobenzene	10	U	UG/L								
1	Y	063113	NORMAL	Nitrobenzene	10	U	UG/L								
1 Count					3					Weighted		Weighted			
1 Average					10			Mass Fraction:	0.138297872	Average:	1.382978723	Variance:	0		
1 Var					0										
2	Y	063634	NORMAL	Nitrobenzene	10	UJ	UG/L								
2 Count					1					Weighted		Weighted			
2 Average					10			Mass Fraction:	0	Average:	0	Variance:			
2 Var					#DIV/0!										
3	Y	063394	NORMAL	Nitrobenzene	10	UJ	UG/L								
3	Y	063478	NORMAL	Nitrobenzene	10	UJ	UG/L								
3 Count					2					Weighted		Weighted			
3 Average					10			Mass Fraction:	0.478723404	Average:	4.787234043	Variance:	0		
3 Var					0										
4	Y	063787	NORMAL	Nitrobenzene	5	U	UG/L								
4	Y	063854	NORMAL	Nitrobenzene	10	U	UG/L								
4 Count					2					Weighted		Weighted			
4 Average					7.5			Mass Fraction:	0.159574468	Average:	1.196808511	Variance:	1.994680851		
4 Var					12.5										
5	Y	100214		NITROBENZENE	10	-	UG/L								
5	Y	100211		NITROBENZENE	10	-	UG/L								
5	Y	100213		NITROBENZENE	9	-	UG/L								
5	Y	100210		NITROBENZENE	10	-	UG/L								
5	Y	100215		NITROBENZENE	10	-	UG/L								
5	Y	100218		NITROBENZENE	10	-	UG/L								
5	Y	100219		NITROBENZENE	10	-	UG/L								
5	Y	100216DL		NITROBENZENE	10	-	UG/L								
5	Y	100212		NITROBENZENE	10	-	UG/L								
5	Y	100217		NITROBENZENE	10	-	UG/L								
5 Count					10					Weighted		Weighted			
5 Average					9.9			Mass Fraction:	0.127659574	Average:	1.263829787	Variance:	0.012765957		
5 Var					0.1										
6	Y	100227		NITROBENZENE	5	UJ	UG/L								
6	Y	100233		NITROBENZENE	4.5	UJ	UG/L								
6	Y	100231		NITROBENZENE	5	UJ	UG/L								
6	Y	100230		NITROBENZENE	9	-	UG/L								
6	Y	100228		NITROBENZENE	4.5	UJ	UG/L								
6	Y	100232DL		NITROBENZENE	13	-	UG/L								
6	Y	100226		NITROBENZENE	4.5	UJ	UG/L								
6	Y	100225		NITROBENZENE	5	UJ	UG/L								
6	Y	100229		NITROBENZENE	5	UJ	UG/L								
6 Count					9					Weighted		Weighted			
6 Average					6.166666667			Mass Fraction:	0.021276596	Average:	0.131205674	Variance:	0.182180851		
6 Var					8.5625										
BURN_PIT	Y	063205	NORMAL	Nitrobenzene	10	U	UG/L								
BURN_PIT	Y	063164	NORMAL	Nitrobenzene	10	UJ	UG/L								
BURN_PIT Count					2					Weighted		Weighted			
BURN_PIT					10			Mass Fraction:	0.063829787	Average:	0.638297872	Variance:	0		
BURN_PIT Var					0										
CLEARWELL	Y	090526		NITROBENZENE	10	-	UG/L								
CLEARWELL	Y	090527		NITROBENZENE	13	-	UG/L								
CLEARWELL	Y	090528		NITROBENZENE	12	-	UG/L								
CLEARWELL	Y	090529		NITROBENZENE	12	-	UG/L								
CLEARWELL	Y	090530		NITROBENZENE	12	-	UG/L								
CLEARWELL	Y	090532		NITROBENZENE	12	-	UG/L								
CLEARWELL	Y	090531		NITROBENZENE	11	-	UG/L								
CLEARWELL					7					Weighted		Weighted			
CLEARWELL					11.71428571			Mass Fraction:	0.010638298	Average:	0.124620061	Variance:	0.009625127		
CLEARWELL Var					0.904761905										
Grand Count					36										
Grand Average					9.208333333					Weighted		Weighted		Weighted	

000456

Grand Var					6.576785714			Totals:	1	Average:	9.524974671	Variance:	2.199252786	STD:	1.48298779
													Number Sx's		36
													Weighted Mean		9.52
													Std Dev		1.48
													Std Dev^ Std Dev		2.19925
													t.20 (Deg F =#Sx's - 7)		1.311
													t.20*t.20		1.719
													RT (Reg Threshold)		2000
													n (Recommend Sx's)		0.00
													sx		0.25
													CI (Confindence interval)		9.85

000457

1730

pit	tclp	sample_id	parameter	validated_result	validation_qualifier	units
4	Y	063854	Nitrobenzene	20	R	UG/L
4	Y	063711	Nitrobenzene	20	R	UG/L
4	Y	063711	Nitrobenzene	20	R	UG/L
3	Y	063478	Nitrobenzene	20	R	UG/L
3	Y	063314	Nitrobenzene	20	R	UG/L
2	Y	063634	Nitrobenzene	20	Z	UG/L
2	Y	063540	Nitrobenzene	20	R	UG/L

000458

000088

Pentachlorophenol U Adj.

pit	tclp	sample_id	qa_type	parameter	validated_result	validation_qualifier	units								
1	Y	063113	NORMAL	Pentachlorophenol	50	U	UG/L								
1	Y	063072	NORMAL	Pentachlorophenol	50	U	UG/L								
1	Y	063033	NORMAL	Pentachlorophenol	50	U	UG/L								
1 Count					3					Weighted		Weighted			
1 Average					50			Mass Fraction:	0.166666667	Average:	8.333333333	Variance:	0		
1 Var					0										
3	Y	063394	NORMAL	Pentachlorophenol	50	UJ	UG/L								
3	Y	063314	NORMAL	Pentachlorophenol	50	U	UG/L								
3 Count					2					Weighted		Weighted			
3 Average					50			Mass Fraction:	0.576923077	Average:	28.84615385	Variance:	0		
3 Var					0										
4	Y	063711	NORMAL	Pentachlorophenol	50	UJ	UG/L								
4 Count					1					Weighted		Weighted			
4 Average					50			Mass Fraction:	0	Average:	0	Variance:			
4 Var					#DIV/0!										
5	Y	100214		PENTACHLOROPHENOL	52	-	UG/L								
5	Y	100210		PENTACHLOROPHENOL	50	-	UG/L								
5	Y	100211		PENTACHLOROPHENOL	50	-	UG/L								
5	Y	100213		PENTACHLOROPHENOL	46	-	UG/L								
5	Y	100215		PENTACHLOROPHENOL	46	-	UG/L								
5	Y	100217		PENTACHLOROPHENOL	50	-	UG/L								
5	Y	100218		PENTACHLOROPHENOL	51	-	UG/L								
5	Y	100219		PENTACHLOROPHENOL	51	-	UG/L								
5	Y	100216DL		PENTACHLOROPHENOL	49	-	UG/L								
5	Y	100212		PENTACHLOROPHENOL	52	-	UG/L								
5 Count					10					Weighted		Weighted			
5 Average					49.6			Mass Fraction:	0.153846154	Average:	7.676923077	Variance:	0.528205128		
5 Var					3.433333333										
6	Y	100232DL		PENTACHLOROPHENOL	63	-	UG/L								
6	Y	100225		PENTACHLOROPHENOL	23.5	UJ	UG/L								
6	Y	100226		PENTACHLOROPHENOL	23	UJ	UG/L								
6	Y	100227		PENTACHLOROPHENOL	25	UJ	UG/L								
6	Y	100228		PENTACHLOROPHENOL	23	UJ	UG/L								
6	Y	100229		PENTACHLOROPHENOL	25	UJ	UG/L								
6	Y	100231		PENTACHLOROPHENOL	24.5	UJ	UG/L								
6	Y	100233		PENTACHLOROPHENOL	22	UJ	UG/L								
6 Count					8					Weighted		Weighted			
6 Average					28.75			Mass Fraction:	0.025641026	Average:	0.737179487	Variance:	4.952380952		
6 Var					193.1428571										
BURN_PIT	Y	063205	NORMAL	Pentachlorophenol	50	U	UG/L								
BURN_PIT	Y	063184	NORMAL	Pentachlorophenol	50	UJ	UG/L								
BURN_PIT Count					2					Weighted		Weighted			
BURN_PIT					50			Mass Fraction:	0.076923077	Average:	3.846153846	Variance:	0		
BURN_PIT Var					0										
Grand Count					26										
Grand Average					43.42307692					Weighted		Weighted		Weighted	
Grand Var					154.8338462			Totals:	1	Average:	49.43974359	Variance:	5.480586081	STD:	2.341065159
													Number Sx's		26
NOTE: INSUFFICIENT DATA FOR PITS 2, 4, AND CLEARWELL. ALL OTHER DATA NORMALIZED													Weighted Mean		49.44
													Std Dev		2.34
													Std Dev^ Std Dev		5.48059
													t.20 (Deg F =#Sx's - 5)		1.323
													t.20^t.20		1.750
													RT (Reg Threshold)		100000
													n (Recommend Sx's)		0.00
													sx		0.46
													CI (Confindence Interval)		50.05

1230

000459

000089

pit	tclp	sample_id	parameter	validated_result	validation_qualifier	units
4	Y	063854	Pentachlorophenol	100	R	UG/L
4	Y	063854	Pentachlorophenol	100	R	UG/L
4	Y	063787	Pentachlorophenol	50	R	UG/L
4	Y	063711	Pentachlorophenol	100	R	UG/L
3	Y	063478	Pentachlorophenol	100	R	UG/L
3	Y	063478	Pentachlorophenol	100	R	UG/L
2	Y	063634	Pentachlorophenol	100	R	UG/L
2	Y	063634	Pentachlorophenol	100	Z	UG/L
2	Y	063540	Pentachlorophenol	100	R	UG/L
CLEARWELL	Y	098526	PENTACHLOROPHENOL	50	R	UG/L
CLEARWELL	Y	098527	PENTACHLOROPHENOL	63	R	UG/L
CLEARWELL	Y	098528	PENTACHLOROPHENOL	62	R	UG/L
CLEARWELL	Y	098529	PENTACHLOROPHENOL	60	R	UG/L
CLEARWELL	Y	098530	PENTACHLOROPHENOL	59	R	UG/L
CLEARWELL	Y	098531	PENTACHLOROPHENOL	54	R	UG/L
CLEARWELL	Y	098532	PENTACHLOROPHENOL	59	R	UG/L
6	Y	100230	PENTACHLOROPHENOL	46	R	UG/L

000460

000090

Sample Number Calculator:													
			Th228	Th230	Th232	Ra226	Ra228	U234	U235	U238	Utot		
		N =	83	86	83	49	49	81	83	85	81		
		s =	385.09	3684.77	147.93	141.29	68.79	1804.52	822.68	7026.51	8694.04		
		x =	173.43	3113.98	77.52	125.47	78.41	814.29	154.13	3108.26	4120.22		
		RT =	NA	15000	680	2000	670	NA	NA	NA	110000	(Envirocare Limit)	
		RT - x =	NA	-11886.02	-602.48	-1874.53	-591.59	NA	NA	NA	-105879.8		
		90% CI =	3625.15	3626.15	98.45	151.77	91.22	1072.74	270.53	4090.64	5365.51	(90% Confidence)	
	Chebyshev Level =		1391.19	14766.25	545.32	572.27	295.94	6520.68	2755.67	25328.04	31613.19	(90% Confidence)	
N	F	t.20	n	n	n	n	n	n	n	n	n		
1	0												
2	1	3.078	NA	0.910511	0.571169	0.053824	0.128099	NA	NA	NA	0.063878		
3	2	1.886	NA	0.341847	0.214442	0.020208	0.048094	NA	NA	NA	0.023983		
4	3	1.638	NA	0.257855	0.161754	0.015243	0.036277	NA	NA	NA	0.01809		
5	4	1.533	NA	0.225856	0.141681	0.013351	0.031776	NA	NA	NA	0.015845		
6	5	1.476	NA	0.209373	0.131341	0.012377	0.029457	NA	NA	NA	0.014689		
7	6	1.44	NA	0.199284	0.125012	0.01178	0.028037	NA	NA	NA	0.013981		
8	7	1.415	NA	0.192425	0.120709	0.011375	0.027072	NA	NA	NA	0.0135		
9	8	1.397	NA	0.18756	0.117658	0.011087	0.026388	NA	NA	NA	0.013159		
10	9	1.393	NA	0.186488	0.116985	0.011024	0.026237	NA	NA	NA	0.013083		
11	10	1.372	NA	0.180907	0.113484	0.010694	0.025452	NA	NA	NA	0.012692		
12	11	1.363	NA	0.178542	0.112	0.010554	0.025119	NA	NA	NA	0.012526		
13	12	1.356	NA	0.176712	0.110853	0.010446	0.024862	NA	NA	NA	0.012398		
14	13	1.35	NA	0.175152	0.109874	0.010354	0.024642	NA	NA	NA	0.012288		
15	14	1.345	NA	0.173857	0.109062	0.010277	0.02446	NA	NA	NA	0.012197		
16	15	1.341	NA	0.172825	0.108414	0.010216	0.024315	NA	NA	NA	0.012125		
17	16	1.337	NA	0.171795	0.107768	0.010155	0.02417	NA	NA	NA	0.012053		
18	17	1.333	NA	0.170769	0.107124	0.010095	0.024025	NA	NA	NA	0.011981		
19	18	1.33	NA	0.170001	0.106643	0.010049	0.023917	NA	NA	NA	0.011927		
20	19	1.328	NA	0.16949	0.106322	0.010019	0.023845	NA	NA	NA	0.011891		
21	20	1.325	NA	0.168725	0.105842	0.009974	0.023738	NA	NA	NA	0.011837		

000461

1730

000091

Sample Number Calculator:											
			Cs137	Np237	Pu238	Pu239/240	Ru106	Sr90	Tc99		
		N =	90	49	82	83	90	90	90		
		s =	16.71	2.7	0.48	3.1	5.08	21.53	359.89		
		x =	4.62	5.75	0.93	1.22	4.12	5.75	244.93		
		RT =	560	2000	1000	1000	19000	20000	10000	(Reg Limit)	
		RT - x =	-555.38	-1994.25	-999.07	-998.78	-18995.9	-19994.3	-9755.07		
		90% CI =	6.89	6.25	1	1.66	4.81	8.57	293.83	(90% Confidence)	
	Chebyshev	Level =	57.46	14.29	2.45	11.02	20.18	73.83	1383.00	(90% Confidence)	
N	F	t.20	n	n	n	n	n	n	n		
1	0										
2	1	3.078	0.008576	1.74E-05	2.19E-06	9.13E-05	6.78E-07	1.1E-05	0.012895		
3	2	1.886	0.00322	6.52E-06	8.21E-07	3.43E-05	2.54E-07	4.12E-06	0.004841		
4	3	1.638	0.002429	4.92E-06	6.19E-07	2.58E-05	1.92E-07	3.11E-06	0.003652		
5	4	1.533	0.002127	4.31E-06	5.42E-07	2.26E-05	1.68E-07	2.72E-06	0.003199		
6	5	1.476	0.001972	3.99E-06	5.03E-07	2.1E-05	1.56E-07	2.53E-06	0.002965		
7	6	1.44	0.001877	3.8E-06	4.79E-07	2E-05	1.48E-07	2.4E-06	0.002822		
8	7	1.415	0.001813	3.67E-06	4.62E-07	1.93E-05	1.43E-07	2.32E-06	0.002725		
9	8	1.397	0.001767	3.58E-06	4.5E-07	1.88E-05	1.4E-07	2.26E-06	0.002656		
10	9	1.393	0.001757	3.56E-06	4.48E-07	1.87E-05	1.39E-07	2.25E-06	0.002641		
11	10	1.372	0.001704	3.45E-06	4.35E-07	1.81E-05	1.35E-07	2.18E-06	0.002562		
12	11	1.363	0.001682	3.41E-06	4.29E-07	1.79E-05	1.33E-07	2.15E-06	0.002529		
13	12	1.356	0.001665	3.37E-06	4.24E-07	1.77E-05	1.32E-07	2.13E-06	0.002503		
14	13	1.35	0.00165	3.34E-06	4.21E-07	1.76E-05	1.3E-07	2.11E-06	0.002481		
15	14	1.345	0.001638	3.32E-06	4.18E-07	1.74E-05	1.29E-07	2.1E-06	0.002462		
16	15	1.341	0.001628	3.3E-06	4.15E-07	1.73E-05	1.29E-07	2.09E-06	0.002448		
17	16	1.337	0.001618	3.28E-06	4.13E-07	1.72E-05	1.28E-07	2.07E-06	0.002433		
18	17	1.333	0.001609	3.26E-06	4.1E-07	1.71E-05	1.27E-07	2.06E-06	0.002418		
19	18	1.33	0.001601	3.24E-06	4.08E-07	1.7E-05	1.27E-07	2.05E-06	0.002408		
20	19	1.328	0.001596	3.23E-06	4.07E-07	1.7E-05	1.26E-07	2.04E-06	0.0024		
21	20	1.325	0.001589	3.22E-06	4.05E-07	1.69E-05	1.26E-07	2.04E-06	0.00239		
ncalc1.xls											

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DatePoint	Pit	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
657	1	PS-01-002	CIS	U234	429		-								
658	1	PS-01-017	CIS	U234	244		-								
659	1	PS-01-034	CIS	U234	488		-								
660	1	PS-01-049	CIS	U234	1180		-								
661	1	PS-01-060	CIS	U234	451		-								
664	1	063061	RI/FS	U234	830		J								
665	1	063071	RI/FS	U234	441		-								
666	1	063100	RI/FS	U234	423		-								
667	1	063112	RI/FS	U234	600		-								
	1 Count				9					Weighted		Weighted			
	1				565.1111111			Mass Fraction:	0.13	Average:	73.46444444	Variance:	10167.24944		
	1 Var				78209.61111										
735	2	PS-02-002	CIS	U234	18200		J								
736	2	PS-02-009	CIS	U234	564		-								
737	2	PS-02-019	CIS	U234	226		-								
738	2	PS-02-028	CIS	U234	303		-								
739	2	PS-02-040	CIS	U234	40		-								
742	2	063630	RI/FS	U234	1651		-								
743	2	063632	RI/FS	U234	260		-								
	2 Count				7					Weighted		Weighted			
	2				3033.428571			Mass Fraction:	0.06	Average:	182.0057143	Variance:	2700790.597		
	2 Var				45013176.62										
827	3	PS-03-002	CIS	U234	27		J								
828	3	PS-03-009	CIS	U234	475		J								
829	3	PS-03-030	CIS	U234	387		J								
830	3	PS-03-053	CIS	U234	156		J								
831	3	PS-03-074	CIS	U234	79		-								
832	3	PS-03-091	CIS	U234	163		-								
833	3	PS-03-111	CIS	U234	167		-								
834	3	063308	RI/FS	U234	154		F								
835	3	063310	RI/FS	U234	473		F								
838	3	063474	RI/FS	U234	946		-								
839	3	063476	RI/FS	U234	991		-								
	3 Count				11					Weighted		Weighted			
	3				365.2727273			Mass Fraction:	0.45	Average:	164.3727273	Variance:	50307.03818		
	3 Var				111793.4182										
917	4	PS-04-003	CIS	U234	366		-								
918	4	PS-04-023	CIS	U234	298		-								
919	4	PS-04-040	CIS	U234	149		-								
920	4	PS-04-063	CIS	U234	2320		J								
921	4	063709	RI/FS	U234	465		-								
926	4	063850	RI/FS	U234	4100		F								
928	4	063852	RI/FS	U234	3630		F								
	4 Count				7					Weighted		Weighted			
	4				1618.285714			Mass Fraction:	0.15	Average:	242.7428571	Variance:	437463.6357		
	4 Var				2916424.238										
1022	5	PS-05-002	CIS	U234	370		J								
1023	5	PS-05-013	CIS	U234	310		J								
1024	5	PS-05-026	CIS	U234	680		J								
1025	5	PS-05-046	CIS	U234	790		J								
1026	5	PS-05-066	CIS	U234	1250		J								
1027	5	PS-05-078	CIS	U234	430		-								
1028	5	100210	RI/FS	U234	170		J								
1029	5	100211	RI/FS	U234	410		J								
1030	5	100212	RI/FS	U234	860		J								
1031	5	100213	RI/FS	U234	670		J								
1032	5	100214	RI/FS	U234	290		J								
1033	5	100215	RI/FS	U234	860		J								
1034	5	100216	RI/FS	U234	420		J								
1035	5	100217	RI/FS	U234	680		J								
1036	5	100218	RI/FS	U234	680		J								
	5 Count				15					Weighted		Weighted			
	5				591.3333333			Mass Fraction:	0.12	Average:	70.96	Variance:	9704.342857		

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	5 Var				80869.52381										
1127	6	PS-06-009	CIS	U234	2000		J								
1128	6	PS-06-012	CIS	U234	2960		J								
1129	6	PS-06-025	CIS	U234	5330		J								
1130	6	PS-06-028	CIS	U234	3380		J								
1131	6	100225	RI/FS	U234	1030		J								
1132	6	100226	RI/FS	U234	2338		J								
1133	6	100227	RI/FS	U234	1796		J								
1134	6	100228	RI/FS	U234	1780		J								
1135	6	100229	RI/FS	U234	4064		J								
1136	6	100230	RI/FS	U234	3409		J								
1137	6	100231	RI/FS	U234	3326		J								
1138	6	100232	RI/FS	U234	1466		J								
	6 Count				12					Weighted		Weighted			
	6				2739.833333			Mass Fraction:	0.02	Average:	54.79666667	Variance:	30512.17758		
	6 Var				1526608.879										
1213	Burn	PS-07-005	CIS	U234	9.9		J								
1214	Burn	PS-07-015	CIS	U234	108		-								
1215	Burn	PS-07-027	CIS	U234	415		-								
1216	Burn	PS-07-035	CIS	U234	78		-								
1217	Burn	PS-07-063	CIS	U234	75		-								
1218	Burn	PS-07-073	CIS	U234	125		-								
1219	Burn	063160	RI/FS	U234	40.5		J								
1220	Burn	063162	RI/FS	U234	417		J								
1221	Burn	063201	RI/FS	U234	695		-								
1222	Burn	063203	RI/FS	U234	1711		-								
	Burn				10					Weighted		Weighted			
	Burn				367.44			Mass Fraction:	0.06	Average:	22.0464	Variance:	16315.16483		
	Burn Var				271919.4138										
1294	Clear	PS-08-001	CIS	U234	242		-								
1295	Clear	PS-08-003	CIS	U234	242		-								
1296	Clear	PS-08-005	CIS	U234	376		-								
1297	Clear	PS-08-008	CIS	U234	299		-								
1298	Clear	098526	RI/FS	U234	192		J								
1299	Clear	098527	RI/FS	U234	71.1		J								
1300	Clear	098528	RI/FS	U234	47.2		J								
1301	Clear	098529	RI/FS	U234	738		J								
1302	Clear	098530	RI/FS	U234	645		J								
1303	Clear	098531	RI/FS	U234	1050		J								
	Clear				10					Weighted		Weighted			
	Clear				390.23			Mass Fraction:	0.01	Average:	3.9023	Variance:	1036.029468		
	Clear				103602.9468										
	Grand				81										
	Grand				1123.341975					Weighted		Weighted		Weighted	
	Grand				4921062.283			Totals:	1	Average:	814.2911098	Variance:	3256296.235	STD:	1804.521064
													Number Sx's		81
													Weighted Mean		814.29
													Std Dev		1804.52
													Std Dev * Std Dev		3256296.235
													t.20 (Deg F = #Sx's - 8)		1.289
													t.20*t.20		1.662
													RT (Reg Threshold)		37000
													n (Recommend Sx's)		0.00
													ex		200.50
													CI (90% Confindence Interval)		1072.74
													90% Chebyshev Limit		6521

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DatePoint	Pit	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
668	1	PS-01-002	CIS	U235/236	32		-								
669	1	PS-01-017	CIS	U235/236	16		-								
670	1	PS-01-034	CIS	U235/236	30		-								
671	1	PS-01-049	CIS	U235/236	151		-								
672	1	PS-01-060	CIS	U235/236	51		-								
674	1	063032	RI/FS	U235/236	259		J								
675	1	063061	RI/FS	U235/236	47.3		J								
676	1	063071	RI/FS	U235/236	64		E								
677	1	063100	RI/FS	U235/236	19.6		-								
678	1	063112	RI/FS	U235/236	36.6		J								
	1 Count				10					Weighted		Weighted			
	1 Average				70.55			Mass Fraction:	0.13	Average:	9.1715	Variance:	763.7468944		
	1 Var				5874.976111										
744	2	PS-02-002	CIS	U235/236	8780		J								
745	2	PS-02-009	CIS	U235/236	131		-								
746	2	PS-02-019	CIS	U235/236	21		-								
747	2	PS-02-028	CIS	U235/236	31		-								
748	2	PS-02-040	CIS	U235/236	2		-								
751	2	063630	RI/FS	U235/236	130		-								
752	2	063632	RI/FS	U235/236	18.5		-								
	2 Count				7					Weighted		Weighted			
	2 Average				1301.928571			Mass Fraction:	0.06	Average:	78.11571429	Variance:	652590.8321		
	2 Var				10876513.87										
840	3	PS-03-002	CIS	U235/236	2.5		J								
841	3	PS-03-009	CIS	U235/236	21		J								
842	3	PS-03-030	CIS	U235/236	16.4		J								
843	3	PS-03-063	CIS	U235/236	7.2		J								
844	3	PS-03-074	CIS	U235/236	5.8		-								
845	3	PS-03-091	CIS	U235/236	15		-								
846	3	PS-03-111	CIS	U235/236	14		-								
847	3	063308	RI/FS	U235/236	23.6		-								
848	3	063310	RI/FS	U235/236	48.6		-								
851	3	063474	RI/FS	U235/236	89.2		-								
852	3	063476	RI/FS	U235/236	36.1		-								
	3 Count				11					Weighted		Weighted			
	3 Average				25.4			Mass Fraction:	0.45	Average:	11.43	Variance:	283.7115		
	3 Var				630.47										
927	4	PS-04-003	CIS	U235/236	84		-								
928	4	PS-04-023	CIS	U235/236	35		-								
929	4	PS-04-040	CIS	U235/236	64		-								
930	4	PS-04-063	CIS	U235/236	426		J								
931	4	063709	RI/FS	U235/236	38.9		-								
932	4	063710	RI/FS	U235/236	28.3		J								
935	4	063850	RI/FS	U235/236	934		-								
936	4	063852	RI/FS	U235/236	536		-								
	4 Count				8					Weighted		Weighted			
	4 Average				268.275			Mass Fraction:	0.15	Average:	40.24125	Variance:	16715.29918		
	4 Var				111435.3279										
1037	5	PS-05-002	CIS	U235/236	16		J								
1038	5	PS-05-013	CIS	U235/236	14		J								
1039	5	PS-05-026	CIS	U235/236	36		J								
1040	5	PS-05-046	CIS	U235/236	35		J								
1041	5	PS-05-066	CIS	U235/236	79		J								
1042	5	PS-05-078	CIS	U235/236	26		-								
1043	5	100210	RI/FS	U235/236	1.15	U	UJ								
1044	5	100211	RI/FS	U235/236	16		J								
1045	5	100212	RI/FS	U235/236	39		J								
1046	5	100213	RI/FS	U235/236	33		J								
1047	5	100214	RI/FS	U235/236	0.125	U	UJ								
1048	5	100215	RI/FS	U235/236	36		J								
1049	5	100216	RI/FS	U235/236	0.485	U	UJ								
1050	5	100217	RI/FS	U235/236	0.49	U	UJ								
1051	5	100218	RI/FS	U235/236	0.41	U	UJ								
	5 Count				15					Weighted		Weighted			
	5 Average				22.11066667			Mass Fraction:	0.12	Average:	2.65328	Variance:	56.99792437		
	5 Var				474.9827031										

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1139	6	PS-06-009	CIS	U235/236	580		J								
1140	6	PS-06-012	CIS	U235/236	350		J								
1141	6	PS-06-025	CIS	U235/236	1750		J								
1142	6	PS-06-028	CIS	U235/236	1490		J								
1143	6	100225	RI/FS	U235/236	110		J								
1144	6	100226	RI/FS	U235/236	159		J								
1145	6	100227	RI/FS	U235/236	132		J								
1146	6	100228	RI/FS	U235/236	158		J								
1147	6	100229	RI/FS	U235/236	337		J								
1148	6	100230	RI/FS	U235/236	312		J								
1149	6	100231	RI/FS	U235/236	293		J								
1150	6	100232	RI/FS	U235/236	137		J								
	6 Count				12					Weighted		Weighted			
	6 Average				484			Mass Fraction:	0.02	Average:	9.68	Variance:	6046.778182		
	6 Var				302338.9091										
1223	Burn	PS-07-005	CIS	U235/236	0.5		-								
1224	Burn	PS-07-015	CIS	U235/236	6.3		-								
1225	Burn	PS-07-027	CIS	U235/236	27		-								
1226	Burn	PS-07-035	CIS	U235/236	6		-								
1227	Burn	PS-07-063	CIS	U235/236	3.7		-								
1228	Burn	PS-07-073	CIS	U235/236	6.7		-								
1229	Burn	063160	RI/FS	U235/236	3.8		J								
1230	Burn	063162	RI/FS	U235/236	44.2		J								
1231	Burn	063201	RI/FS	U235/236	63.5		E								
1232	Burn	063203	RI/FS	U235/236	102		C								
	Burn Count				10					Weighted		Weighted			
	Burn Average				26.37			Mass Fraction:	0.06	Average:	1.5822	Variance:	68.76054		
	Burn Var				1146.009										
1304	Clear	PS-08-001	CIS	U235/236	28		-								
1305	Clear	PS-08-003	CIS	U235/236	24		-								
1306	Clear	PS-08-005	CIS	U235/236	39		-								
1307	Clear	PS-08-008	CIS	U235/236	49		-								
1308	Clear	098526	RI/FS	U235/236	11.4		J								
1309	Clear	098527	RI/FS	U235/236	4.61		J								
1310	Clear	098528	RI/FS	U235/236	2.54		J								
1311	Clear	098529	RI/FS	U235/236	373		J								
1312	Clear	098530	RI/FS	U235/236	363		J								
1313	Clear	098531	RI/FS	U235/236	363		J								
	Clear Count				10					Weighted		Weighted			
	Clear Average				125.755			Mass Fraction:	0.01	Average:	1.25755	Variance:	277.7371816		
	Clear Var				27773.71816										
	Grand Count				83										
	Grand Average				239.8254217					Weighted		Weighted		Weighted	
	Grand Var				990468.1437			Totals:	1	Average:	154.1314943	Variance:	676803.8636	STD:	822.6809002
													Number Sx's		83
													Weighted Mean		154.13
													Std Dev		822.68
													Std Dev * Std Dev		676803.864
													t.20 (Deg F = #Sx's - 8)		1.289
													t.20*t.20		1.662
													RT (Reg Threshold)		770
													n (Recommend Sx's)		2.96
													sx		90.30
													CI (90% Confindence Interval)		270.53
													90% Chebyshev Limit		2756

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U238 U Adjusted

DataPoint	Pt	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
679	1	PS-01-002	CIS	U238	485		-								
680	1	PS-01-017	CIS	U238	360		-								
681	1	PS-01-034	CIS	U238	1370		-								
682	1	PS-01-049	CIS	U238	6980		-								
683	1	PS-01-060	CIS	U238	558		-								
685	1	063032	RI/FS	U238	16160		J								
686	1	063061	RI/FS	U238	915		J								
687	1	063071	RI/FS	U238	623		C								
688	1	063100	RI/FS	U238	445		-								
689	1	063112	RI/FS	U238	1342		-								
	1 Count				10					Weighted		Weighted			
	1				2923.8			Mass Fraction:	0.13	Average:	380.094	Variance:	3324495.31		
	1 Var				25573040.84										
753	2	PS-02-002	CIS	U238	17900		J								
754	2	PS-02-009	CIS	U238	4280		-								
755	2	PS-02-019	CIS	U238	1070		-								
756	2	PS-02-028	CIS	U238	317		-								
757	2	PS-02-040	CIS	U238	60		-								
760	2	063630	RI/FS	U238	1861		-								
761	2	063632	RI/FS	U238	279		-								
	2 Count				7					Weighted		Weighted			
	2				3681			Mass Fraction:	0.06	Average:	220.86	Variance:	2486702.24		
	2 Var				41445037.33										
853	3	PS-03-002	CIS	U238	134		J								
854	3	PS-03-009	CIS	U238	521		J								
855	3	PS-03-030	CIS	U238	403		J								
856	3	PS-03-053	CIS	U238	156		J								
857	3	PS-03-074	CIS	U238	215		-								
858	3	PS-03-091	CIS	U238	285		-								
859	3	PS-03-111	CIS	U238	1380		-								
860	3	063308	RI/FS	U238	663		-								
861	3	063310	RI/FS	U238	1740		-								
862	3	063390	RI/FS	U238	785		J								
863	3	063392	RI/FS	U238	881		J								
864	3	063474	RI/FS	U238	880		-								
876	3	063476	RI/FS	U238	922		-								
	3 Count				13					Weighted		Weighted			
	3				689.6153846			Mass Fraction:	0.45	Average:	310.3269231	Variance:	105361.0904		
	3 Var				234135.7564										
937	4	PS-04-003	CIS	U238	737		-								
938	4	PS-04-023	CIS	U238	509		-								
939	4	PS-04-040	CIS	U238	1530		-								
940	4	PS-04-063	CIS	U238	15800		J								
941	4	063709	RI/FS	U238	660		-								
942	4	063710	RI/FS	U238	441		J								
945	4	063850	RI/FS	U238	41900		-								
946	4	063852	RI/FS	U238	33100		C								
	4 Count				8					Weighted		Weighted			
	4				11834.625			Mass Fraction:	0.15	Average:	1775.19375	Variance:	42517852.28		
	4 Var				283452348.6										
1052	5	PS-05-002	CIS	U238	410		J								
1053	5	PS-05-013	CIS	U238	460		J								
1054	5	PS-05-026	CIS	U238	630		J								
1055	5	PS-05-046	CIS	U238	730		J								
1056	5	PS-05-066	CIS	U238	1230		J								
1057	5	PS-05-078	CIS	U238	387		-								
1058	5	100210	RI/FS	U238	220		J								
1059	5	100211	RI/FS	U238	500		J								
1060	5	100212	RI/FS	U238	880		J								
1061	5	100213	RI/FS	U238	710		J								
1062	5	100214	RI/FS	U238	282		J								
1063	5	100215	RI/FS	U238	960		J								
1064	5	100216	RI/FS	U238	410		J								

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1065	5	100217	RI/FS	U238	650		J								
1066	5	100218	RI/FS	U238	680		J								
	5 Count				15					Weighted		Weighted			
	5				609.2666667			Mass Fraction:	0.12	Average:	73.112	Variance:	8872.328		
	5 Var				73936.06667										
1151	6	PS-06-009	CIS	U238	12500		J								
1152	6	PS-06-012	CIS	U238	18000		J								
1153	6	PS-06-025	CIS	U238	18700		J								
1154	6	PS-06-028	CIS	U238	18700		J								
1155	6	100225	RI/FS	U238	6863		J								
1156	6	100226	RI/FS	U238	13095		J								
1157	6	100227	RI/FS	U238	10400		J								
1158	6	100228	RI/FS	U238	9001		J								
1159	6	100229	RI/FS	U238	28746		J								
1160	6	100230	RI/FS	U238	24350		J								
1161	6	100231	RI/FS	U238	19563		J								
1162	6	100232	RI/FS	U238	8886		J								
	6 Count				12					Weighted		Weighted			
	6				15733.66667			Mass Fraction:	0.02	Average:	314.6733333	Variance:	904973.7721		
	6 Var				45248688.61										
1233	Burn	PS-07-005	CIS	U238	22		J								
1234	Burn	PS-07-015	CIS	U238	139		-								
1235	Burn	PS-07-027	CIS	U238	454		-								
1236	Burn	PS-07-035	CIS	U238	209		-								
1237	Burn	PS-07-063	CIS	U238	90		-								
1238	Burn	PS-07-073	CIS	U238	138		-								
1239	Burn	063160	RI/FS	U238	122		J								
1240	Burn	063162	RI/FS	U238	539		J								
1241	Burn	063201	RI/FS	U238	731		C								
1242	Burn	063203	RI/FS	U238	1996		-								
	Burn				10					Weighted		Weighted			
	Burn				444			Mass Fraction:	0.06	Average:	26.64	Variance:	20994.45333		
	Burn Var				349907.5556										
1314	Clear	PS-08-001	CIS	U238	634		-								
1315	Clear	PS-08-003	CIS	U238	634		-								
1316	Clear	PS-08-005	CIS	U238	548		-								
1317	Clear	PS-08-008	CIS	U238	670		-								
1318	Clear	096526	RI/FS	U238	357		J								
1319	Clear	096527	RI/FS	U238	176		J								
1320	Clear	096528	RI/FS	U238	137		J								
1321	Clear	096529	RI/FS	U238	1640		J								
1322	Clear	096530	RI/FS	U238	1320		J								
1323	Clear	096531	RI/FS	U238	1240		J								
	Clear				10					Weighted		Weighted			
	Clear				735.6			Mass Fraction:	0.01	Average:	7.356	Variance:	2643.151556		
	Clear				254315.1556										
	Grand				85										
	Grand				4333.952941					Weighted		Weighted		Weighted	
	Grand				67428072.19			Totals:	1	Average:	3108.256006	Variance:	49371794.63	STD:	7026.506574

Number Sx's	85
Weighted Mean	3108.26
Std Dev	7026.51
Std Dev * Std Dev	49371794.628
t.20 (Deg F = #Sx's - 8)	1.289
t.20*t.20	1.662
RT (Reg Threshold)	28000
n (Recommend Sx's)	0.13
ex	762.13
CI (90% Confindence Interval)	4090.64
90% Chebyshev Limit	26328

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DatePoint	Pit	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
624	1	PS-01-002	CIS	Th228	16		-								
625	1	PS-01-017	CIS	Th228	52		-								
626	1	PS-01-034	CIS	Th228	8.6		-								
627	1	PS-01-049	CIS	Th228	18		-								
628	1	PS-01-060	CIS	Th228	6.1		-								
631	1	063061	RI/FS	Th228	355	U	UD								
632	1	063071	RI/FS	Th228	131		-								
633	1	063100	RI/FS	Th228	306	U	U								
634	1	063112	RI/FS	Th228	395	U	DU								
	1 Count				9					Weighted		Weighted			
	1 Average				142.9666667			Mass Fraction:	0.13	Average:	18.58566667	Variance:	3439.73435		
	1 Var				26459.495										
708	2	PS-02-002	CIS	Th228	73		-								
709	2	PS-02-009	CIS	Th228	164		-								
710	2	PS-02-019	CIS	Th228	11		-								
711	2	PS-02-028	CIS	Th228	37		-								
712	2	PS-02-040	CIS	Th228	28		J								
715	2	063630	RI/FS	Th228	616		-								
716	2	063632	RI/FS	Th228	697		-								
	2 Count				7					Weighted		Weighted			
	2 Average				232.2857143			Mass Fraction:	0.06	Average:	13.93714286	Variance:	5220.674286		
	2 Var				87011.2381										
788	3	PS-03-002	CIS	Th228	1		J								
789	3	PS-03-009	CIS	Th228	13		J								
790	3	PS-03-030	CIS	Th228	40		J								
791	3	PS-03-053	CIS	Th228	1.4		J								
792	3	PS-03-074	CIS	Th228	7.2		J								
793	3	PS-03-091	CIS	Th228	14		J								
794	3	PS-03-111	CIS	Th228	5.9		J								
795	3	063308	RI/FS	Th228	1.48		J								
796	3	063310	RI/FS	Th228	1.85	U	DU								
798	3	063392	RI/FS	Th228	554		-								
799	3	063474	RI/FS	Th228	410	U	U								
800	3	063476	RI/FS	Th228	427		-								
	3 Count				12					Weighted		Weighted			
	3 Average				123.0691667			Mass Fraction:	0.45	Average:	55.381125	Variance:	19540.34941		
	3 Var				43422.99868										
887	4	PS-04-003	CIS	Th228	22		-								
888	4	PS-04-023	CIS	Th228	18		-								
889	4	PS-04-040	CIS	Th228	24		J								
890	4	PS-04-063	CIS	Th228	395		-								
893	4	063782	RI/FS	Th228	2469		J								
894	4	063785	RI/FS	Th228	1248		J								
895	4	063850	RI/FS	Th228	56		-								
896	4	063852	RI/FS	Th228	26.8		-								
	4 Count				8					Weighted		Weighted			
	4 Average				532.35			Mass Fraction:	0.15	Average:	79.8525	Variance:	118876.2013		
	4 Var				792508.0086										
977	5	PS-05-002	CIS	Th228	31		J								
978	5	PS-05-013	CIS	Th228	35		J								
979	5	PS-05-026	CIS	Th228	3.8		J								
980	5	PS-05-046	CIS	Th228	44		J								
981	5	PS-05-066	CIS	Th228	32		J								
982	5	PS-05-078	CIS	Th228	41		-								
983	5	100210	RI/FS	Th228	0.48		J								
984	5	100211	RI/FS	Th228	0.92		J								
985	5	100212	RI/FS	Th228	20		J								
986	5	100213	RI/FS	Th228	6.8		J								
987	5	100214	RI/FS	Th228	28		J								
988	5	100215	RI/FS	Th228	3.3		J								
989	5	100216	RI/FS	Th228	1.5		J								
990	5	100217	RI/FS	Th228	38		J								
991	5	100218	RI/FS	Th228	2		J								
	5 Count				15					Weighted		Weighted			
	5 Average				19.18666667			Mass Fraction:	0.12	Average:	2.3024	Variance:	34.38834971		
	5 Var				286.569581										

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1091	6	PS-06-009	CIS	Th228	0.4		J								
1092	6	PS-06-012	CIS	Th228	0.2		J								
1093	6	PS-06-025	CIS	Th228	0.2		J								
1094	6	PS-06-028	CIS	Th228	1.2		J								
1095	6	100225	RI/FS	Th228	0.7		J								
1096	6	100226	RI/FS	Th228	1.2		J								
1097	6	100227	RI/FS	Th228	1.3		J								
1098	6	100228	RI/FS	Th228	0.9		J								
1099	6	100229	RI/FS	Th228	1.4		J								
1100	6	100230	RI/FS	Th228	1.7		J								
1101	6	100231	RI/FS	Th228	1.6		J								
1102	6	100232	RI/FS	Th228	1.1		J								
	6 Count				12					Weighted		Weighted			
	6 Average				0.991666667			Mass Fraction:	0.02	Average:	0.019833333	Variance:	0.005325758		
	6 Var				0.266287879										
1183	Burn	PS-07-005	CIS	Th228	1.5		-								
1184	Burn	PS-07-015	CIS	Th228	1.8		-								
1185	Burn	PS-07-027	CIS	Th228	9.6		-								
1186	Burn	PS-07-035	CIS	Th228	19		J								
1187	Burn	PS-07-063	CIS	Th228	6		-								
1188	Burn	PS-07-073	CIS	Th228	7.9		-								
1189	Burn	063160	RI/FS	Th228	1.96		J								
1190	Burn	063162	RI/FS	Th228	4.71		J								
1191	Burn	063201	RI/FS	Th228	12.4		-								
1192	Burn	063203	RI/FS	Th228	450	U	DU								
	Burn Count				10					Weighted		Weighted			
	Burn Average				51.487			Mass Fraction:	0.06	Average:	3.08922	Variance:	1178.184893		
	Burn Var				19636.41489										
1264	Clear	PS-08-001	CIS	Th228	56		-								
1266	Clear	PS-08-003	CIS	Th228	20		-								
1266	Clear	PS-08-005	CIS	Th228	30		J								
1267	Clear	PS-08-008	CIS	Th228	41		-								
1268	Clear	098526	RI/FS	Th228	28.1		J								
1269	Clear	098527	RI/FS	Th228	17.7		J								
1270	Clear	098528	RI/FS	Th228	6.06		J								
1271	Clear	098529	RI/FS	Th228	26.3		J								
1272	Clear	098530	RI/FS	Th228	25.7		J								
1273	Clear	098531	RI/FS	Th228	14.6		J								
	Clear Count				10					Weighted		Weighted			
	Clear Average				26.535			Mass Fraction:	0.01	Average:	0.26535	Variance:	1.975411389		
	Clear Var				197.5411389										
	Grand Count				83										
	Grand Average				117.2078313					Weighted		Weighted		Weighted	
	Grand Var				107937.8775			Totals:	1	Average:	173.4332379	Variance:	148291.5133	STD:	385.0863712

Number Sx's	83
Weighted Mean	173.43
Std Dev	385.09
Std Dev * Std Dev	148291.513
t.20 (Deg F = #Sx's - 8)	1.289
t.20*t.20	1.662
RT (Reg Threshold)	NA
n (Recommend Sx's)	#VALUE!
sx	42.27
CI (90% Confindence Interval)	227.92
90% Chebyshev Limit	1391

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DataPoint	Pit	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
635	1	PS-01-002	CIS	Th230	1990		-								
636	1	PS-01-017	CIS	Th230	3600		-								
637	1	PS-01-034	CIS	Th230	1240		-								
638	1	PS-01-049	CIS	Th230	326		-								
639	1	PS-01-060	CIS	Th230	376		-								
642	1	063061	RI/FS	Th230	5460		-								
643	1	063071	RI/FS	Th230	4220		-								
644	1	063100	RI/FS	Th230	5270		-								
645	1	063112	RI/FS	Th230	245	U	DU								
	1 Count				9					Weighted		Weighted			
	1 Average				2524.111111			Mass Fraction:	0.13	Average:	328.1344444	Variance:	597648.1044		
	1 Var				4597293.111										
717	2	PS-02-002	CIS	Th230	3980		-								
718	2	PS-02-009	CIS	Th230	163		-								
719	2	PS-02-019	CIS	Th230	41		-								
720	2	PS-02-028	CIS	Th230	2040		-								
721	2	PS-02-040	CIS	Th230	950		J								
724	2	063630	RI/FS	Th230	18400		-								
725	2	063632	RI/FS	Th230	2630		-								
	2 Count				7					Weighted		Weighted			
	2 Average				4029.142857			Mass Fraction:	0.06	Average:	241.7485714	Variance:	2527717.049		
	2 Var				42128617.48										
801	3	PS-03-002	CIS	Th230	15		J								
802	3	PS-03-009	CIS	Th230	11680		J								
803	3	PS-03-030	CIS	Th230	10660		J								
804	3	PS-03-053	CIS	Th230	83		J								
805	3	PS-03-074	CIS	Th230	4040		-								
806	3	PS-03-091	CIS	Th230	72		J								
807	3	PS-03-111	CIS	Th230	5900		-								
808	3	063308	RI/FS	Th230	3.28		J								
809	3	063310	RI/FS	Th230	3.81		-								
810	3	063390	RI/FS	Th230	11370		J								
811	3	063392	RI/FS	Th230	7652		J								
812	3	063474	RI/FS	Th230	5770		J								
813	3	063476	RI/FS	Th230	4780		-								
	3 Count				13					Weighted		Weighted			
	3 Average				4771.468462			Mass Fraction:	0.45	Average:	2147.160808	Variance:	9345126.774		
	3 Var				20766948.39										
897	4	PS-04-003	CIS	Th230	566		-								
898	4	PS-04-023	CIS	Th230	553		-								
899	4	PS-04-040	CIS	Th230	369		J								
900	4	PS-04-063	CIS	Th230	226		-								
901	4	063709	RI/FS	Th230	768		-								
902	4	063710	RI/FS	Th230	1717		J								
903	4	063782	RI/FS	Th230	1815		J								
904	4	063785	RI/FS	Th230	683		J								
905	4	063850	RI/FS	Th230	240		-								
906	4	063852	RI/FS	Th230	783		-								
	4 Count				10					Weighted		Weighted			
	4 Average				771.9			Mass Fraction:	0.15	Average:	115.785	Variance:	47066.18167		
	4 Var				313774.5444										
992	5	PS-05-002	CIS	Th230	6430		J								
993	5	PS-05-013	CIS	Th230	8480		J								
994	5	PS-05-026	CIS	Th230	330		J								
995	5	PS-05-046	CIS	Th230	3450		J								
996	5	PS-05-066	CIS	Th230	5080		J								
997	5	PS-05-078	CIS	Th230	3080		-								
998	5	100210	RI/FS	Th230	190		J								
999	5	100211	RI/FS	Th230	92		J								
1000	5	100212	RI/FS	Th230	2600		J								
1001	5	100213	RI/FS	Th230	190		J								
1002	5	100214	RI/FS	Th230	140		J								
1003	5	100215	RI/FS	Th230	120		J								

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1004	5	100216	RI/FS	Th230	11		J							
1005	5	100217	RI/FS	Th230	95		J							
1006	5	100218	RI/FS	Th230	9.8		J							
	5 Count				15					Weighted		Weighted		
	5 Average				2019.853333			Mass Fraction:	0.12	Average:	242.3824	Variance:	910682.5176	
	5 Var				7589020.98									
1103	6	PS-06-009	CIS	Th230	14		J							
1104	6	PS-06-012	CIS	Th230	25		J							
1105	6	PS-06-025	CIS	Th230	44		J							
1106	6	PS-06-028	CIS	Th230	41		J							
1107	6	100225	RI/FS	Th230	4.9		J							
1108	6	100226	RI/FS	Th230	35		J							
1109	6	100227	RI/FS	Th230	4.6		J							
1110	6	100228	RI/FS	Th230	35		J							
1111	6	100229	RI/FS	Th230	39		J							
1112	6	100230	RI/FS	Th230	62		J							
1113	6	100231	RI/FS	Th230	52		J							
1114	6	100232	RI/FS	Th230	26		J							
	6 Count				12					Weighted		Weighted		
	6 Average				31.875			Mass Fraction:	0.02	Average:	0.6375	Variance:	6.33815	
	6 Var				316.9075									
1193	Burn	PS-07-005	CIS	Th230	5.7		-							
1194	Burn	PS-07-015	CIS	Th230	12		-							
1195	Burn	PS-07-027	CIS	Th230	26		-							
1196	Burn	PS-07-035	CIS	Th230	218		J							
1197	Burn	PS-07-063	CIS	Th230	30		-							
1198	Burn	PS-07-073	CIS	Th230	70		-							
1199	Burn	063160	RI/FS	Th230	5.32		J							
1200	Burn	063162	RI/FS	Th230	90		J							
1201	Burn	063201	RI/FS	Th230	107		-							
1202	Burn	063203	RI/FS	Th230	4530		-							
	Burn Count				10					Weighted		Weighted		
	Burn				509.402			Mass Fraction:	0.06	Average:	30.56412	Variance:	119998.3321	
	Burn Var				1999972.202									
1274	Clear	PS-08-001	CIS	Th230	578		-							
1275	Clear	PS-08-003	CIS	Th230	430		-							
1276	Clear	PS-08-005	CIS	Th230	5600		J							
1277	Clear	PS-08-008	CIS	Th230	105		-							
1278	Clear	098526	RI/FS	Th230	78.6		J							
1279	Clear	098527	RI/FS	Th230	79.5		J							
1280	Clear	098528	RI/FS	Th230	70		J							
1281	Clear	098529	RI/FS	Th230	314		J							
1282	Clear	098530	RI/FS	Th230	249		J							
1283	Clear	098531	RI/FS	Th230	63		J							
	Clear Count				10					Weighted		Weighted		
	Clear				756.71			Mass Fraction:	0.01	Average:	7.5671	Variance:	29273.19219	
	Clear Var				2927319.219									
	Grand				86									Weighted
	Grand				1907.098963					Weighted		Weighted		
	Grand Var				10845001.89			Totals:	1	Average:	3113.979944	Variance:	13577518.49	STD: 3684.768444

Number Sx's	86
Weighted Mean	3113.98
Std Dev	3684.77
Std Dev* Std Dev	13577518.489
t.20 (Deg F = #Sx's - 8)	1.289
t.20*t.20	1.662
RT (Reg Threshold)	15000
n (Recommend Sx's)	0.16
sx	397.34
CI (90% Confindence Interval)	3626.15
90% Chebyshev Limit	14766

000472

000102

DataPoint	Plt	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
646	1	PS-01-002	CIS	Th232	17		-								
647	1	PS-01-017	CIS	Th232	55		-								
648	1	PS-01-034	CIS	Th232	7.7		-								
649	1	PS-01-049	CIS	Th232	17		-								
650	1	PS-01-060	CIS	Th232	11.4		-								
653	1	063061	RI/FS	Th232	150	U	UD								
654	1	063071	RI/FS	Th232	131		-								
655	1	063100	RI/FS	Th232	210	U	U								
656	1	063112	RI/FS	Th232	245	U	DU								
	1 Count				9					Weighted		Weighted			
	1				93.78888889			Mass Fraction:	0.13	Average:	12.192556	Variance:	1111.679544		
	1 Var				8551.381111										
726	2	PS-02-002	CIS	Th232	88		-								
727	2	PS-02-009	CIS	Th232	43		-								
728	2	PS-02-019	CIS	Th232	11		-								
729	2	PS-02-028	CIS	Th232	38		-								
730	2	PS-02-040	CIS	Th232	33		J								
733	2	063630	RI/FS	Th232	170	U	DU								
734	2	063632	RI/FS	Th232	268		-								
	2 Count				7					Weighted		Weighted			
	2				93			Mass Fraction:	0.06	Average:	5.58	Variance:	524.28		
	2 Var				8738										
814	3	PS-03-002	CIS	Th232	1		J								
815	3	PS-03-009	CIS	Th232	23		J								
816	3	PS-03-030	CIS	Th232	59		J								
817	3	PS-03-053	CIS	Th232	1.4		J								
818	3	PS-03-074	CIS	Th232	6.9		-								
819	3	PS-03-091	CIS	Th232	9.5		J								
820	3	PS-03-111	CIS	Th232	9.4		-								
821	3	063308	RI/FS	Th232	1.2		-								
822	3	063310	RI/FS	Th232	0.75	U	DU								
824	3	063392	RI/FS	Th232	396		-								
825	3	063474	RI/FS	Th232	180	U	U								
826	3	063476	RI/FS	Th232	272		-								
	3 Count				12					Weighted		Weighted			
	3				80.0125			Mass Fraction:	0.45	Average:	36.005625	Variance:	7797.975571		
	3 Var				17328.8346										
907	4	PS-04-003	CIS	Th232	17		-								
908	4	PS-04-023	CIS	Th232	18		-								
909	4	PS-04-040	CIS	Th232	21		J								
910	4	PS-04-063	CIS	Th232	92		-								
913	4	063782	RI/FS	Th232	838		J								
914	4	063785	RI/FS	Th232	48.7		J								
915	4	063850	RI/FS	Th232	28		-								
916	4	063852	RI/FS	Th232	23.4		-								
	4 Count				8					Weighted		Weighted			
	4				135.7625			Mass Fraction:	0.15	Average:	20.364375	Variance:	12171.71997		
	4 Var				81144.79982										
1007	5	PS-05-002	CIS	Th232	26		J								
1008	5	PS-05-013	CIS	Th232	43		J								
1009	5	PS-05-026	CIS	Th232	3.8		J								
1010	5	PS-05-046	CIS	Th232	55		J								
1011	5	PS-05-066	CIS	Th232	34		J								
1012	5	PS-05-078	CIS	Th232	21		-								
1013	5	100210	RI/FS	Th232	0.34		J								
1014	5	100211	RI/FS	Th232	0.36		J								
1015	5	100212	RI/FS	Th232	10		J								
1016	5	100213	RI/FS	Th232	1.4		J								
1017	5	100214	RI/FS	Th232	3		J								
1018	5	100215	RI/FS	Th232	0.6		J								
1019	5	100216	RI/FS	Th232	0.04	U	UJ								

000423

1730

1020	5	100217	RI/FS	Th232	6.9		J								
1021	5	100218	RI/FS	Th232	0.125	U	UJ								
	5 Count				15					Weighted		Weighted			
	5				13.70433333			Mass Fraction:	0.12	Average:	1.64452	Variance:	38.60143837		
	5 Var				321.6786531										
1115	6	PS-06-009	CIS	Th232	0.4		J								
1116	6	PS-06-012	CIS	Th232	0.2		J								
1117	6	PS-06-025	CIS	Th232	0.2		J								
1118	6	PS-06-028	CIS	Th232	1.2		J								
1119	6	100225	RI/FS	Th232	0.4		J								
1120	6	100226	RI/FS	Th232	0.4		J								
1121	6	100227	RI/FS	Th232	0.6		J								
1122	6	100228	RI/FS	Th232	0.2		J								
1123	6	100229	RI/FS	Th232	0.4		J								
1124	6	100230	RI/FS	Th232	1		J								
1125	6	100231	RI/FS	Th232	0.6		J								
1126	6	100232	RI/FS	Th232	0.6		J								
	6 Count				12					Weighted		Weighted			
	6				0.516666667			Mass Fraction:	0.02	Average:	0.0103333	Variance:	0.001957576		
	6 Var				0.097878788										
1203	Burn	PS-07-005	CIS	Th232	1.1		-								
1204	Burn	PS-07-015	CIS	Th232	1.5		-								
1205	Burn	PS-07-027	CIS	Th232	7.7		-								
1206	Burn	PS-07-035	CIS	Th232	21		J								
1207	Burn	PS-07-063	CIS	Th232	6.5		-								
1208	Burn	PS-07-073	CIS	Th232	5.3		-								
1209	Burn	063160	RI/FS	Th232	1.67		J								
1210	Burn	063162	RI/FS	Th232	5.14		J								
1211	Burn	063201	RI/FS	Th232	14.4		-								
1212	Burn	063203	RI/FS	Th232	205	U	DU								
	Burn				10					Weighted		Weighted			
	Burn				26.931			Mass Fraction:	0.06	Average:	1.61586	Variance:	237.2191393		
	Burn Var				3953.652321										
1284	Clear	PS-08-001	CIS	Th232	20		-								
1285	Clear	PS-08-003	CIS	Th232	15		-								
1286	Clear	PS-08-005	CIS	Th232	39		J								
1287	Clear	PS-08-008	CIS	Th232	2.8		-								
1288	Clear	098526	RI/FS	Th232	4.24		J								
1289	Clear	098527	RI/FS	Th232	2.72		J								
1290	Clear	098528	RI/FS	Th232	3.69		J								
1291	Clear	098529	RI/FS	Th232	9.69		J								
1292	Clear	098530	RI/FS	Th232	8.19		J								
1293	Clear	098531	RI/FS	Th232	3.18		J								
	Clear				10					Weighted		Weighted			
	Clear				10.851			Mass Fraction:	0.01	Average:	0.10851	Variance:	1.318305211		
	Clear Var				131.8305211										
	Grand				83										
	Grand				49.7703012					Weighted		Weighted		Weighted	
	Grand				13297.34501			Totals:	1	Average:	77.521779	Variance:	21882.79593	STD:	147.9283473

Number Sx's	83
Weighted Mean	77.52
Std Dev	147.93
Std Dev * Std Dev	21882.796
t.20 (Deg F = #Sx's - 8)	1.289
t.20*t.20	1.662
RT (Reg Threshold)	680
n (Recommend Sx's)	0.10
ex	16.24
CI (90% Confindence Interval)	98.45
90% Chebyshev Limit	545

000474

000104

DatePoint	Pit	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
607	1	063017	RI/FS	Ra226	20.9		J								
608	1	063032	RI/FS	Ra226	0.65	U	UJD								
609	1	063061	RI/FS	Ra226	99.6		J								
610	1	063071	RI/FS	Ra226	76.9		-								
611	1	063100	RI/FS	Ra226	92.3		J								
612	1	063112	RI/FS	Ra226	13.4		J								
	1 Count				6					Weighted		Weighted			
	1				50.625			Mass Fraction:	0.13	Average:	6.58125	Variance:	249.4052275		
	1 Var				1918.50175										
695	2	063536	RI/FS	Ra226	329		J								
696	2	063538	RI/FS	Ra226	306		J								
697	2	063630	RI/FS	Ra226	951		J								
698	2	063632	RI/FS	Ra226	161		J								
	2 Count				4					Weighted		Weighted			
	2				436.75			Mass Fraction:	0.06	Average:	26.205	Variance:	7383.936		
	2 Var				123065.5833										
769	3	063308	RI/FS	Ra226	1.41		J								
770	3	063310	RI/FS	Ra226	37		-								
771	3	063390	RI/FS	Ra226	451		J								
772	3	063392	RI/FS	Ra226	226		J								
773	3	063474	RI/FS	Ra226	208		J								
774	3	063476	RI/FS	Ra226	109		J								
	3 Count				6					Weighted		Weighted			
	3				172.0683333			Mass Fraction:	0.45	Average:	77.43075	Variance:	12001.31281		
	3 Var				26669.58402										
870	4	063709	RI/FS	Ra226	18.8		-								
871	4	063710	RI/FS	Ra226	16.9		J								
872	4	063782	RI/FS	Ra226	2.05	U	UJD								
873	4	063785	RI/FS	Ra226	30.2		J								
874	4	063850	RI/FS	Ra226	22.6		J								
875	4	063852	RI/FS	Ra226	50.1		J								
	4 Count				6					Weighted		Weighted			
	4				23.44166667			Mass Fraction:	0.15	Average:	3.51625	Variance:	38.3697625		
	4 Var				255.7984167										
953	5	100210	RI/FS	Ra226	26		J								
954	5	100211	RI/FS	Ra226	81		J								
955	5	100212	RI/FS	Ra226	150		J								
956	5	100213	RI/FS	Ra226	110		J								
957	5	100214	RI/FS	Ra226	39		J								
958	5	100215	RI/FS	Ra226	150		J								
959	5	100216	RI/FS	Ra226	79		J								
960	5	100217	RI/FS	Ra226	70		J								
961	5	100218	RI/FS	Ra226	48		J								
	5 Count				9					Weighted		Weighted			
	5				83.66666667			Mass Fraction:	0.12	Average:	10.04	Variance:	244.53		
	5 Var				2037.75										
1071	6	100225	RI/FS	Ra226	3.2		J								
1072	6	100226	RI/FS	Ra226	2.9		J								
1073	6	100227	RI/FS	Ra226	4.6		J								
1074	6	100228	RI/FS	Ra226	3.4		J								
1075	6	100229	RI/FS	Ra226	4.1		J								
1076	6	100230	RI/FS	Ra226	4.4		J								
1077	6	100231	RI/FS	Ra226	4.9		J								
1078	6	100232	RI/FS	Ra226	3.7		J								
	6 Count				8					Weighted		Weighted			
	6				3.9			Mass Fraction:	0.02	Average:	0.078	Variance:	0.010171429		
	6 Var				0.508571429										
1169	Burn	063160	RI/FS	Ra226	2.18		J								
1170	Burn	063162	RI/FS	Ra226	8.31		J								
1171	Burn	063201	RI/FS	Ra226	8.95		J								
1172	Burn	063203	RI/FS	Ra226	39.2		-								

004045

1730

Ra226 U Adjusted

	Burn				4					Weighted		Weighted			
	Burn				14.66			Mass Fraction:	0.06	Average:	0.8796	Variance:	16.617772		
	Burn Var				276.9628667										
1248	Clear	098526	RI/FS	Ra226	76		J								
1249	Clear	098527	RI/FS	Ra226	64		J								
1250	Clear	098528	RI/FS	Ra226	10		J								
1251	Clear	098529	RI/FS	Ra226	78		J								
1252	Clear	098530	RI/FS	Ra226	170		J								
1253	Clear	098531	RI/FS	Ra226	43		J								
	Clear				6					Weighted		Weighted			
	Clear				73.5			Mass Fraction:	0.01	Average:	0.735	Variance:	28.783		
	Clear Var				2878.3										
	Grand				49										
	Grand				91.99285714					Weighted		Weighted		Weighted	
	Grand				24708.12691			Totals:	1	Average:	125.46585	Variance:	19962.96374	STD:	141.2903526
													Number Sx's		49
													Weighted Mean		125.47
													Std Dev		141.29
													Std Dev* Std Dev		19962.964
													t.20 (Deg F = #Sx's - 8)		1.303
													t.20*t.20		1.698
													RT (Reg Threshold)		2000
													n (Recommend Sx's)		0.01
													sx		20.18
													CI (90% Confindence Interval)		151.77
													90% Chebyshev Limit		572

000476

000106

Ra228 U Adjusted

DatePoint	Pit	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
618	1	063017	RI/FS	Ra228	6.5		J								
619	1	063032	RI/FS	Ra228	1.4	U	UJD								
620	1	063061	RI/FS	Ra228	41		J								
621	1	063071	RI/FS	Ra228	37.2		-								
622	1	063100	RI/FS	Ra228	31.2		J								
623	1	063112	RI/FS	Ra228	4.02		J								
	1 Count				6					Weighted		Weighted			
	1				20.22			Mass Fraction:	0.13	Average:	2.6286	Variance:	42.78456		
	1 Var				329.112										
704	2	063536	RI/FS	Ra228	82		J								
705	2	063538	RI/FS	Ra228	119		J								
706	2	063630	RI/FS	Ra228	437		J								
707	2	063632	RI/FS	Ra228	71		J								
	2 Count				4					Weighted		Weighted			
	2				177.25			Mass Fraction:	0.06	Average:	10.635	Variance:	1824.495		
	2 Var				30408.25										
782	3	063308	RI/FS	Ra228	1.5		J								
783	3	063310	RI/FS	Ra228	142		-								
784	3	063390	RI/FS	Ra228	118		J								
785	3	063392	RI/FS	Ra228	241		J								
786	3	063474	RI/FS	Ra228	119		J								
787	3	063476	RI/FS	Ra228	119		J								
	3 Count				6					Weighted		Weighted			
	3				123.4166667			Mass Fraction:	0.45	Average:	55.5375	Variance:	2619.28875		
	3 Var				5820.641667										
881	4	063709	RI/FS	Ra228	19.2		-								
882	4	063710	RI/FS	Ra228	18.4		J								
883	4	063782	RI/FS	Ra228	14.1		J								
884	4	063785	RI/FS	Ra228	97.7		J								
885	4	063850	RI/FS	Ra228	44.8		J								
886	4	063852	RI/FS	Ra228	31.1		J								
	4 Count				6					Weighted		Weighted			
	4				37.55			Mass Fraction:	0.15	Average:	5.6325	Variance:	148.96605		
	4 Var				993.107										
968	5	100210	RI/FS	Ra228	1.45	U	UJ								
969	5	100211	RI/FS	Ra228	8.5		J								
970	5	100212	RI/FS	Ra228	14		J								
971	5	100213	RI/FS	Ra228	24		J								
972	5	100214	RI/FS	Ra228	11		J								
973	5	100215	RI/FS	Ra228	20		J								
974	5	100216	RI/FS	Ra228	39		J								
975	5	100217	RI/FS	Ra228	32		J								
976	5	100218	RI/FS	Ra228	24		J								
	5 Count				9					Weighted		Weighted			
	5				19.32777778			Mass Fraction:	0.12	Average:	2.31933333	Variance:	16.8942833		
	5 Var				140.7856944										
1083	6	100225	RI/FS	Ra228	13		J								
1084	6	100226	RI/FS	Ra228	83		J								
1085	6	100227	RI/FS	Ra228	8	U	J								
1086	6	100228	RI/FS	Ra228	191		J								
1087	6	100229	RI/FS	Ra228	79		J								
1088	6	100230	RI/FS	Ra228	26		J								
1089	6	100231	RI/FS	Ra228	15		J								
1090	6	100232	RI/FS	Ra228	19		J								
	6 Count				8					Weighted		Weighted			
	6				54.25			Mass Fraction:	0.02	Average:	1.085	Variance:	78.7471429		
	6 Var				3937.357143										
1179	Burn	063160	RI/FS	Ra228	1.92		J								
1180	Burn	063162	RI/FS	Ra228	5.07		J								
1181	Burn	063201	RI/FS	Ra228	10.4		-								
1182	Burn	063203	RI/FS	Ra228	9.19		-								

000427

1730

Ra228 U Adjusted

	Burn				4					Weighted		Weighted			
	Burn				6.645			Mass Fraction:	0.06	Average:	0.3987	Variance:	0.907666		
	Burn Var				15.12776667										
1258	Clear	098526	RI/FS	Ra228	25		J								
1259	Clear	098527	RI/FS	Ra228	14.1		J								
1260	Clear	098528	RI/FS	Ra228	6.59		J								
1261	Clear	098529	RI/FS	Ra228	26.4		J								
1262	Clear	098530	RI/FS	Ra228	21.4		J								
1263	Clear	098531	RI/FS	Ra228	12.7		J								
	Clear				6					Weighted		Weighted			
	Clear				17.69833333			Mass Fraction:	0.01	Average:	0.17698333	Variance:	0.60812417		
	Clear				60.81241667										
	Grand				49										
	Grand				51.7722449					Weighted		Weighted		Weighted	
	Grand				5866.13243			Totals:	1	Average:	78.4136167	Variance:	4732.69158	STD:	68.7945607
													Number Sx's		49
													Weighted Mean		78.41
													Std Dev		68.79
													Std Dev* Std Dev		4732.692
													t.20 (Deg F = #Sx's - 8)		1.303
													t.20*t.20		1.698
													RT (Reg Threshold)		670
													n (Recommend Sx's)		0.02
													sx		9.83
													CI (90% Confindence Interva		91.22
													90% Chebyshev Limit		296

000478

000108

1730

DataPoint	Pt	Sy Number	Source	Analyte	Activity (pCi/g)	LQ	VQ							
62	1	063017	RI/FS	Cs137	0.25	U	UJD							
63	1	063032	RI/FS	Cs137	0.4	U	UJD							
64	1	063061	RI/FS	Cs137	0.1	U	UJ							
65	1	063071	RI/FS	Cs137	0.15	U	DJ							
66	1	063100	RI/FS	Cs137	0.1	U	UJ							
67	1	063112	RI/FS	Cs137	0.1	U	UJ							
57	1	PS-01-002	CIS	Cs137	0.25	U	UJ							
58	1	PS-01-017	CIS	Cs137	0.2	U	UJ							
59	1	PS-01-034	CIS	Cs137	0.1	U	U							
60	1	PS-01-049	CIS	Cs137	0.5	U	UJ							
61	1	PS-01-060	CIS	Cs137	1.1		-							
	1 Count				11					Weighted		Weighted		
	1				0.295454545			Mass Fraction:	0.13	Average:	0.038408091	Variance:	0.011534545	
	1 Var				0.088727273									
120	2	063526	RI/FS	Cs137	0.5	U	DJ							
121	2	063528	RI/FS	Cs137	0.25	U	UDJ							
122	2	063630	RI/FS	Cs137	0.05	U	UJD							
123	2	063632	RI/FS	Cs137	0.15	U	UJ							
115	2	PS-02-002	CIS	Cs137	1	U	UJ							
116	2	PS-02-009	CIS	Cs137	3.6		-							
117	2	PS-02-019	CIS	Cs137	0.1	U	U							
118	2	PS-02-028	CIS	Cs137	0.35	U	UJ							
119	2	PS-02-040	CIS	Cs137	0.7		-							
	2 Count				9					Weighted		Weighted		
	2				0.811111111			Mass Fraction:	0.06	Average:	0.048666667	Variance:	0.070841667	
	2 Var				1.177361111									
197	3	063308	RI/FS	Cs137	0.1	U	UJ							
198	3	063310	RI/FS	Cs137	0.25	U	DU							
199	3	063390	RI/FS	Cs137	0.6	U	UJD							
200	3	063392	RI/FS	Cs137	0.25	U	UJD							
201	3	063474	RI/FS	Cs137	0.15	U	UJD							
202	3	063476	RI/FS	Cs137	0.2	U	UJ							
180	3	PS-03-002	CIS	Cs137	0.35	U	UJ							
181	3	PS-03-009	CIS	Cs137	2	U	UJ							
182	3	PS-03-030	CIS	Cs137	5	U	J							
183	3	PS-03-053	CIS	Cs137	1	U	J							
184	3	PS-03-074	CIS	Cs137	0.3	U	UJ							
185	3	PS-03-081	CIS	Cs137	0.1	U	U							
186	3	PS-03-111	CIS	Cs137	0.4	U	UJ							
	3 Count				13					Weighted		Weighted		
	3				0.9			Mass Fraction:	0.45	Average:	0.405	Variance:	0.952875	
	3 Var				2.1175									
257	4	063709	RI/FS	Cs137	0.1	U	U							
258	4	063710	RI/FS	Cs137	0.1	U	UJ							
259	4	063782	RI/FS	Cs137	1.25	U	UJD							
260	4	063785	RI/FS	Cs137	0.05	U	UJD							
261	4	063850	RI/FS	Cs137	0.6	U	UJD							
262	4	063852	RI/FS	Cs137	0.3	U	UJD							
253	4	PS-04-003	CIS	Cs137	0.1	U	U							
254	4	PS-04-023	CIS	Cs137	0.15	U	UJ							
255	4	PS-04-040	CIS	Cs137	0.25	U	UJ							
256	4	PS-04-063	CIS	Cs137	0.1	U	U							
	4 Count				10					Weighted		Weighted		
	4				0.36			Mass Fraction:	0.15	Average:	0.054	Variance:	0.021066667	
	4 Var				0.140444444									
345	5	100210	RI/FS	Cs137	15		J							
246	5	100211	RI/FS	Cs137	56		J							
247	5	100212	RI/FS	Cs137	36		J							
248	5	100213	RI/FS	Cs137	78		J							
349	5	100214	RI/FS	Cs137	2.8		J							
350	5	100215	RI/FS	Cs137	8		J							
351	5	100216	RI/FS	Cs137	4.1		J							
352	5	100217	RI/FS	Cs137	5		J							
353	5	100218	RI/FS	Cs137	4		J							
339	5	PS-05-002	CIS	Cs137	76		J							
340	5	PS-05-013	CIS	Cs137	61		J							
341	5	PS-05-026	CIS	Cs137	3	U	UJ							
342	5	PS-05-046	CIS	Cs137	2	U	UJ							
343	5	PS-05-066	CIS	Cs137	3.5	U	UJ							
344	5	PS-05-078	CIS	Cs137	1	U	UJ							
	5 Count				15					Weighted		Weighted		
	5				23.69333333			Mass Fraction:	0.12	Average:	2.8432	Variance:	102.6281943	
	5 Var				855.2249524									
418	6	100225	RI/FS	Cs137	0.9		J							
419	6	100226	RI/FS	Cs137	0.8		J							
420	6	100227	RI/FS	Cs137	1.6		J							
421	6	100228	RI/FS	Cs137	7.9		J							
422	6	100229	RI/FS	Cs137	14		J							
423	6	100230	RI/FS	Cs137	10		J							
424	6	100231	RI/FS	Cs137	12.3		J							
425	6	100232	RI/FS	Cs137	10.5		J							
414	6	PS-06-009	CIS	Cs137	2	U	UJ							
415	6	PS-06-012	CIS	Cs137	20		J							
416	6	PS-06-025	CIS	Cs137	31		J							
417	6	PS-06-028	CIS	Cs137	15		J							
	6 Count				12					Weighted		Weighted		
	6				10.475			Mass Fraction:	0.02	Average:	0.2095	Variance:	1.820477273	
	6 Var				81.02288364									
482	Burn	063160	RI/FS	Cs137	0.1	U	UJ							
483	Burn	063162	RI/FS	Cs137	0.1	U	UJ							
484	Burn	063201	RI/FS	Cs137	0.1	U	U							
485	Burn	063203	RI/FS	Cs137	0.1	U	U							
476	Burn	PS-07-005	CIS	Cs137	0.1	U	U							
477	Burn	PS-07-015	CIS	Cs137	0.3	U	UJ							
478	Burn	PS-07-027	CIS	Cs137	0.1	U	U							
479	Burn	PS-07-035	CIS	Cs137	0.15	U	UJ							
480	Burn	PS-07-063	CIS	Cs137	0.1	U	U							
481	Burn	PS-07-073	CIS	Cs137	0.15	U	UJ							
	Burn				10					Weighted		Weighted		
	Burn				0.13			Mass Fraction:	0.06	Average:	0.0078	Variance:	0.00024	
	Burn Var				0.004									
540	Clear	098526	RI/FS	Cs137	48		J							
541	Clear	098527	RI/FS	Cs137	40		J							
542	Clear	098528	RI/FS	Cs137	9.16		J							
543	Clear	098529	RI/FS	Cs137	98.7		J							
544	Clear	098530	RI/FS	Cs137	71.41		J							
545	Clear	098531	RI/FS	Cs137	18.1		J							
536	Clear	PS-08-001	CIS	Cs137	140		-							
537	Clear	PS-08-003	CIS	Cs137	18		-							
538	Clear	PS-08-005	CIS	Cs137	450		-							
539	Clear	PS-08-008	CIS	Cs137	150		-							
	Clear				10					Weighted		Weighted		
	Clear				101.127			Mass Fraction:	0.01	Average:	1.01127	Variance:	173.8998511	
	Clear				17288.98511									
	Grand				90									
	Grand				16.88466667					Weighted		Weighted		Weighted

000479

Cs137 U Adjusted

DatePoint	Pit	Bx Number	Source	Analyte	Activity In Ci/kg	LQ	VQ								
	Grand				2874.014371			Totals:	1	Average:	4.617946758	Variance:	279.1948806	STD:	16.70912587
													Number Bx's		90
													Weighted Mean		4.62
													Std Dev		16.71
													Std Dev² Std Dev		279.194
													t.20 (Des F = #Bx's - 8)		1.299
													t.20*t.20		1.662
													RT (Rec Threshold)		560
													n (Recommend Bx's)		0.00
													sx		1.76
													CI (Confidence Interval)		6.83

000480

000110

1730

DataPoint	Pt	Sa Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
546	1	PS-01-002	CIS	Np237	0.05	U	UJ								
547	1	PS-01-017	CIS	Np237	0.05	U	UJ								
548	1	PS-01-034	CIS	Np237	0.05	U	UJ								
549	1	PS-01-049	CIS	Np237	0.19	U	U								
550	1	PS-01-060	CIS	Np237	0.05	U	UJ								
	1 Count				5					Weighted		Weighted			
	1				0.07			Mass Fraction:	0.13	Average:	0.026	Variance:	0.013		
	1 Var				0.002										
551	2	PS-02-002	CIS	Np237	0.2	U	UJ								
552	2	PS-02-009	CIS	Np237	0.1	U	UJ								
553	2	PS-02-018	CIS	Np237	0.15	U	U								
554	2	PS-02-026	CIS	Np237	0.05	U	UJ								
555	2	PS-02-040	CIS	Np237	0.05	U	UJ								
	2 Count				5					Weighted		Weighted			
	2				0.11			Mass Fraction:	0.05	Average:	0.009	Variance:	0.046		
	2 Var				0.00425										
556	3	PS-03-002	CIS	Np237	0.15	U	UJ								
557	3	PS-03-009	CIS	Np237	0.8		-								
558	3	PS-03-030	CIS	Np237	2.1		-								
559	3	PS-03-052	CIS	Np237	0.15	U	U								
560	3	PS-03-074	CIS	Np237	0.3		-								
561	3	PS-03-091	CIS	Np237	0.1	U	UJ								
562	3	PS-03-111	CIS	Np237	0.1	U	UJ								
	3 Count				7					Weighted		Weighted			
	3				0.528571429			Mass Fraction:	0.45	Average:	0.0225	Variance:	0.0675		
	3 Var				0.541547619										
563	4	PS-04-003	CIS	Np237	0.05	U	UJ								
564	4	PS-04-023	CIS	Np237	0.15	U	U								
565	4	PS-04-040	CIS	Np237	0.1	U	UJ								
566	4	PS-04-063	CIS	Np237	0.4		-								
	4 Count				4					Weighted		Weighted			
	4				0.175			Mass Fraction:	0.15	Average:	4.95	Variance:	6.9		
	4 Var				0.024166667										
577	5	100214	RI/FS	Np237	33		J								
578	5	100215	RI/FS	Np237	46		J								
567	5	PS-05-002	CIS	Np237	4.1		-								
568	5	PS-05-013	CIS	Np237	0.15	U	U								
569	5	PS-05-020	CIS	Np237	19		-								
570	5	PS-05-046	CIS	Np237	17		-								
571	5	PS-05-066	CIS	Np237	9.3		-								
572	5	PS-05-078	CIS	Np237	2.2		-								
	5 Count				8					Weighted		Weighted			
	5				16.34375			Mass Fraction:	0.12	Average:	0.18	Variance:	0.108		
	5 Var				260.8881696										
562	6	PS-06-009	CIS	Np237	1.5		-								
563	6	PS-06-012	CIS	Np237	0.9		-								
564	6	PS-06-024	CIS	Np237	3.6		-								
565	6	PS-06-026	CIS	Np237	2.1		-								
	6 Count				4					Weighted		Weighted			
	6				2.025			Mass Fraction:	0.02	Average:	0.001	Variance:	0.005		
	6 Var				1.3425										
586	Burn	PS-07-005	CIS	Np237	0.05	U	UJ								
587	Burn	PS-07-015	CIS	Np237	0.25	U	UJ								
588	Burn	PS-07-027	CIS	Np237	0.1	U	UJ								
589	Burn	PS-07-035	CIS	Np237	0.6		-								
590	Burn	PS-07-063	CIS	Np237	0.1	U	UJ								
591	Burn	PS-07-073	CIS	Np237	0.5		-								
	Burn				6					Weighted		Weighted			
	Burn				0.200000667			Mass Fraction:	0.06	Average:	0.072	Variance:	0.108		
	Burn Var				0.063000667										
596	Clear	098526	RI/FS	Np237	1.2		J								
597	Clear	098527	RI/FS	Np237	1.8		J								
598	Clear	098528	RI/FS	Np237	0.03		UJ								
599	Clear	098529	RI/FS	Np237	1.2		J								
600	Clear	098530	RI/FS	Np237	1.8		J								
601	Clear	098531	RI/FS	Np237	0.44		UJ								
592	Clear	PS-08-001	CIS	Np237	1.1		-								
593	Clear	PS-08-003	CIS	Np237	0.15	U	U								
594	Clear	PS-08-005	CIS	Np237	0.7		-								
595	Clear	PS-08-008	CIS	Np237	2.2		-								
	Clear				10					Weighted		Weighted			
	Clear				1.062			Mass Fraction:	0.01	Average:	0.49	Variance:	0.031912245		
	Clear				0.537617778										
	Grand				49										
	Grand				3.19122449					Weighted		Weighted		Weighted	
	Grand				73.09047347			Totals:	1	Average:	5.7505	Variance:	7.281412245	STD:	2.698408206

Number Sa's	49
Weighted Mean	5.75
Std Dev	2.70
Std Dev * Std Dev	7.281
t.20 (Deg F = #Sa's - 8)	1.303
t.20*t.20	1.698
RT (Reg Threshold)	2000
n (Recommend Sa's)	0.00
ax	0.39
CI (Confindence Interval)	6.25

000481

000111

DataPoint	PH	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
7	1	062017	RIFS	Pu238	0.3	U	DU								
8	1	062032	RIFS	Pu238	0.3	U	U								
9	1	062061	RIFS	Pu238	0.3	U	U								
11	1	062100	RIFS	Pu238	0.3	U	U								
12	1	062112	RIFS	Pu238	0.3	U	U								
2	1	PS-01-002	CIS	Pu238	0.05	U	UJ								
3	1	PS-01-017	CIS	Pu238	0.05	U	UJ								
4	1	PS-01-034	CIS	Pu238	0.05	U	UJ								
5	1	PS-01-049	CIS	Pu238	0.05	U	UJ								
6	1	PS-01-060	CIS	Pu238	0.05	U	UJ								
	1 Count				10						Weighted		Weighted		
	1				0.195			Mass Fraction		0.13	Average:	0.029	Variance:	0.029	
	1 Var				0.020916667										
73	2	062526	RIFS	Pu238	0.3	U	UJ								
74	2	062528	RIFS	Pu238	0.3	U	U								
75	2	062630	RIFS	Pu238	0.3	U	U								
76	2	062632	RIFS	Pu238	0.3	U	U								
68	2	PS-02-002	CIS	Pu238	0.1		J								
69	2	PS-02-009	CIS	Pu238	0.1		J								
70	2	PS-02-019	CIS	Pu238	0.05	U	UJ								
71	2	PS-02-028	CIS	Pu238	0.05	U	UJ								
72	2	PS-02-040	CIS	Pu238	0.05	U	UJ								
	2 Count				9						Weighted		Weighted		
	2				0.172222222			Mass Fraction		0.09	Average:	0.018	Variance:	0.018	
	2 Var				0.015000444										
121	3	062208	RIFS	Pu238	0.3	U	U								
122	3	062210	RIFS	Pu238	0.3	U	UJ								
124	3	062392	RIFS	Pu238	0.88		J								
125	3	062474	RIFS	Pu238	0.3	U	U								
126	3	062476	RIFS	Pu238	0.3	U	U								
124	3	PS-03-002	CIS	Pu238	0.04	U	UJ								
125	3	PS-03-009	CIS	Pu238	0.14		-								
126	3	PS-03-030	CIS	Pu238	1		-								
127	3	PS-03-053	CIS	Pu238	0.3		-								
128	3	PS-03-074	CIS	Pu238	0.05	U	UJ								
129	3	PS-03-081	CIS	Pu238	0.05	U	UJ								
130	3	PS-03-111	CIS	Pu238	0.05	U	UJ								
	3 Count				12						Weighted		Weighted		
	3				0.3175			Mass Fraction		0.45	Average:	0.0225	Variance:	0.0225	
	3 Var				0.111666909										
203	4	PS-04-003	CIS	Pu238	0.05	U	UJ								
204	4	PS-04-023	CIS	Pu238	0.05	U	UJ								
205	4	PS-04-040	CIS	Pu238	0.5		J								
206	4	PS-04-063	CIS	Pu238	0.4	U	J								
	4 Count				4						Weighted		Weighted		
	4				0.25			Mass Fraction		0.15	Average:	0.00375	Variance:	0.045	
	4 Var				0.055										
270	5	100210	RIFS	Pu238	0.025	U	UJ								
271	5	100211	RIFS	Pu238	0.3		J								
272	5	100212	RIFS	Pu238	0.01	U	UJ								
273	5	100213	RIFS	Pu238	0.02		UJ								
274	5	100214	RIFS	Pu238	0.0095		UJ								
275	5	100215	RIFS	Pu238	0.015		UJ								
276	5	100216	RIFS	Pu238	0.02	U	UJ								
277	5	100217	RIFS	Pu238	0.04		J								
278	5	100218	RIFS	Pu238	0.04		J								
204	5	PS-05-002	CIS	Pu238	0.4		-								
205	5	PS-05-013	CIS	Pu238	0.4		-								
206	5	PS-05-026	CIS	Pu238	4.4		-								
207	5	PS-05-046	CIS	Pu238	4.2		-								
208	5	PS-05-066	CIS	Pu238	2.4		-								
209	5	PS-05-078	CIS	Pu238	0.05	U	UJ								
	5 Count				15						Weighted		Weighted		
	5				0.8293			Mass Fraction		0.12	Average:	0.0049	Variance:	0.064	
	5 Var				2.407997315										
358	6	100225	RIFS	Pu238	0.04		UJ								
359	6	100226	RIFS	Pu238	0.7		J								
360	6	100227	RIFS	Pu238	0.1		J								
361	6	100228	RIFS	Pu238	0.5		J								
362	6	100229	RIFS	Pu238	0.9		J								
363	6	100230	RIFS	Pu238	0.7		J								
364	6	100231	RIFS	Pu238	1		J								
365	6	100232	RIFS	Pu238	0.295		UJ								
354	6	PS-06-009	CIS	Pu238	0.7		-								
355	6	PS-06-012	CIS	Pu238	0.4		-								
356	6	PS-06-025	CIS	Pu238	0.6		-								
357	6	PS-06-028	CIS	Pu238	1.4		-								
	6 Count				12						Weighted		Weighted		
	6				0.60875			Mass Fraction		0.02	Average:	0.006	Variance:	0.006	
	6 Var				0.149526932										
432	Burn	062160	RIFS	Pu238	0.3	U	U								
433	Burn	062162	RIFS	Pu238	0.3	U	U								
434	Burn	062201	RIFS	Pu238	0.3	U	U								
435	Burn	062203	RIFS	Pu238	0.3	U	U								
426	Burn	PS-07-005	CIS	Pu238	0.05	U	UJ								
427	Burn	PS-07-015	CIS	Pu238	0.05	U	UJ								
428	Burn	PS-07-027	CIS	Pu238	0.5		J								
429	Burn	PS-07-035	CIS	Pu238	0.05	U	UJ								
430	Burn	PS-07-063	CIS	Pu238	0.05	U	UJ								
431	Burn	PS-07-073	CIS	Pu238	0.05	U	UJ								
	Burn				10						Weighted		Weighted		
	Burn				0.195			Mass Fraction		0.09	Average:	0.0138	Variance:	0.0102	
	Burn Var				0.020916667										
490	Clear	096526	RIFS	Pu238	0.23		J								
491	Clear	096527	RIFS	Pu238	0.17		J								
492	Clear	096528	RIFS	Pu238	0.18		J								
493	Clear	096529	RIFS	Pu238	0.49		J								
494	Clear	096530	RIFS	Pu238	0.37		J								
495	Clear	096531	RIFS	Pu238	0.04		U								
486	Clear	PS-08-001	CIS	Pu238	0.05	U	UJ								
487	Clear	PS-08-003	CIS	Pu238	0.05	U	UJ								
488	Clear	PS-08-005	CIS	Pu238	0.05	U	UJ								
489	Clear	PS-08-008	CIS	Pu238	0.05	U	UJ								
	Clear				10						Weighted		Weighted		
	Clear				0.168			Mass Fraction		0.01	Average:	0.02	Variance:	0.00286296	
	Clear Var				0.024906667										
	Grand				82										
	Grand				0.386396241						Weighted		Weighted		Weighted
	Grand				0.52921569			Totals:		1	Average:	0.92785	Variance:	0.22856396	STD: 0.47809364
														Number Sx's	82
														Weighted Mean	0.93
														Std Dev	0.48
														Std Dev* Std Dev	0.229
														t.20 (Dos F = #Sx's - 8)	1.289
														t.20*t.20	1.662

000482

1730

DatePoint	PH	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ							
													RT (Rss Threshold)	1000
													n (Recommend 5x's)	0.00
													sx	0.05
													CI (Confidence Interval)	1.00

000483

DataPoint	PB	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
18	1	063017	RI/FS	Pu239/240	0.5	U	DU								
19	1	063032	RI/FS	Pu239/240	0.3	U	U								
20	1	063061	RI/FS	Pu239/240	0.3	U	U								
21	1	063071	RI/FS	Pu239/240	0.3	U	U								
22	1	063100	RI/FS	Pu239/240	0.3	U	U								
23	1	063112	RI/FS	Pu239/240	0.3	U	U								
12	1	PS-01-002	CIS	Pu239/240	0.05	U	UJ								
14	1	PS-01-017	CIS	Pu239/240	0.05	U	UJ								
15	1	PS-01-034	CIS	Pu239/240	0.05	U	UJ								
16	1	PS-01-048	CIS	Pu239/240	0.05	U	UJ								
17	1	PS-01-060	CIS	Pu239/240	0.05	U	UJ								
	1 Count				11					Weighted		Weighted			
	1				0.204545455			Mass Fraction:	0.13	Average:	0.026590909	Variance:	0.003278545		
	1 Var				0.025227273										
84	2	063536	RI/FS	Pu239/240	0.3	U	UJ								
85	2	063538	RI/FS	Pu239/240	0.3	U	U								
86	2	063630	RI/FS	Pu239/240	0.3	U	U								
87	2	063632	RI/FS	Pu239/240	0.3	U	U								
79	2	PS-02-002	CIS	Pu239/240	0.6		-								
80	2	PS-02-009	CIS	Pu239/240	0.05		J								
81	2	PS-02-019	CIS	Pu239/240	0.05	U	UJ								
82	2	PS-02-026	CIS	Pu239/240	0.05	U	UJ								
83	2	PS-02-040	CIS	Pu239/240	0.05	U	UJ								
	2 Count				9					Weighted		Weighted			
	2				0.222222222			Mass Fraction:	0.06	Average:	0.013333333	Variance:	0.002141667		
	2 Var				0.035694444										
144	3	063308	RI/FS	Pu239/240	0.3	U	U								
145	3	063310	RI/FS	Pu239/240	0.3	U	UJ								
147	3	063382	RI/FS	Pu239/240	1.59		J								
146	3	063474	RI/FS	Pu239/240	0.3	U	U								
149	3	063476	RI/FS	Pu239/240	1.38		-								
137	3	PS-03-002	CIS	Pu239/240	0.025	U	UJ								
138	3	PS-03-009	CIS	Pu239/240	0.3		J								
139	3	PS-03-030	CIS	Pu239/240	14		J								
140	3	PS-03-053	CIS	Pu239/240	0.2		J								
141	3	PS-03-074	CIS	Pu239/240	0.05	U	UJ								
142	3	PS-03-091	CIS	Pu239/240	0.15	U	UJ								
143	3	PS-03-111	CIS	Pu239/240	0.05	U	UJ								
	3 Count				12					Weighted		Weighted			
	3				1.562083333			Mass Fraction:	0.45	Average:	0.7029375	Variance:	7.021201619		
	3 Var				15.60267027										
213	4	PS-04-003	CIS	Pu239/240	0.05	U	UJ								
214	4	PS-04-023	CIS	Pu239/240	0.1	U	UJ								
215	4	PS-04-040	CIS	Pu239/240	0.4		J								
216	4	PS-04-063	CIS	Pu239/240	0.05	U	UJ								
	4 Count				4					Weighted		Weighted			
	4				0.15			Mass Fraction:	0.15	Average:	0.0225	Variance:	0.00425		
	4 Var				0.028333333										
285	5	100210	RI/FS	Pu239/240	0.016	U	UJ								
286	5	100211	RI/FS	Pu239/240	2.72		J								
287	5	100212	RI/FS	Pu239/240	0.0035		UJ								
288	5	100213	RI/FS	Pu239/240	0.01		UJ								
289	5	100214	RI/FS	Pu239/240	0.065		UJ								
290	5	100215	RI/FS	Pu239/240	0.07		J								
291	5	100216	RI/FS	Pu239/240	0.09		J								
292	5	100217	RI/FS	Pu239/240	0.16		J								
293	5	100218	RI/FS	Pu239/240	0.3		J								
278	5	PS-05-002	CIS	Pu239/240	0.9		J								
280	5	PS-05-013	CIS	Pu239/240	0.4		J								
281	5	PS-05-026	CIS	Pu239/240	11		J								
282	5	PS-05-046	CIS	Pu239/240	4.8		J								
283	5	PS-05-066	CIS	Pu239/240	13		J								
284	5	PS-05-078	CIS	Pu239/240	0.05	U	UJ								
	5 Count				15					Weighted		Weighted			
	5				2.305666667			Mass Fraction:	0.12	Average:	0.276068	Variance:	2.127852835		
	5 Var				17.73210666										
370	6	100225	RI/FS	Pu239/240	0.6		J								
371	6	100226	RI/FS	Pu239/240	10		J								
372	6	100227	RI/FS	Pu239/240	0.7		J								
373	6	100228	RI/FS	Pu239/240	8.1		J								
374	6	100229	RI/FS	Pu239/240	11		J								
375	6	100230	RI/FS	Pu239/240	13		J								
376	6	100231	RI/FS	Pu239/240	14		J								
377	6	100232	RI/FS	Pu239/240	4.7		J								
386	6	PS-06-009	CIS	Pu239/240	6.3		J								
387	6	PS-06-012	CIS	Pu239/240	4		J								
388	6	PS-06-025	CIS	Pu239/240	9.5		J								
389	6	PS-06-028	CIS	Pu239/240	15		J								
	6 Count				12					Weighted		Weighted			
	6				8.075			Mass Fraction:	0.02	Average:	0.1615	Variance:	0.478222727		
	6 Var				23.81113636										
442	Burn	063160	RI/FS	Pu239/240	0.3	U	U								
443	Burn	063162	RI/FS	Pu239/240	0.3	U	U								
444	Burn	063201	RI/FS	Pu239/240	0.3	U	U								
445	Burn	063203	RI/FS	Pu239/240	0.3	U	U								
436	Burn	PS-07-005	CIS	Pu239/240	0.05	U	UJ								
437	Burn	PS-07-015	CIS	Pu239/240	0.05	U	UJ								
438	Burn	PS-07-027	CIS	Pu239/240	0.05	U	UJ								
439	Burn	PS-07-035	CIS	Pu239/240	0.05	U	UJ								
440	Burn	PS-07-063	CIS	Pu239/240	0.05	U	UJ								
441	Burn	PS-07-073	CIS	Pu239/240	0.4		J								
	Burn				10					Weighted		Weighted			
	Burn				0.185			Mass Fraction:	0.06	Average:	0.0111	Variance:	0.001268333		
	Burn Var				0.021138889										
500	Clear	098526	RI/FS	Pu239/240	0.38		J								
501	Clear	098527	RI/FS	Pu239/240	0.15		J								
502	Clear	098528	RI/FS	Pu239/240	0.035		UJ								
503	Clear	098529	RI/FS	Pu239/240	0.37		J								
504	Clear	098530	RI/FS	Pu239/240	0.54		J								
505	Clear	098531	RI/FS	Pu239/240	0.2		J								
496	Clear	PS-08-001	CIS	Pu239/240	0.05	U	UJ								
497	Clear	PS-08-003	CIS	Pu239/240	0.05	U	UJ								
498	Clear	PS-08-005	CIS	Pu239/240	0.05	U	UJ								
499	Clear	PS-08-008	CIS	Pu239/240	0.05	U	UJ								
	Clear				10					Weighted		Weighted			
	Clear				0.1875			Mass Fraction:	0.01	Average:	0.001875	Variance:	0.000327847		
	Clear				0.032784722										
	Grand				82										
	Grand				1.813295181					Weighted		Weighted		Weighted	
	Grand				15.62867733			Totals:	1	Average:	1.218504742	Variance:	9.638544574	STD:	3.10460065
													Number Sx's		82
													Weighted Mean		1.22
													Std Dev		3.10
													Std Dev² Std Dev		9.639
													1.20 (Deg F = (Sx's - 8)		1.269

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DataPoint	Pk	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ							
													t.20*s.20	1.062
													RT (Rss Threshold)	1000
													n (Recommend 8x's)	0.00
													sx	0.34
													CI (Confidence interval)	1.06

000485

DataPoint	PS	Sa Number	Source	Analyte	Activity in Ci/g	LQ	VQ								
51	1	063017	RI/FS	Tc99	0.45	U	UJ								
52	1	063032	RI/FS	Tc99	0.45	U	U								
53	1	063061	RI/FS	Tc99	1.1		J								
54	1	063071	RI/FS	Tc99	0.45	U	U								
55	1	063100	RI/FS	Tc99	0.45	U	U								
56	1	063112	RI/FS	Tc99	0.45	U	U								
46	1	PS-01-002	CIS	Tc99	0.5	U	UJ								
47	1	PS-01-017	CIS	Tc99	0.5	U	UJ								
48	1	PS-01-034	CIS	Tc99	1	U	UJ								
49	1	PS-01-049	CIS	Tc99	15		-								
50	1	PS-01-080	CIS	Tc99	1	U	UJ								
	1 Count				11						Weighted		Weighted		
	1				1.840909091			Mass Fraction:	0.12	Average:	0.252318182	Variance:	2.447893182		
	1 Var				18.62849669										
111	2	063536	RI/FS	Tc99	0.45	U	U								
112	2	063538	RI/FS	Tc99	0.45	U	UJ								
113	2	063630	RI/FS	Tc99	0.45	U	U								
114	2	063632	RI/FS	Tc99	1.64		-								
106	2	PS-02-002	CIS	Tc99	818		-								
107	2	PS-02-009	CIS	Tc99	11		-								
108	2	PS-02-019	CIS	Tc99	14		-								
109	2	PS-02-026	CIS	Tc99	0.5	U	UJ								
110	2	PS-02-040	CIS	Tc99	1	U	UJ								
	2 Count				8						Weighted		Weighted		
	2				71.84333333			Mass Fraction:	0.08	Average:	4.3106	Variance:	2517.472187		
	2 Var				41967.86876										
184	3	063308	RI/FS	Tc99	1.39		-								
185	3	063310	RI/FS	Tc99	1.75		-								
186	3	063390	RI/FS	Tc99	33		J								
187	3	063392	RI/FS	Tc99	10		J								
188	3	063474	RI/FS	Tc99	19.4		-								
189	3	063476	RI/FS	Tc99	19.8		-								
177	3	PS-03-002	CIS	Tc99	0.6	U	UJ								
178	3	PS-03-009	CIS	Tc99	132		-								
179	3	PS-03-020	CIS	Tc99	1110		-								
180	3	PS-03-053	CIS	Tc99	189		-								
181	3	PS-03-074	CIS	Tc99	47		-								
182	3	PS-03-091	CIS	Tc99	52		-								
183	3	PS-03-111	CIS	Tc99	93		-								
	3 Count				12						Weighted		Weighted		
	3				131.6953846			Mass Fraction:	0.45	Average:	59.26292308	Variance:	40460.07594		
	3 Var				89911.27980										
247	4	063709	RI/FS	Tc99	0.45	U	UJ								
248	4	063710	RI/FS	Tc99	2.22		J								
249	4	063782	RI/FS	Tc99	8.43		J								
250	4	063785	RI/FS	Tc99	4.87		J								
251	4	063850	RI/FS	Tc99	4.22		J								
252	4	063852	RI/FS	Tc99	3.15		J								
243	4	PS-04-003	CIS	Tc99	6.8		-								
244	4	PS-04-023	CIS	Tc99	58		-								
245	4	PS-04-040	CIS	Tc99	31		-								
246	4	PS-04-063	CIS	Tc99	225		-								
	4 Count				10						Weighted		Weighted		
	4				34.814			Mass Fraction:	0.15	Average:	5.1921	Variance:	721.290894		
	4 Var				4908.90898										
230	5	100210	RI/FS	Tc99	1080		J								
231	5	100211	RI/FS	Tc99	1940		J								
232	5	100212	RI/FS	Tc99	582		J								
233	5	100213	RI/FS	Tc99	731		J								
234	5	100214	RI/FS	Tc99	1940		J								
235	5	100215	RI/FS	Tc99	1860		J								
236	5	100216	RI/FS	Tc99	827		J								
237	5	100217	RI/FS	Tc99	3020		J								
238	5	100218	RI/FS	Tc99	2060		J								
324	5	PS-05-002	CIS	Tc99	2990		-								
325	5	PS-05-013	CIS	Tc99	698		-								
326	5	PS-05-026	CIS	Tc99	621		-								
327	5	PS-05-046	CIS	Tc99	887		-								
328	5	PS-05-066	CIS	Tc99	1830		-								
329	5	PS-05-078	CIS	Tc99	422		-								
	5 Count				15						Weighted		Weighted		
	5				1426.533333			Mass Fraction:	0.12	Average:	171.184	Variance:	85250.89057		
	5 Var				710423.6361										
406	6	100225	RI/FS	Tc99	1.85	U	UJ								
407	6	100226	RI/FS	Tc99	1.8	U	UJ								
408	6	100227	RI/FS	Tc99	2.05	U	UJ								
409	6	100228	RI/FS	Tc99	13		J								
410	6	100229	RI/FS	Tc99	44		J								
411	6	100230	RI/FS	Tc99	48		J								
412	6	100231	RI/FS	Tc99	22		J								
413	6	100232	RI/FS	Tc99	7.1		J								
402	6	PS-06-009	CIS	Tc99	140		-								
403	6	PS-06-012	CIS	Tc99	184		-								
404	6	PS-06-025	CIS	Tc99	120		-								
405	6	PS-06-038	CIS	Tc99	84		-								
	6 Count				12						Weighted		Weighted		
	6				54.575			Mass Fraction:	0.02	Average:	1.0915	Variance:	68.04814091		
	6 Var				3402.407045										
472	Burn	063180	RI/FS	Tc99	0.782		-								
473	Burn	063182	RI/FS	Tc99	3.29		-								
474	Burn	063201	RI/FS	Tc99	1.47		-								
475	Burn	063203	RI/FS	Tc99	0.847		-								
466	Burn	PS-07-005	CIS	Tc99	0.6	U	UJ								
467	Burn	PS-07-015	CIS	Tc99	0.65	U	UJ								
468	Burn	PS-07-027	CIS	Tc99	60		-								
469	Burn	PS-07-035	CIS	Tc99	32		-								
470	Burn	PS-07-063	CIS	Tc99	18		-								
471	Burn	PS-07-073	CIS	Tc99	64		-								
	Burn				10						Weighted		Weighted		
	Burn				18.1849			Mass Fraction:	0.06	Average:	1.089894	Variance:	28.39650635		
	Burn Var				639.9418059										
530	Clear	098526	RI/FS	Tc99	212		J								
531	Clear	098527	RI/FS	Tc99	695		J								
532	Clear	098528	RI/FS	Tc99	112		J								
533	Clear	098529	RI/FS	Tc99	383		J								
534	Clear	098530	RI/FS	Tc99	419		J								
535	Clear	098531	RI/FS	Tc99	314		J								
526	Clear	PS-08-001	CIS	Tc99	278		-								
527	Clear	PS-08-002	CIS	Tc99	117		-								
528	Clear	PS-08-005	CIS	Tc99	0.2	U	UJ								
529	Clear	PS-08-008	CIS	Tc99	0.2	U	UJ								
	Clear				10						Weighted		Weighted		
	Clear				254.04			Mass Fraction:	0.01	Average:	2.5404	Variance:	460.8089489		
	Clear				46080.88489										
	Grand				80										
	Grand				305.5774333						Weighted		Weighted		Weighted

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DataPoint	Pit	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
	Grand				292712.0000			Totals:	1	Average:	244.9297353	Variance:	129518.4018	STD:	359.8880406
													Number Sx's		90
													Weighted Mean		244.93
													Std Dev		359.89
													Std Dev² Std Dev		129518.402
													t.20 (Deg F = #Sx's - 8)		1.289
													t.20*t.20		1.662
													RT (Reg Threshold)		10000
													n (Recommend Sx's)		0.00
													sx		37.94
													CI (Confidence Interval)		283.83

000487

DataPoint	Fit	Sample Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
29	1	083017	RI/FS	Ru106	2	U	UJD								
30	1	083032	RI/FS	Ru106	3.9	U	UJD								
31	1	083081	RI/FS	Ru106	1.1	U	UDJ								
32	1	083071	RI/FS	Ru106	2.4	U	DU								
33	1	083100	RI/FS	Ru106	0.9	U	UJ								
34	1	083112	RI/FS	Ru106	0.76	U	UJD								
24	1	PS-01-002	CIS	Ru106	2	U	UJ								
25	1	PS-01-017	CIS	Ru106	1.5	U	UJ								
26	1	PS-01-034	CIS	Ru106	1	U	UJ								
27	1	PS-01-049	CIS	Ru106	1	U	UJ								
28	1	PS-01-060	CIS	Ru106	1	U	UJ								
	1 Count				11					Weighted		Weighted			
	1				1.558090909			Mass Fraction:	0.13	Average:	0.202681818	Variance:	0.092353182		
	1 Var				0.710409091										
83	2	083536	RI/FS	Ru106	4	U	DJ								
84	2	083538	RI/FS	Ru106	2.35	U	UDJ								
85	2	083620	RI/FS	Ru106	5.5	U	UJD								
86	2	083632	RI/FS	Ru106	1.2	U	UJD								
87	2	PS-02-002	CIS	Ru106	6	U	UJ								
88	2	PS-02-009	CIS	Ru106	6	U	UJ								
90	2	PS-02-019	CIS	Ru106	1	U	UJ								
91	2	PS-02-028	CIS	Ru106	2.5	U	UJ								
92	2	PS-02-040	CIS	Ru106	1	U	UJ								
	2 Count				8					Weighted		Weighted			
	2				3.505555556			Mass Fraction:	0.06	Average:	0.210333333	Variance:	0.381466667		
	2 Var				6.357777778										
157	3	083309	RI/FS	Ru106	1.7	U	DU								
158	3	083310	RI/FS	Ru106	4.2	U	DU								
159	3	083390	RI/FS	Ru106	4.8	U	UJD								
160	3	083392	RI/FS	Ru106	1.9	U	UJD								
161	3	083474	RI/FS	Ru106	1.3	U	UDJ								
162	3	083476	RI/FS	Ru106	1.6	U	UJ								
150	3	PS-03-002	CIS	Ru106	2.5	U	UJ								
151	3	PS-03-009	CIS	Ru106	17.5	U	UJ								
152	3	PS-03-020	CIS	Ru106	17.5	U	UJ								
153	3	PS-03-053	CIS	Ru106	3	U	UJ								
154	3	PS-03-074	CIS	Ru106	2	U	UJ								
155	3	PS-03-091	CIS	Ru106	1	U	UJ								
156	3	PS-03-111	CIS	Ru106	3	U	UJ								
	3 Count				13					Weighted		Weighted			
	3				4.769230769			Mass Fraction:	0.46	Average:	2.146153846	Variance:	14.80578846		
	3 Var				23.12397436										
227	4	083709	RI/FS	Ru106	1.1	U	DU								
228	4	083710	RI/FS	Ru106	0.5	U	UJ								
229	4	083782	RI/FS	Ru106	11.3	U	UJD								
230	4	083785	RI/FS	Ru106	6	U	UJD								
231	4	083850	RI/FS	Ru106	5.7	U	UJD								
232	4	083852	RI/FS	Ru106	2.6	U	UJD								
223	4	PS-04-003	CIS	Ru106	1	U	UJ								
224	4	PS-04-023	CIS	Ru106	1.5	U	UJ								
225	4	PS-04-040	CIS	Ru106	2	U	UJ								
226	4	PS-04-063	CIS	Ru106	1	U	UJ								
	4 Count				10					Weighted		Weighted			
	4				3.27			Mass Fraction:	0.15	Average:	0.4905	Variance:	1.762016667		
	4 Var				11.74677778										
300	5	100210	RI/FS	Ru106	0.91	U	UJ								
301	5	100211	RI/FS	Ru106	1.25	U	UJ								
302	5	100212	RI/FS	Ru106	1.15	U	UJ								
303	5	100213	RI/FS	Ru106	1.1	U	UJ								
304	5	100214	RI/FS	Ru106	0.84		J								
305	5	100215	RI/FS	Ru106	1.65	U	UJ								
306	5	100216	RI/FS	Ru106	1.5	U	UJ								
307	5	100217	RI/FS	Ru106	1	U	UJ								
308	5	100218	RI/FS	Ru106	1.6		J								
294	5	PS-05-002	CIS	Ru106	17.5	U	UJ								
295	5	PS-05-013	CIS	Ru106	17.5	U	UJ								
296	5	PS-05-026	CIS	Ru106	17.5	U	UJ								
297	5	PS-05-046	CIS	Ru106	17.5	U	UJ								
298	5	PS-05-066	CIS	Ru106	17.5	U	UJ								
299	5	PS-05-078	CIS	Ru106	8.5	U	UJ								
	5 Count				15					Weighted		Weighted			
	5				7			Mass Fraction:	0.12	Average:	0.84	Variance:	7.308524571		
	5 Var				60.90437143										
382	6	100225	RI/FS	Ru106	1.85	U	UJ								
383	6	100226	RI/FS	Ru106	1.6	U	UJ								
384	6	100227	RI/FS	Ru106	1.8	U	UJ								
385	6	100228	RI/FS	Ru106	0.75	U	UJ								
386	6	100229	RI/FS	Ru106	0.9	U	UJ								
387	6	100230	RI/FS	Ru106	1	U	UJ								
388	6	100231	RI/FS	Ru106	2.6	U	UJ								
389	6	100232	RI/FS	Ru106	2	U	UJ								
378	6	PS-06-009	CIS	Ru106	17.5	U	UJ								
379	6	PS-06-012	CIS	Ru106	17.5	U	UJ								
380	6	PS-06-025	CIS	Ru106	17.5	U	UJ								
381	6	PS-06-028	CIS	Ru106	17.5	U	UJ								
	6 Count				12					Weighted		Weighted			
	6				6.875			Mass Fraction:	0.02	Average:	0.1375	Variance:	1.237359091		
	6 Var				61.86795455										
452	Burn	083160	RI/FS	Ru106	0.5	U	UJ								
453	Burn	083162	RI/FS	Ru106	0.8	U	UDJ								
454	Burn	083201	RI/FS	Ru106	1.4	U	DU								
455	Burn	083203	RI/FS	Ru106	1.5	U	DU								
446	Burn	PS-07-005	CIS	Ru106	1	U	UJ								
447	Burn	PS-07-015	CIS	Ru106	1	U	UJ								
448	Burn	PS-07-027	CIS	Ru106	1	U	UJ								
449	Burn	PS-07-035	CIS	Ru106	1	U	UJ								
450	Burn	PS-07-063	CIS	Ru106	1	U	UJ								
451	Burn	PS-07-073	CIS	Ru106	1	U	UJ								
	Burn				10					Weighted		Weighted			
	Burn				1.02			Mass Fraction:	0.06	Average:	0.0612	Variance:	0.00464		
	Burn Var				0.077333333										
510	Clear	098526	RI/FS	Ru106	1.235		UJ								
511	Clear	098527	RI/FS	Ru106	0.88		UJ								
512	Clear	098528	RI/FS	Ru106	0.71		UJ								
513	Clear	098529	RI/FS	Ru106	1.535		UJ								
514	Clear	098530	RI/FS	Ru106	1.15		UJ								
515	Clear	098531	RI/FS	Ru106	1.205		UJ								
506	Clear	PS-08-001	CIS	Ru106	6	U	UJ								
507	Clear	PS-08-003	CIS	Ru106	1.5	U	UJ								
508	Clear	PS-08-005	CIS	Ru106	12	U	UJ								
509	Clear	PS-08-008	CIS	Ru106	6.5	U	UJ								
	Clear				10					Weighted		Weighted			
	Clear				3.2715			Mass Fraction:	0.01	Average:	0.032715	Variance:	0.139341503		
	Clear				13.93415028										
	Grand				90										
	Grand				4.1535					Weighted		Weighted			Weighted

1730

DatePoint	PB	Sk Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
	Grand				29.52183003			Totals:	1	Average:	4.121083298	Variance:	25.83149014	STD:	5.082488902
													Number Sk's		80
													Weighted Mean		4.12
													Std Dev		5.08
													Std Dev* Std Dev		25.831
													t.20 (Deg F = #Sk's - 1)		1.289
													t.20*t.20		1.662
													RT (Rec Threshold)		10000
													n (Recommend Sk's)		0.00
													sx		0.54
													CI (Confidence Interval)		4.81

000489

DataPoint	Pit	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
40	1	063017	R/FS	Sr90	7.69		J								
41	1	063032	R/FS	Sr90	3.04		J								
42	1	063061	R/FS	Sr90	1.67		J								
43	1	063071	R/FS	Sr90	1.2		-								
44	1	063100	R/FS	Sr90	0.25	U	U								
45	1	063112	R/FS	Sr90	0.65		J								
35	1	PS-01-002	CIS	Sr90	0.2	U	UJ								
36	1	PS-01-017	CIS	Sr90	0.25	U	U								
37	1	PS-01-034	CIS	Sr90	0.15	U	UJ								
38	1	PS-01-049	CIS	Sr90	0.3	U	UJ								
39	1	PS-01-060	CIS	Sr90	0.3	U	UJ								
	1 Coun				11					Weighted		Weighted			
	1 Aver				1.445454545			Mass Fraction:	0.13	Average:	0.16790909	Variance:	0.89527435		
	1 Var				5.125187273										
102	2	063036	R/FS	Sr90	2.96		J								
103	2	063036	R/FS	Sr90	3.09		J								
104	2	063030	R/FS	Sr90	0.25	U	U								
105	2	063032	R/FS	Sr90	3		-								
97	2	PS-02-002	CIS	Sr90	0.5	U	UJ								
98	2	PS-02-009	CIS	Sr90	0.15	U	UJ								
99	2	PS-02-019	CIS	Sr90	0.25	U	U								
100	2	PS-02-028	CIS	Sr90	0.45	U	UJ								
101	2	PS-02-040	CIS	Sr90	0.3	U	UJ								
	2 Coun				9					Weighted		Weighted			
	2 Aver				1.316666667			Mass Fraction:	0.08	Average:	0.079	Variance:	0.140769		
	2 Var				2.34615										
170	3	063306	R/FS	Sr90	0.25	U	U								
171	3	063310	R/FS	Sr90	1.21		-								
172	3	063380	R/FS	Sr90	0.827		J								
173	3	063382	R/FS	Sr90	0.25	U	UJ								
174	3	063474	R/FS	Sr90	0.5	U	UJ								
175	3	063476	R/FS	Sr90	4.91		J								
163	3	PS-03-002	CIS	Sr90	0.5	U	UJ								
164	3	PS-03-009	CIS	Sr90	1.5	U	UJ								
165	3	PS-03-030	CIS	Sr90	5.2		-								
166	3	PS-03-053	CIS	Sr90	0.75	U	UJ								
167	3	PS-03-074	CIS	Sr90	0.45	U	UJ								
168	3	PS-03-091	CIS	Sr90	0.45	U	UJ								
169	3	PS-03-111	CIS	Sr90	0.3	U	UJ								
	3 Coun				13					Weighted		Weighted			
	3 Aver				1.315153846			Mass Fraction:	0.45	Average:	0.59161923	Variance:	1.30287914		
	3 Var				2.895286974										
237	4	063709	R/FS	Sr90	1.91		J								
238	4	063710	R/FS	Sr90	2.44		J								
239	4	063762	R/FS	Sr90	144		-								
240	4	063765	R/FS	Sr90	116		-								
241	4	063850	R/FS	Sr90	0.25	U	UJ								
242	4	063852	R/FS	Sr90	0.59		J								
233	4	PS-04-009	CIS	Sr90	0.2	U	UJ								
234	4	PS-04-023	CIS	Sr90	0.2	U	UJ								
235	4	PS-04-040	CIS	Sr90	0.3	U	UJ								
236	4	PS-04-063	CIS	Sr90	0.5	U	U								
	4 Coun				10					Weighted		Weighted			
	4 Aver				26.836			Mass Fraction:	0.15	Average:	3.9954	Variance:	451.793861		
	4 Var				3011.958204										
315	5	100210	R/FS	Sr90	3.9		J								
316	5	100211	R/FS	Sr90	6.4		J								
317	5	100212	R/FS	Sr90	4.9		J								
318	5	100213	R/FS	Sr90	15		J								
319	5	100214	R/FS	Sr90	0.11		J								
320	5	100215	R/FS	Sr90	1.02		J								
321	5	100216	R/FS	Sr90	0.95		UJ								
322	5	100217	R/FS	Sr90	2		J								
323	5	100218	R/FS	Sr90	0.68		J								
309	5	PS-05-002	CIS	Sr90	31		-								
310	5	PS-05-013	CIS	Sr90	19		-								
311	5	PS-05-028	CIS	Sr90	1.9		-								
312	5	PS-05-046	CIS	Sr90	2.3		-								
313	5	PS-05-066	CIS	Sr90	1.4		-								
314	5	PS-05-078	CIS	Sr90	4.1		-								
	5 Coun				15					Weighted		Weighted			
	5 Aver				6.309333333			Mass Fraction:	0.12	Average:	0.75712	Variance:	9.12107394		
	5 Var				78.00994952										
394	6	100225	R/FS	Sr90	0.446	U	UJ								
395	6	100226	R/FS	Sr90	3.9		J								
396	6	100227	R/FS	Sr90	0.475	U	UJ								
397	6	100228	R/FS	Sr90	3.2		J								
398	6	100229	R/FS	Sr90	4.8		J								
399	6	100230	R/FS	Sr90	2.2		J								
400	6	100231	R/FS	Sr90	4.3		J								
401	6	100232	R/FS	Sr90	1.4		J								
380	6	PS-06-009	CIS	Sr90	3.7		-								
381	6	PS-06-012	CIS	Sr90	2.8		-								
382	6	PS-06-025	CIS	Sr90	5		-								
383	6	PS-06-028	CIS	Sr90	5.1		-								
	6 Coun				12					Weighted		Weighted			
	6 Aver				3.093333333			Mass Fraction:	0.02	Average:	0.06186667	Variance:	0.05807112		
	6 Var				2.803558061										
462	Burn	063160	R/FS	Sr90	0.5		J								
463	Burn	063162	R/FS	Sr90	0.25	U	UJ								
464	Burn	063201	R/FS	Sr90	0.25	U	U								
465	Burn	063203	R/FS	Sr90	0.25	U	U								
456	Burn	PS-07-005	CIS	Sr90	0.25	U	U								
457	Burn	PS-07-015	CIS	Sr90	0.25	U	U								
458	Burn	PS-07-027	CIS	Sr90	0.4	U	UJ								
459	Burn	PS-07-035	CIS	Sr90	0.45	U	UJ								
460	Burn	PS-07-063	CIS	Sr90	0.4	U	UJ								
461	Burn	PS-07-073	CIS	Sr90	0.48	U	UJ								
	Burn				10					Weighted		Weighted			
	Burn				0.345			Mass Fraction:	0.06	Average:	0.0207	Variance:	0.00064533		

000490

1730

DataPoint	Pit	Sx Number	Source	Analyte	Activity (pCi/g)	LQ	VQ								
	Burn				0.010805898										
520	Clear	089526	RI/FS	Sr90	0.765		UJ								
521	Clear	089527	RI/FS	Sr90	0.88		UJ								
522	Clear	089528	RI/FS	Sr90	0.87		UJ								
523	Clear	089529	RI/FS	Sr90	3.04		J								
524	Clear	089530	RI/FS	Sr90	1.15		UJ								
525	Clear	089531	RI/FS	Sr90	12.8		J								
516	Clear	PS-09-001	CIS	Sr90	2.8		-								
517	Clear	PS-09-003	CIS	Sr90	1.3		-								
518	Clear	PS-09-005	CIS	Sr90	26		-								
519	Clear	PS-09-008	CIS	Sr90	3.8		-								
	Clear				10					Weighted		Weighted			
	Clear				5.3385			Mass Fraction:	0.01	Average:	0.053385	Variance:	0.85717778		
	Clear				85.71777806										
	Grand				90										
	Grand				5.553355856					Weighted		Weighted		Weighted	
	Grand				385.1382257			Totals:	1	Average:	5.74719999	Variance:	463.736774	STD:	21.5345846
													Number Sx's		90
													Weighted Mean		5.75
													Std Dev		21.53
													Std Dev* Std Dev		463.739
													t.20 (Deg F =#Sx's - 8)		1.289
													t.20*t.20		1.662
													RT (Reg Threshold)		20000
													n (Recommend Sx's)		0.00
													sx		2.27
													CI (Confindence Interval)		8.67

000491

000121

WAC Contribution of Minor Radioisotopes
Tc, Sr,Pu,Ru,Np

Sx Number	Pit	Cs137	Cs Activity (uCi/m)	Cs VQ	Tc99 Activity (uCi/m)	Tc VQ	Sr90 Activity (uCi/m)	Sr VQ	Pu239 Activity (uCi/m)	Pu239 VQ
PS-01-002	1	Cs137	0.25	UJ	0.5	UJ	0.2	UJ	0.05	UJ
PS-01-017	1	Cs137	0.2	UJ	0.5	UJ	0.25	U	0.05	UJ
PS-01-034	1	Cs137	0.1	U	1	UJ	0.15	UJ	0.05	UJ
PS-01-049	1	Cs137	0.5	UJ	15	-	0.2	UJ	0.05	UJ
PS-01-060	1	Cs137	1.1	-	1	UJ	0.2	UJ	0.05	UJ
	1 Count									
	1 Average									
	1 Var									
PS-02-002	2	Cs137	1	UJ	618	-	0.5	UJ	0.1	J
PS-02-009	2	Cs137	3.6	-	11	-	0.15	UJ	0.1	J
PS-02-019	2	Cs137	0.1	U	14	-	0.25	U	0.05	UJ
PS-02-028	2	Cs137	0.35	UJ	0.5	UJ	0.45	UJ	0.05	UJ
PS-02-040	2	Cs137	0.7	-	1	UJ	0.2	UJ	0.05	UJ
	2 Count									
	2 Average									
	2 Var									
PS-03-002	3	Cs137	0.35	UJ	0.6	UJ	0.5	UJ	0.04	UJ
PS-03-009	3	Cs137	3	UJ	132	-	1.5	UJ	0.14	-
PS-03-030	3	Cs137	5	J	1110	-	5.2	-	1	-
PS-03-053	3	Cs137	1	J	199	-	0.75	UJ	0.3	-
PS-03-074	3	Cs137	0.2	UJ	47	-	0.45	UJ	0.05	UJ
PS-03-091	3	Cs137	0.1	U	52	-	0.45	UJ	0.05	UJ
PS-03-111	3	Cs137	0.4	UJ	93	-	0.3	UJ	0.05	UJ
	3 Count									
	3 Average									
	3 Var									
PS-04-003	4	Cs137	0.1	U	6.8	-	0.2	UJ	0.05	UJ
PS-04-023	4	Cs137	0.15	UJ	59	-	0.2	UJ	0.05	UJ
PS-04-040	4	Cs137	0.25	UJ	31	-	0.2	UJ	0.5	J
PS-04-063	4	Cs137	0.1	U	225	-	0.5	U	0.4	J
	4 Count									
	4 Average									
	4 Var									
PS-05-002	5	Cs137	76	J	2990	-	31	-	0.4	-
PS-05-013	5	Cs137	61	J	696	-	19	-	0.4	-
PS-05-026	5	Cs137	3	UJ	821	-	1.9	-	4.4	-
PS-05-046	5	Cs137	2	UJ	887	-	2.3	-	4.3	-
PS-05-066	5	Cs137	3.5	UJ	1830	-	1.4	-	2.4	-
PS-05-078	5	Cs137	1	UJ	423	-	4.1	-	0.05	UJ
100214	5	Cs137	2.8	J	1540	J	0.11	J	0.0095	UJ
100215	5	Cs137	8	J	1960	J	1.02	J	0.015	UJ
	5 Count									
	5 Average									
	5 Var									
PS-06-009	6	Cs137	2	UJ	140	-	3.7	-	0.7	-
PS-06-012	6	Cs137	20	J	164	-	2.6	-	0.4	-
PS-06-025	6	Cs137	31	J	120	-	5	-	0.6	-
PS-06-026	6	Cs137	15	J	84	-	5.1	-	1.4	-
	6 Count									
	6 Average									
	6 Var									
PS-07-005	Burn	Cs137	0.1	U	0.6	UJ	0.25	U	0.05	UJ
PS-07-015	Burn	Cs137	0.2	UJ	0.65	UJ	0.25	U	0.05	UJ
PS-07-027	Burn	Cs137	0.1	U	60	-	0.4	UJ	0.5	J
PS-07-035	Burn	Cs137	0.15	UJ	32	-	0.45	UJ	0.05	UJ
PS-07-063	Burn	Cs137	0.1	U	18	-	0.4	UJ	0.05	UJ
PS-07-073	Burn	Cs137	0.15	UJ	64	-	0.45	UJ	0.05	UJ
	Burn Count									
	Burn Average									
	Burn Var									
PS-08-001	Clear	Cs137	140	-	278	-	2.8	-	0.05	UJ
PS-08-003	Clear	Cs137	18	-	117	-	1.3	-	0.05	UJ
PS-08-005	Clear	Cs137	450	-	0.2	UJ	26	-	0.05	UJ
PS-08-008	Clear	Cs137	150	-	0.2	UJ	3.8	-	0.05	UJ
098526	Clear	Cs137	48	J	212	J	0.765	UJ	0.23	J
098527	Clear	Cs137	40	J	695	J	0.96	UJ	0.17	J
098528	Clear	Cs137	9.16	J	112	J	0.87	UJ	0.18	J
098529	Clear	Cs137	66.7	J	393	J	3.04	J	0.49	J
098530	Clear	Cs137	71.41	J	419	J	1.15	UJ	0.37	J
098531	Clear	Cs137	18.1	J	314	J	12.8	J	0.04	U
	Clear Count									
	Clear Average									
	Clear Var									
	Grand Count									
	Grand Average									
	Grand Var									

000492

WAC Contribution of Minor Radioisotopes
Tc, Sr,Pu,Ru,Np

1730

Sx Number	Pit	Pu239/240 Activity (uCi/g)	Pu239/240 VQ	Ru106 Activity (uCi/g)	Ru106 VQ	Np237 Activity (uCi/g)	Np237 VQ	WAC Contribution
PS-01-002	1	0.05	UJ	0.05	UJ	0.05	UJ	0.000187632
PS-01-017	1	0.05	UJ	0.05	UJ	0.05	UJ	0.000190132
PS-01-034	1	0.05	UJ	0.05	UJ	0.05	UJ	0.000235132
PS-01-049	1	0.05	UJ	0.05	UJ	0.15	U	0.001692632
PS-01-060	1	0.05	UJ	0.05	UJ	0.05	UJ	0.000242632
	1 Count							5
	1 Average							0.000509632
	1 Var							4.37973E-07
PS-02-002	2	0.6	-	0.3	UJ	0.2	UJ	0.002640789
PS-02-009	2	0.05	J	0.025	UJ	0.1	UJ	0.001208816
PS-02-019	2	0.05	UJ	0.05	UJ	0.15	U	0.001590132
PS-02-028	2	0.05	UJ	0.05	UJ	0.05	UJ	0.000200132
PS-02-040	2	0.05	UJ	0.05	UJ	0.05	UJ	0.000242632
	2 Count							5
	2 Average							0.0131965
	2 Var							0.000764369
PS-03-002	3	0.025	UJ	0.025	UJ	0.15	UJ	0.000226316
PS-03-009	3	0.3	J	0.15	UJ	0.8	-	0.014122895
PS-03-030	3	14	J	7	UJ	2.1	-	0.127678421
PS-03-053	3	0.3	J	0.15	UJ	0.15	U	0.020620395
PS-03-074	3	0.05	UJ	0.05	UJ	0.3	-	0.004975132
PS-03-091	3	0.15	UJ	0.15	UJ	0.1	UJ	0.005490395
PS-03-111	3	0.05	UJ	0.05	UJ	0.1	UJ	0.009467632
	3 Count							7
	3 Average							0.026081598
	3 Var							0.002051527
PS-04-003	4	0.05	UJ	0.05	UJ	0.05	UJ	0.000817632
PS-04-023	4	0.1	UJ	0.1	UJ	0.15	U	0.006140263
PS-04-040	4	0.4	J	0.2	UJ	0.1	UJ	0.004075526
PS-04-063	4	0.05	UJ	0.05	UJ	0.4	-	0.023177632
	4 Count							4
	4 Average							0.008552763
	4 Var							9.88016E-05
PS-05-002	5	0.9	J	0.45	UJ	4.1	-	0.303923684
PS-05-013	5	0.4	J	0.2	UJ	0.15	U	0.071435526
PS-05-026	5	11	J	5.5	UJ	19	-	0.107394474
PS-05-046	5	4.8	J	2.4	UJ	17	-	0.106541316
PS-05-066	5	13	J	6.5	UJ	9.3	-	0.203462105
PS-05-078	5	0.05	UJ	0.05	UJ	2.2	-	0.043707632
100214	5	0.065	UJ	0.13	J	33	J	0.170588842
100215	5	0.07	J	0.035	UJ	46	J	0.219137842
	5 Count							8
	5 Average							0.153272428
	5 Var							0.007549153
PS-06-009	6	6.3	J	3.15	UJ	1.5	-	0.022100789
PS-06-012	6	4	J	2	UJ	0.9	-	0.021495263
PS-06-025	6	9.5	J	4.75	UJ	3.6	-	0.0244
PS-06-028	6	15	J	7.5	UJ	2.1	-	0.026499737
	6 Count							4
	6 Average							0.023621447
	6 Var							5.25546E-06
PS-07-005	Burn	0.05	UJ	0.05	UJ	0.05	UJ	0.000200132
PS-07-015	Burn	0.05	UJ	0.05	UJ	0.25	UJ	0.000305132
PS-07-027	Burn	0.05	UJ	0.05	UJ	0.1	UJ	0.000622632
PS-07-035	Burn	0.05	UJ	0.05	UJ	0.6	-	0.003625132
PS-07-063	Burn	0.05	UJ	0.05	UJ	0.1	UJ	0.001972632
PS-07-073	Burn	0.4	J	0.2	UJ	0.5	-	0.007133026
	Burn Count							6
	Burn Average							0.003309781
	Burn Var							9.23549E-06
PS-08-001	Clear	0.05	UJ	0.05	UJ	1.1	-	0.028592632
PS-08-003	Clear	0.05	UJ	0.05	UJ	0.15	U	0.011942632
PS-08-005	Clear	0.05	UJ	0.05	UJ	0.7	-	0.001772632
PS-08-008	Clear	0.05	UJ	0.05	UJ	2.2	-	0.001412632
098526	Clear	0.38	J	0.19	UJ	1.2	J	0.02245825
098527	Clear	0.15	J	0.075	UJ	1.8	J	0.070766947
098528	Clear	0.035	UJ	0.035	UJ	0.03	UJ	0.011475342
098529	Clear	0.37	J	0.185	UJ	1.2	J	0.040921737
098530	Clear	0.54	J	0.27	UJ	1.8	J	0.043781711
098531	Clear	0.2	J	0.1	UJ	0.44	UJ	0.032505263
	Clear Count							10
	Clear Average							0.026562978
	Clear Var							0.000466825
	Grand Count							49
	Grand Average							0.039601358
	Grand Var							0.004226784

000493

000123

WAC Contribution of Minor Radioisotopes
To, Sr,Pu,Ru,Np

Sx Number	Pk									
PS-01-002	1									
PS-01-017	1									
PS-01-034	1									
PS-01-049	1									
PS-01-060	1									
	1 Count				Weighted		Weighted			
	1 Average		Mass Fraction:	0.13	Average:	0.02521E-05	Variance:	5.69365E-08		
	1 Var									
PS-02-002	2									
PS-02-009	2									
PS-02-019	2									
PS-02-026	2									
PS-02-040	2									
	2 Count				Weighted		Weighted			
	2 Average		Mass Fraction:	0.06	Average:	0.00079179	Variance:	4.58621E-05		
	2 Var									
PS-03-002	3									
PS-03-009	3									
PS-03-020	3									
PS-03-053	3									
PS-03-074	3									
PS-03-091	3									
PS-03-111	3									
	3 Count				Weighted		Weighted			
	3 Average		Mass Fraction:	0.45	Average:	0.011736719	Variance:	0.000923187		
	3 Var									
PS-04-003	4									
PS-04-023	4									
PS-04-040	4									
PS-04-063	4									
	4 Count				Weighted		Weighted			
	4 Average		Mass Fraction:	0.15	Average:	0.001282914	Variance:	1.49792E-05		
	4 Var									
PS-05-002	5									
PS-05-013	5									
PS-05-026	5									
PS-05-046	5									
PS-05-066	5									
PS-05-078	5									
100214	5									
100215	5									
	5 Count				Weighted		Weighted			
	5 Average		Mass Fraction:	0.12	Average:	0.018392691	Variance:	0.000905898		
	5 Var									
PS-06-009	6									
PS-06-012	6									
PS-06-025	6									
PS-06-028	6									
	6 Count				Weighted		Weighted			
	6 Average		Mass Fraction:	0.02	Average:	0.000472429	Variance:	1.06109E-07		
	6 Var									
PS-07-005	Burn									
PS-07-015	Burn									
PS-07-027	Burn									
PS-07-035	Burn									
PS-07-063	Burn									
PS-07-073	Burn									
	Burn Count				Weighted		Weighted			
	Burn Average		Mass Fraction:	0.06	Average:	0.000198587	Variance:	5.54129E-07		
	Burn Var									
PS-08-001	Clear									
PS-08-003	Clear									
PS-08-005	Clear									
PS-08-008	Clear									
098526	Clear									
098527	Clear									
098528	Clear									
098529	Clear									
098530	Clear									
098531	Clear									
	Clear Count				Weighted		Weighted			
	Clear Average		Mass Fraction:	0.01	Average:	0.00026563	Variance:	4.66825E-06		
	Clear Var									
	Grand Count									
	Grand Average				Weighted		Weighted		Weighted	
	Grand Var		Totals:	1	Average:	0.033207012	Variance:	0.001895311	STD:	0.043535172
								Number Sx's		49
								Weighted Mean		0.033
								Std Dev		0.044
								Std Dev* Std Dev		0.0019
								t.20 (Deg F =#Sx's - 8)		1.303
								t.20*t.20		1.698
								RT (Req Threshold)		1
								n (Recommend Sx's)		0.00
								ex		0.01
								90% CI (Confidence Interval)		0.041

000494

000124

Number of Samples for WAC

1730

Sample Number Calculator:							
			WAC	WAC	WAC	WAC	WAC
		s =	0.47	0.47	0.47	0.47	0.47
		x =	0.8	0.7	0.6	0.54	0.5
		RT =	0.959	0.959	0.959	0.959	0.959
		RT - x =	-0.159	-0.259	-0.359	-0.419	-0.459
N	F	t.20	n	n	n	n	n
1	0						
2	1	3.078	82.78253	31.19848	16.23843	11.92079	9.933621
3	2	1.886	31.08027	11.71331	6.096635	4.475598	3.729527
4	3	1.638	23.44387	8.835355	4.598695	3.375946	2.813184
5	4	1.533	20.53458	7.738922	4.028015	2.957004	2.464079
6	5	1.476	19.03593	7.174124	3.734045	2.741198	2.284247
7	6	1.44	18.11868	6.828435	3.554118	2.609112	2.174179
8	7	1.415	17.49502	6.593395	3.431782	2.519304	2.099342
9	8	1.397	17.05274	6.426714	3.345027	2.455616	2.046271
10	9	1.393	16.95523	6.389964	3.325899	2.441574	2.03457
11	10	1.372	16.44787	6.198754	3.226376	2.368514	1.973688
12	11	1.363	16.23279	6.117696	3.184187	2.337542	1.947879
13	12	1.356	16.06648	6.05502	3.151564	2.313593	1.927923
14	13	1.35	15.92462	6.001554	3.123736	2.293164	1.9109
15	14	1.345	15.80688	5.95718	3.10064	2.27621	1.896771
16	15	1.341	15.713	5.9218	3.082225	2.262691	1.885506
17	16	1.337	15.6194	5.886525	3.063865	2.249212	1.874274
18	17	1.333	15.52608	5.851356	3.04556	2.235774	1.863076
19	18	1.33	15.45627	5.825047	3.031867	2.225722	1.8547
20	19	1.328	15.40982	5.807542	3.022755	2.219033	1.849126
21	20	1.325	15.34028	5.781332	3.009114	2.209019	1.840781
22	21	1.323	15.294	5.763893	3.000036	2.202355	1.835228
23	22	1.321	15.2478	5.746479	2.990973	2.195702	1.829684
24	23	1.319	15.20166	5.729092	2.981923	2.189058	1.824147
25	24	1.318	15.17862	5.720408	2.977403	2.18574	1.821383
26	25	1.316	15.13259	5.70306	2.968374	2.179111	1.815859
27	26	1.315	15.1096	5.694396	2.963864	2.175801	1.8131
28	27	1.314	15.08663	5.685739	2.959358	2.172493	1.810344
29	28	1.313	15.06367	5.677088	2.954856	2.169188	1.807589
30	29	1.311	15.01782	5.659806	2.945861	2.162584	1.802087
31	30	1.31	14.99492	5.651175	2.941368	2.159286	1.799339
40	39	1.303	14.83509	5.590942	2.910018	2.136272	1.780161
60	59	1.296	14.67613	5.531032	2.878835	2.11338	1.761085
120	119	1.289	14.51802	5.471445	2.847821	2.090612	1.742112

000495

000125

Sample Number	Pit	Cs137	Cs Activity (pCi/g)	Cs VQ	Tc99 Activity (pCi/g)	c V	U234 Activity (pCi/g)	234 V	U235 Activity (pCi/g)	235 V	U238 Activity (pCi/g)	238 V	Th230 Activity (pCi/g)	230	Th228 Activity (pCi/g)	h228 V	Th232 Activity (pCi/g)
063061	1	Cs137	0.1	UJ	1.1	J	820	J	47.3	J	915	J	5460	-	355	UD	150
063071	1	Cs137	0.15	DU	0.45	U	441	-	64	E	623	C	4220	-	131	-	131
063100	1	Cs137	0.1	UJ	0.45	U	423	-	19.6	-	445	-	5270	-	305	U	210
063112	1	Cs137	0.1	UJ	0.45	U	600	-	35.6	J	1342	-	245	DU	395	DU	245
	1 Count																
	1 Average																
	1 Var																
063630	2	Cs137	0.65	UJD	0.45	U	1651	-	130	-	1861	-	18400	-	616	-	170
063632	2	Cs137	0.15	UJ	1.64	-	250	-	18.5	-	279	-	2630	-	697	-	298
	2 Count																
	2 Average																
	2 Var																
063308	3	Cs137	0.1	UJ	1.39	-	154	F	22.6	-	663	-	3.28	J	1.48	J	1.2
063310	3	Cs137	0.25	DU	1.75	-	472	F	48.6	-	1740	-	3.81	-	1.85	DU	0.7
063474	3	Cs137	0.15	UJD	16.4	-	946	-	69.2	-	880	-	5770	J	410	U	160
063476	3	Cs137	0.2	UJ	15.9	-	991	-	36.1	-	922	-	4790	-	427	-	272
	3 Count																
	3 Average																
	3 Var																
063850	4	Cs137	0.6	UJD	4.22	J	4100	F	934	-	41800	-	240	-	56	-	28
063852	4	Cs137	0.2	UJD	3.15	J	3620	F	536	-	33100	C	783	-	26.8	-	23.4
	4 Count																
	4 Average																
	4 Var																
100210	5	Cs137	15	J	1090	J	170	J	1.15	UJ	220	J	190	J	0.48	J	0.3
100211	5	Cs137	56	J	1940	J	410	J	16	J	500	J	92	J	0.92	J	0.3
100212	5	Cs137	36	J	592	J	665	J	36	J	860	J	2600	J	20	J	10
100213	5	Cs137	78	J	721	J	670	J	33	J	710	J	180	J	6.8	J	1.4
100214	5	Cs137	2.8	J	1540	J	280	J	0.125	UJ	282	J	140	J	28	J	3
100215	5	Cs137	9	J	1960	J	660	J	35	J	960	J	130	J	3.2	J	0.6
100216	5	Cs137	4.1	J	837	J	420	J	0.485	UJ	410	J	11	J	1.5	J	0.04
100217	5	Cs137	5	J	3020	J	660	J	0.49	UJ	660	J	95	J	38	J	6.6
100218	5	Cs137	4	J	2060	J	680	J	0.41	UJ	680	J	9.8	J	2	J	0.125
	5 Count																
	5 Average																
	5 Var																
100225	6	Cs137	0.9	J	1.85	UJ	1030	J	110	J	6863	J	4.9	J	0.7	J	0.4
100226	6	Cs137	0.8	J	1.9	UJ	2336	J	156	J	13095	J	35	J	1.2	J	0.4
100227	6	Cs137	1.6	J	2.05	UJ	1796	J	132	J	10400	J	4.6	J	1.3	J	0.6
100228	6	Cs137	7.5	J	13	J	1760	J	158	J	8001	J	35	J	0.9	J	0.2
100229	6	Cs137	14	J	44	J	4084	J	337	J	28746	J	39	J	1.4	J	0.4
100230	6	Cs137	10	J	45	J	3408	J	312	J	24350	J	62	J	1.7	J	1
100231	6	Cs137	12.3	J	37	J	3326	J	293	J	19563	J	52	J	1.6	J	0.6
100232	6	Cs137	10.5	J	7.1	J	1465	J	137	J	6886	J	26	J	1.1	J	0.6
	6 Count																
	6 Average																
	6 Var																
063160	Burn	Cs137	0.1	UJ	0.792	-	40.5	J	2.8	J	122	J	5.32	J	1.98	J	1.67
063162	Burn	Cs137	0.1	UJ	3.29	-	417	J	44.2	J	539	J	90	J	4.71	J	5.16
063201	Burn	Cs137	0.1	U	1.47	-	695	-	63.5	E	731	C	107	-	12.4	-	14.6
063203	Burn	Cs137	0.1	U	0.847	-	1711	-	102	C	1896	-	4530	-	450	DU	205
	Burn Count																
	Burn																
	Burn Var																
098526	Clear	Cs137	48	J	212	J	192	J	11.4	J	357	J	78.6	J	28.1	J	4.26
098527	Clear	Cs137	40	J	695	J	71.1	J	4.61	J	176	J	79.5	J	17.7	J	2.72
098528	Clear	Cs137	9.16	J	112	J	47.2	J	2.54	J	137	J	70	J	6.05	J	3.66
098529	Clear	Cs137	66.7	J	393	J	738	J	373	J	1640	J	314	J	28.3	J	9.66
098530	Clear	Cs137	71.41	J	419	J	645	J	363	J	1320	J	249	J	25.7	J	8.16
098531	Clear	Cs137	18.1	J	314	J	1050	J	363	J	1240	J	63	J	14.5	J	3.16
	Clear Count																
	Clear																
	Clear Var																
	Grand																
	Grand																
	Grand Var																

000496

232	Ra226 Activity (pCi/g)	226	Ra228 Activity (pCi/g)	Ra228 VQ	WAC										
UD	99.6	J	41	J	0.712164473										
.	76.9	.	37.2	.	0.578520183										
U	92.3	J	31.2	J	0.781100669										
DU	13.4	J	4.02	J	0.407529204										
					4						Weighted		Weighted		
					0.614845137			Mass Fraction:		0.13	Average:	0.079929868	Variance:	0.003257819	
					0.026080149										
DU	951	J	437	J	2.638720278										
.	161	J	71	J	0.76133026										
					2						Weighted		Weighted		
					1.700025269			Mass Fraction:		0.06	Average:	0.102001516	Variance:	0.105737796	
					1.76229664										
.	1.41	J	1.5	J	0.012886568										
DU	37	.	142	.	0.252978668										
U	208	J	119	J	0.960303256										
.	109	J	119	J	0.970444841										
					4						Weighted		Weighted		
					0.546653323			Mass Fraction:		0.45	Average:	0.245994	Variance:	0.10705264	
					0.237694757										
.	22.6	J	44.8	J	0.563606298										
.	50.1	J	31.1	J	0.497712208										
					2						Weighted		Weighted		
					0.530610253			Mass Fraction:		0.15	Average:	0.079591538	Variance:	0.000324684	
					0.002164563										
J	26	J	1.45	UJ	0.167672469										
J	81	J	8.6	J	0.362367484										
J	150	J	14	J	0.42368318										
J	110	J	24	J	0.330777556										
J	39	J	11	J	0.212864146										
J	150	J	20	J	0.34068245										
UJ	79	J	39	J	0.196072404										
J	70	J	32	J	0.422265521										
UJ	48	J	24	J	0.285168273										
					9						Weighted		Weighted		
					0.304740388			Mass Fraction:		0.12	Average:	0.036568847	Variance:	0.001087401	
					0.006061672										
J	3.2	J	13	J	0.096464675										
J	2.9	J	83	J	0.271784763										
J	4.6	J	8	J	0.130564188										
J	3.4	J	191	J	0.40354030										
J	4.1	J	79	J	0.453068047										
J	4.4	J	26	J	0.324157944										
J	4.9	J	15	J	0.26509682										
J	3.7	J	19	J	0.14762935										
					8						Weighted		Weighted		
					0.261641834			Mass Fraction:		0.02	Average:	0.005232833	Variance:	0.000338799	
					0.016939051										
	2.18	J	1.92	J	0.00853581										
	8.31	J	5.07	J	0.034981286										
	8.95	J	10.4	.	0.063173673										
	39.2	.	9.19	.	0.67167755										
					4						Weighted		Weighted		
					0.19431706			Mass Fraction:		0.06	Average:	0.011659025	Variance:	0.006105367	
					0.10175645										
J	76	J	25	J	0.196797556										
J	64	J	14.1	J	0.20556162										
J	10	J	6.59	J	0.054182737										
J	78	J	26.4	J	0.297002552										
J	170	J	21.4	J	0.33616561										
J	43	J	12.7	J	0.137171305										
					8						Weighted		Weighted		
					0.20481378			Mass Fraction:		0.01	Average:	0.002048138	Variance:	0.000106108	
					0.010610764										
					39										
					0.408954167						Weighted		Weighted		Weighted
					0.196187602			Totals:		1	Average:	0.563025784	Variance:	0.224010637	STD: 0.47329762

Number Sx's	39
Weighted Mean	0.56
Std Dev	0.47
Std Dev* Std Dev	0.224
t.20 (Deg F = #Sx's - 6)	1.310
t.20*t.20	1.716
RT (Reg Threshold)	970
n (Recommend Sx's)	0.00
sx	0.08
CI (90% Confindence Interval)	0.66
90% Chebyshev Limit	2

1730

Sx Number	Pit	Cs137	Cs Activity (pCi/g)	Cs VQ	Tc99 Activity (pCi/g)	c V	U234 Activity (pCi/g)	234 V	U235 Activity (pCi/g)	235 V	U238 Activity (pCi/g)	238 V	Th230 Activity (pCi/g)	230	Th228 Activity (pCi/g)	h228 V	Th232 Activity (pCi/g)
063061	1	Cs137	0.1	UJ	1.1	J	830	J	47.3	J	915	J	5460	-	355	UD	150
063071	1	Cs137	0.15	DU	0.45	U	441	-	64	E	623	C	4220	-	131	-	131
063100	1	Cs137	0.1	UJ	0.45	U	423	-	19.8	-	445	-	5270	-	306	U	210
063112	1	Cs137	0.1	UJ	0.45	U	600	-	35.6	J	1342	-	245	DU	396	DU	245
	1 Count																
	1 Average																
	1 Var																
063630	2	Cs137	0.65	UJD	0.45	U	1651	-	130	-	1661	-	18400	-	816	-	170
063632	2	Cs137	0.15	UJ	1.64	-	250	-	18.5	-	279	-	2630	-	667	-	266
	2 Count																
	2 Average																
	2 Var																
063308	3	Cs137	0.1	UJ	1.39	-	154	F	23.6	-	663	-	3.26	J	1.48	J	1.2
063310	3	Cs137	0.25	DU	1.75	-	473	F	48.6	-	1740	-	3.81	-	1.85	DU	0.76
063474	3	Cs137	0.15	UJD	16.4	-	946	-	89.2	-	860	-	5770	J	410	U	180
063476	3	Cs137	0.2	UJ	15.9	-	991	-	36.1	-	922	-	4780	-	427	-	272
	3 Count																
	3 Average																
	3 Var																
063850	4	Cs137	0.6	UJD	4.22	J	4100	F	934	-	41900	-	240	-	56	-	28
063852	4	Cs137	0.3	UJD	3.15	J	3630	F	536	-	33100	C	783	-	26.8	-	23.4
	4 Count																
	4 Average																
	4 Var																
100210	5	Cs137	15	J	1090	J	170	J	1.15	UJ	220	J	190	J	0.48	J	0.34
100211	5	Cs137	56	J	1940	J	410	J	16	J	500	J	92	J	0.92	J	0.36
100212	5	Cs137	36	J	593	J	860	J	39	J	880	J	2600	J	20	J	10
100213	5	Cs137	78	J	731	J	670	J	33	J	710	J	190	J	6.8	J	1.4
100214	5	Cs137	2.8	J	1540	J	290	J	0.125	UJ	282	J	140	J	28	J	3
100215	5	Cs137	8	J	1960	J	860	J	35	J	960	J	120	J	3.2	J	0.6
100216	5	Cs137	4.1	J	827	J	420	J	0.465	UJ	410	J	11	J	1.5	J	0.04
100217	5	Cs137	5	J	3020	J	680	J	0.49	UJ	650	J	96	J	36	J	6.9
100218	5	Cs137	4	J	2050	J	680	J	0.41	UJ	680	J	9.8	J	2	J	0.126
	5 Count																
	5 Average																
	5 Var																
100225	6	Cs137	0.9	J	1.85	UJ	1030	J	110	J	6863	J	4.9	J	0.7	J	0.4
100226	6	Cs137	0.9	J	1.8	UJ	2336	J	159	J	13065	J	39	J	1.2	J	0.4
100227	6	Cs137	1.6	J	2.05	UJ	1796	J	132	J	10400	J	4.6	J	1.3	J	0.6
100228	6	Cs137	7.5	J	13	J	1780	J	158	J	9001	J	35	J	0.9	J	0.2
100229	6	Cs137	14	J	44	J	4064	J	337	J	28746	J	39	J	1.4	J	0.4
100230	6	Cs137	10	J	45	J	3409	J	312	J	24350	J	62	J	1.7	J	1
100231	6	Cs137	12.3	J	32	J	3328	J	293	J	19563	J	52	J	1.6	J	0.6
100232	6	Cs137	10.5	J	7.1	J	1465	J	137	J	8886	J	26	J	1.1	J	0.8
	6 Count																
	6 Average																
	6 Var																
063160	Burn	Cs137	0.1	UJ	0.792	-	40.5	J	3.8	J	122	J	5.32	J	1.96	J	1.67
063162	Burn	Cs137	0.1	UJ	3.29	-	417	J	44.2	J	539	J	90	J	4.71	J	5.14
063201	Burn	Cs137	0.1	U	1.47	-	695	-	63.5	E	731	C	107	-	12.4	-	14.4
063203	Burn	Cs137	0.1	U	0.847	-	1711	-	102	C	1996	-	4530	-	450	DU	205
	Burn Count																
	Burn																
	Burn Var																
098526	Clear	Cs137	48	J	212	J	192	J	11.4	J	357	J	78.6	J	28.1	J	4.24
098527	Clear	Cs137	40	J	695	J	71.1	J	4.61	J	176	J	79.5	J	17.7	J	2.72
098528	Clear	Cs137	9.16	J	112	J	47.2	J	2.54	J	137	J	70	J	6.05	J	3.66
098529	Clear	Cs137	66.7	J	393	J	738	J	273	J	1640	J	314	J	26.3	J	9.66
098530	Clear	Cs137	71.41	J	419	J	645	J	363	J	1320	J	249	J	25.7	J	8.16
098531	Clear	Cs137	18.1	J	314	J	1050	J	363	J	1240	J	63	J	14.5	J	3.16
	Clear Count																
	Clear																
	Clear Var																
	Grand																
	Grand																
	Grand Var																

000498

232	Ra226 Activity (pCi/g)	226	Ra228 Activity (pCi/g)	Ra228 VQ	WAC										
UD	99.6	J	41	J	0.712054473										
.	76.9	-	37.2	-	0.578475182										
U	92.3	J	31.2	J	0.701121680										
DU	13.4	J	4.02	J	0.407484204										
					4						Weighted		Weighted		
					0.614782887			Mass Fraction:		0.13	Average:	0.079921905	Variance:	0.003257271	
					0.025055833										
DU	951	J	437	J	2.636676278										
.	161	J	71	J	0.76116626										
					2						Weighted		Weighted		
					1.699820769			Mass Fraction:		0.06	Average:	0.101995246	Variance:	0.105751203	
					1.762520057										
.	1.41	J	1.5	J	0.012747568										
DU	37	-	142	-	0.252803668										
U	208	J	119	J	0.948663256										
.	109	J	119	J	0.968654841										
					4						Weighted		Weighted		
					0.545767233			Mass Fraction:		0.45	Average:	0.2455953	Variance:	0.106689891	
					0.237066647										
.	22.6	J	44.8	J	0.563066299										
.	50.1	J	31.1	J	0.497397206										
					2						Weighted		Weighted		
					0.530241753			Mass Fraction:		0.15	Average:	0.079536263	Variance:	0.000323629	
					0.002157526										
J	26	J	1.45	UJ	0.058672469										
J	81	J	8.5	J	0.188267494										
J	150	J	14	J	0.304369318										
J	110	J	24	J	0.257677565										
J	39	J	11	J	0.059664145										
J	150	J	20	J	0.14469245										
UJ	79	J	39	J	0.113372404										
J	70	J	32	J	0.120265521										
UJ	48	J	24	J	0.066168273										
					9						Weighted		Weighted		
					0.151951499			Mass Fraction:		0.12	Average:	0.01823418	Variance:	0.001221778	
					0.010181496										
J	3.2	J	13	J	0.066279575										
J	2.9	J	83	J	0.271604763										
J	4.6	J	8	J	0.130256188										
J	3.4	J	191	J	0.40224030										
J	4.1	J	79	J	0.449468047										
J	4.4	J	26	J	0.319657944										
J	4.9	J	15	J	0.26189692										
J	3.7	J	19	J	0.14691935										
					8						Weighted		Weighted		
					0.256805394			Mass Fraction:		0.02	Average:	0.005196108	Variance:	0.000332092	
					0.019604614										
J	2.18	J	1.92	J	0.00945691										
J	6.31	J	5.07	J	0.034552266										
.	8.95	J	10.4	-	0.062026673										
DU	39.2	-	9.19	-	0.07159265										
					4						Weighted		Weighted		
					0.194157105			Mass Fraction:		0.06	Average:	0.011649426	Variance:	0.006107234	
					0.101787236										
J	76	J	25	J	0.177587956										
J	64	J	14.1	J	0.13606192										
J	10	J	6.59	J	0.042962737										
J	78	J	26.4	J	0.257702652										
J	170	J	21.4	J	0.29426591										
J	43	J	12.7	J	0.105771205										
					6						Weighted		Weighted		
					0.16906276			Mass Fraction:		0.01	Average:	0.001690628	Variance:	8.9193E-05	
					0.006919296										
					39										
					0.367690709						Weighted		Weighted		Weighted
					0.20699723			Totals:		1	Average:	0.543819086	Variance:	0.223772293	STD: 0.473045762

Number Sx's	39
Weighted Mean	0.54
Std Dev	0.47
Std Dev* Std Dev	0.224
1.20 (Dep F =#Sx's - 8)	1.310
1.20*1.20	1.716
RT (Reg Threshold)	670
n (Recommend Sx's)	0.00
sx	0.08
CI (90% Confidence Interval)	0.64
90% Chebyshev Limit	2

000499

E-1730

Sx Number	Pit	Cs137	Cs Activity (pCi/g)	Cs V	Tc99 Activity (pCi/g)	e V	U234 Activity (pCi/g)	34	U235 Activity (pCi/g)	235	U238 Activity (pCi/g)	38	Th230 Activity (pCi/g)	230	Th228 Activity (pCi/g)	228	Th232 Activity (pCi/g)	232
063061	1	Cs137	0.1	UJ	1.1	J	930	J	47.3	J	915	J	5400	-	359	UD	150	UD
063071	1	Cs137	0.15	DU	0.45	U	441	-	64	E	623	C	4220	-	131	-	131	-
063100	1	Cs137	0.1	UJ	0.45	U	423	-	19.6	-	445	-	5270	-	305	U	210	U
063112	1	Cs137	0.1	UJ	0.45	U	800	-	35.6	J	1342	-	245	DU	395	DU	245	DU
	1 Count																	
	1																	
	1 Var																	
063630	2	Cs137	0.05	UJD	0.45	U	1051	-	130	-	1861	-	18400	-	616	-	170	DU
063632	2	Cs137	0.15	UJ	1.64	-	250	-	19.5	-	279	-	2630	-	697	-	299	-
	2 Count																	
	2																	
	2 Var																	
063309	3	Cs137	0.1	UJ	1.39	-	154	F	23.6	-	063	-	3.28	J	1.48	J	1.2	-
063310	3	Cs137	0.25	DU	1.75	-	473	F	48.6	-	1740	-	3.81	-	1.85	DU	0.75	DU
063474	3	Cs137	0.15	UJD	16.4	-	946	-	69.2	-	980	-	5770	J	410	U	180	U
063476	3	Cs137	0.2	UJ	15.9	-	981	-	36.1	-	922	-	4790	-	427	-	272	-
	3 Count																	
	3																	
	3 Var																	
063850	4	Cs137	0.6	UJD	4.22	J	4100	F	934	-	41900	-	240	-	56	-	29	-
063852	4	Cs137	0.3	UJD	3.15	J	3630	F	536	-	33100	C	783	-	26.6	-	23.4	-
	4 Count																	
	4																	
	4 Var																	
100210	5	Cs137	15	J	1090	J	170	J	1.15	UJ	220	J	190	J	0.48	J	0.34	J
100211	5	Cs137	56	J	1940	J	410	J	16	J	500	J	92	J	0.92	J	0.38	J
100212	5	Cs137	36	J	593	J	880	J	29	J	880	J	2000	J	20	J	10	J
100213	5	Cs137	78	J	731	J	870	J	33	J	710	J	190	J	6.6	J	1.4	J
100214	5	Cs137	2.6	J	1540	J	290	J	0.125	UJ	282	J	140	J	28	J	3	J
100215	5	Cs137	8	J	1900	J	880	J	36	J	900	J	120	J	3.3	J	0.6	J
100216	5	Cs137	4.1	J	827	J	420	J	0.485	UJ	410	J	11	J	1.6	J	0.04	UJ
100217	5	Cs137	5	J	3020	J	880	J	0.49	UJ	850	J	96	J	38	J	6.9	J
100218	5	Cs137	4	J	2050	J	880	J	0.41	UJ	880	J	9.8	J	2	J	0.125	UJ
	5 Count																	
	5																	
	5 Var																	
100225	6	Cs137	0.9	J	1.85	UJ	1030	J	110	J	6863	J	4.9	J	0.7	J	0.4	J
100226	6	Cs137	0.9	J	1.9	UJ	2338	J	158	J	13095	J	35	J	1.2	J	0.4	J
100227	6	Cs137	1.6	J	2.05	UJ	1786	J	132	J	10400	J	4.6	J	1.3	J	0.6	J
100228	6	Cs137	7.5	J	13	J	1780	J	158	J	9001	J	35	J	0.9	J	0.2	J
100229	6	Cs137	14	J	44	J	4084	J	337	J	28746	J	39	J	1.4	J	0.4	J
100230	6	Cs137	10	J	45	J	3409	J	312	J	24350	J	62	J	1.7	J	1	J
100231	6	Cs137	12.3	J	32	J	3328	J	293	J	18563	J	52	J	1.6	J	0.6	J
100232	6	Cs137	10.5	J	7.1	J	1465	J	137	J	8890	J	26	J	1.1	J	0.6	J
	6 Count																	
	6																	
	6 Var																	
063160	Burn	Cs137	0.1	UJ	0.792	-	40.5	J	3.8	J	122	J	5.32	J	1.38	J	1.87	J
063162	Burn	Cs137	0.1	UJ	3.29	-	417	J	44.2	J	539	J	90	J	4.71	J	8.14	J
063201	Burn	Cs137	0.1	U	1.47	-	895	-	63.5	E	731	C	107	-	12.4	-	14.4	-
063203	Burn	Cs137	0.1	U	0.847	-	1711	-	102	C	1998	-	4530	-	450	DU	205	DU
	Burn																	
	Burn																	
	Burn Var																	
098526	Clear	Cs137	49	J	212	J	192	J	11.4	J	357	J	78.6	J	28.1	J	4.24	J
098527	Clear	Cs137	40	J	695	J	71.1	J	4.61	J	176	J	79.5	J	17.7	J	2.72	J
098528	Clear	Cs137	9.16	J	112	J	47.2	J	2.64	J	137	J	70	J	8.05	J	3.69	J
098529	Clear	Cs137	66.7	J	393	J	736	J	373	J	1940	J	314	J	26.3	J	9.69	J
098530	Clear	Cs137	71.41	J	419	J	945	J	363	J	1320	J	249	J	25.7	J	8.19	J
098531	Clear	Cs137	18.1	J	314	J	1050	J	363	J	1240	J	63	J	14.5	J	3.19	J
	Clear																	
	Clear																	
	Clear Var																	
	Grand																	
	Grand																	
	Grand																	

000500

Ra226 Activity (pCi/g)	226	Ra228 Activity (pCi/g)	a228 V	Sum a(i)/A2(i) (Ci/g)	Total Activity (Ci/g)	LSA-1 (Ci/g) A2/g x 10e-6							
99.6	J	41	J	1.07308E-06	7.8991E-09	7.36117E-09							
76.9	-	37.2	-	8.08677E-07	5.7247E-09	7.07909E-09							
92.3	J	31.2	J	1.01823E-06	6.79685E-09	6.67497E-09							
13.4	J	4.02	J	1.04111E-07	2.68057E-09	2.76682E-08							
				4					Weighted		Weighted		
				7.51024E-07			Mass Fraction:	0.13	Average:	9.763E-08	Variance:	2.587E-14	
				1.98979E-13									
951	J	437	J	3.52146E-06	2.42171E-08	6.877E-09							
161	J	.71	J	5.60298E-07	4.37629E-09	7.81065E-09							
				2					Weighted		Weighted		
				2.04069E-06			Mass Fraction:	0.06	Average:	1.225E-07	Variance:	2.631E-13	
				4.38425E-12									
1.41	J	1.5	J	6.46105E-09	8.5096E-10	1.3191E-07							
37	-	142	-	1.85964E-08	2.44901E-09	1.31692E-07							
208	J	119	J	1.14004E-06	8.61875E-09	7.56004E-09							
109	J	119	J	9.60103E-07	7.6722E-09	7.99101E-09							
				4					Weighted		Weighted		
				5.31298E-07			Mass Fraction:	0.45	Average:	2.391E-07	Variance:	1.639E-13	
				3.64256E-13									
22.6	J	44.8	J	2.01483E-07	4.73302E-08	2.34809E-07							
50.1	J	31.1	J	2.8178E-07	3.81839E-08	1.3551E-07							
				2					Weighted		Weighted		
				2.41632E-07			Mass Fraction:	0.15	Average:	3.624E-08	Variance:	4.836E-16	
				3.22376E-15									
26	J	1.45	UJ	4.15114E-08	1.71442E-09	4.13E-08							
81	J	8.5	J	3.24379E-08	3.10478E-09	9.57149E-08							
150	J	14	J	5.14569E-07	5.202E-09	1.01091E-06							
110	J	24	J	6.07963E-08	2.5542E-09	4.20124E-08							
39	J	11	J	3.9294E-08	2.33593E-09	5.94474E-08							
150	J	20	J	5.46353E-08	4.1169E-09	7.53524E-08							
79	J	39	J	1.79108E-08	1.79213E-09	1.00058E-07							
70	J	32	J	4.64237E-08	4.59739E-09	9.9031E-08							
48	J	24	J	2.72935E-08	3.49834E-09	1.28175E-07							
				9					Weighted		Weighted		
				9.27657E-08			Mass Fraction:	0.12	Average:	1.113E-08	Variance:	3.024E-15	
				2.51967E-14									
3.2	J	13	J	3.91369E-08	8.02795E-09	2.05125E-07							
2.9	J	83	J	9.32569E-08	1.57173E-08	1.68539E-07							
4.6	J	8	J	6.75053E-08	1.23508E-08	1.8298E-07							
3.4	J	191	J	7.28058E-08	1.119E-08	1.53993E-07							
4.1	J	79	J	1.5794E-07	3.33289E-08	2.11022E-07							
4.4	J	26	J	1.3791E-07	2.82211E-08	2.04634E-07							
4.9	J	15	J	1.32969E-07	2.33004E-08	1.75231E-07							
3.7	J	19	J	5.91920E-08	1.0556E-08	1.78333E-07							
				8					Weighted		Weighted		
				9.50722E-08			Mass Fraction:	0.02	Average:	1.901E-09	Variance:	3.687E-17	
				1.84356E-15									
2.18	J	1.92	J	2.67069E-09	1.80242E-10	6.74889E-08							
9.31	J	5.07	J	3.25386E-08	1.11862E-09	3.43751E-08							
8.95	J	10.4	-	4.68934E-08	1.64422E-09	3.52131E-08							
39.2	-	9.19	-	9.42456E-07	9.04334E-09	9.5955E-09							
				4					Weighted		Weighted		
				2.56089E-07			Mass Fraction:	0.06	Average:	1.537E-08	Variance:	1.258E-14	
				2.09714E-13									
76	J	25	J	2.44092E-08	1.03234E-09	4.2293E-08							
64	J	14.1	J	1.91019E-08	1.16473E-09	6.09749E-08							
10	J	6.59	J	1.52727E-08	4.0423E-10	2.64675E-08							
78	J	26.4	J	8.79832E-08	3.66509E-09	4.16567E-08							
170	J	21.4	J	7.26341E-08	3.2927E-09	4.53327E-08							
43	J	12.7	J	5.19694E-08	3.12148E-09	6.00638E-08							
				6					Weighted		Weighted		
				4.52284E-08			Mass Fraction:	0.01	Average:	4.523E-10	Variance:	9.276E-18	
				9.27573E-16									
				39									
				3.22705E-07					Weighted		Weighted		Weighted
				3.97916E-13			Totals:	1	Average:	5.243E-07	Variance:	4.69E-13	STD: 6.848E-07

Number Sx's	39
Weighted Mean	5.24E-07
Std Dev	6.85E-07
Std Dev* Std Dev	4.69E-13
t.20 (Deg F = #Sx's - 9)	1.289
t.20*t.20	1.662
RT (Reg Threshold)	1.00E-06
n (Recommend Sx's)	3.44
sx	1.10E-07
CI (90% Confindence Interval)	6.66E-07
90% Chebyshev Limit	2.69E-06

000501

1730

Sx Number	Pt	Cs137	Cs Activity (pCi/g)	Cs V	Tc99 Activity (pCi/g)	c V	U234 Activity (pCi/g)	34	U235 Activity (pCi/g)	235	U238 Activity (pCi/g)	38	Th230 Activity (pCi/g)	230	Th228 Activity (pCi/g)	228	Th232 Activity (pCi/g)	232
063061	1	Cs137	0.1	UJ	1.1	J	830	J	47.3	J	915	J	5400	-	355	UD	150	UD
063071	1	Cs137	0.15	DU	0.45	U	441	-	64	E	623	C	4220	-	121	-	131	-
063100	1	Cs137	0.1	UJ	0.45	U	423	-	19.8	-	445	-	5270	-	305	U	210	U
063112	1	Cs137	0.1	UJ	0.45	U	600	-	35.8	J	1342	-	245	DU	395	DU	245	DU
	1 Count																	
	1																	
	1 Var																	
063630	2	Cs137	0.65	UJD	0.45	U	1651	-	130	-	1861	-	19400	-	610	-	170	DU
063632	2	Cs137	0.15	UJ	1.64	-	250	-	19.5	-	279	-	2630	-	697	-	266	-
	2 Count																	
	2																	
	2 Var																	
063308	3	Cs137	0.1	UJ	1.39	-	154	F	23.6	-	663	-	3.26	J	1.49	J	1.2	-
063310	3	Cs137	0.25	DU	1.75	-	473	F	48.6	-	1740	-	3.81	-	1.85	DU	0.75	DU
063474	3	Cs137	0.15	UJD	16.4	-	946	-	69.2	-	860	-	5770	J	410	U	160	U
063476	3	Cs137	0.2	UJ	15.9	-	991	-	36.1	-	922	-	4760	-	427	-	272	-
	3 Count																	
	3																	
	3 Var																	
063850	4	Cs137	0.6	UJD	4.22	J	4100	F	934	-	41900	-	240	-	56	-	29	-
063852	4	Cs137	0.3	UJD	3.15	J	3630	F	536	-	33100	C	783	-	26.8	-	23.4	-
	4 Count																	
	4																	
	4 Var																	
100210	5	Cs137	15	J	1090	J	170	J	1.15	UJ	220	J	190	J	0.49	J	0.34	J
100211	5	Cs137	56	J	1940	J	410	J	16	J	500	J	92	J	0.92	J	0.36	J
100212	5	Cs137	36	J	593	J	800	J	39	J	880	J	2600	J	20	J	10	J
100213	5	Cs137	76	J	731	J	670	J	33	J	710	J	190	J	6.8	J	1.4	J
100214	5	Cs137	2.8	J	1540	J	290	J	0.125	UJ	282	J	140	J	28	J	3	J
100215	5	Cs137	8	J	1960	J	860	J	35	J	960	J	120	J	3.3	J	0.8	J
100216	5	Cs137	4.1	J	827	J	420	J	0.485	UJ	410	J	11	J	1.5	J	0.04	UJ
100217	5	Cs137	5	J	3020	J	880	J	0.49	UJ	850	J	95	J	38	J	6.8	J
100218	5	Cs137	4	J	2050	J	680	J	0.41	UJ	680	J	9.8	J	2	J	0.125	UJ
	5 Count																	
	5																	
	5 Var																	
100225	6	Cs137	0.9	J	1.85	UJ	1030	J	110	J	6863	J	4.9	J	0.7	J	0.4	J
100226	6	Cs137	0.9	J	1.9	UJ	2338	J	159	J	13095	J	35	J	1.2	J	0.4	J
100227	6	Cs137	1.6	J	2.05	UJ	1796	J	132	J	10400	J	4.6	J	1.3	J	0.6	J
100228	6	Cs137	7.5	J	13	J	1780	J	156	J	9001	J	35	J	0.9	J	0.2	J
100229	6	Cs137	14	J	44	J	4064	J	337	J	28749	J	39	J	1.4	J	0.4	J
100230	6	Cs137	10	J	45	J	3409	J	312	J	24350	J	62	J	1.7	J	1	J
100231	6	Cs137	12.3	J	32	J	3328	J	293	J	19563	J	52	J	1.6	J	0.6	J
100232	6	Cs137	10.5	J	7.1	J	1465	J	137	J	8998	J	26	J	1.1	J	0.6	J
	6 Count																	
	6																	
	6 Var																	
063160	Burn	Cs137	0.1	UJ	0.792	-	40.5	J	3.8	J	122	J	5.32	J	1.98	J	1.07	J
063162	Burn	Cs137	0.1	UJ	3.29	-	417	J	44.2	J	539	J	90	J	4.71	J	5.14	J
063201	Burn	Cs137	0.1	U	1.47	-	695	-	63.5	E	731	C	107	-	12.4	-	14.4	-
063203	Burn	Cs137	0.1	U	0.847	-	1711	-	102	C	1996	-	4530	-	450	DU	205	DU
	Burn																	
	Burn																	
	Burn Var																	
096526	Clear	Cs137	48	J	212	J	192	J	11.4	J	357	J	78.6	J	28.1	J	4.24	J
096527	Clear	Cs137	40	J	695	J	71.1	J	4.61	J	176	J	79.5	J	17.7	J	2.72	J
096528	Clear	Cs137	9.16	J	112	J	47.2	J	2.54	J	137	J	70	J	6.09	J	3.69	J
096529	Clear	Cs137	66.7	J	393	J	739	J	373	J	1640	J	314	J	20.3	J	9.69	J
096530	Clear	Cs137	71.41	J	419	J	645	J	393	J	1320	J	249	J	25.7	J	8.19	J
096531	Clear	Cs137	18.1	J	314	J	1050	J	363	J	1240	J	63	J	14.5	J	3.19	J
	Clear																	
	Clear																	
	Clear Var																	
	Grand																	
	Grand																	
	Grand																	

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Ra226 Activity (pCi/g)	226	Ra228 Activity (pCi/g)	a228 V	Sum a(i)/A2(i) (Ci/g)	Total Activity (Ci/g)	LSA-I (Ci/g) A2/g X 10e-6							
99.6	J	41	J	1.07306E-06	7.8991E-09	7.36117E-09							
76.9	-	37.2	-	8.08677E-07	5.7247E-09	7.07909E-09							
92.3	J	31.2	J	1.01823E-06	6.79665E-09	6.67497E-09							
13.4	J	4.02	J	1.04111E-07	2.88057E-09	2.76682E-08							
				4					Weighted		Weighted		
				7.51024E-07			Mass Fraction:	0.13	Average:	9.763E-08	Variance:	2.587E-14	
				1.98979E-13									
951	J	437	J	3.52146E-06	2.42171E-08	6.877E-09							
161	J	71	J	5.60298E-07	4.37629E-09	7.81065E-09							
				2					Weighted		Weighted		
				2.04068E-06			Mass Fraction:	0.06	Average:	1.225E-07	Variance:	2.631E-13	
				4.38425E-12									
1.41	J	1.5	J	6.45111E-09	8.5096E-10	1.31909E-07							
37	-	142	-	1.85985E-08	2.44901E-09	1.31692E-07							
208	J	119	J	1.14004E-06	8.61875E-09	7.56004E-09							
109	J	119	J	9.60104E-07	7.6722E-09	7.99101E-09							
				4					Weighted		Weighted		
				5.31298E-07			Mass Fraction:	0.45	Average:	2.391E-07	Variance:	1.639E-13	
				3.64257E-13									
22.6	J	44.8	J	2.01484E-07	4.73302E-08	2.34909E-07							
50.1	J	31.1	J	2.8178E-07	3.81839E-08	1.35509E-07							
				2					Weighted		Weighted		
				2.41632E-07			Mass Fraction:	0.15	Average:	3.624E-08	Variance:	4.836E-16	
				3.22378E-15									
26	J	1.45	UJ	4.15563E-09	1.71442E-09	4.12554E-09							
81	J	8.5	J	3.25176E-08	3.10478E-09	9.54799E-08							
150	J	14	J	5.14613E-07	5.202E-09	1.01086E-08							
110	J	24	J	6.08264E-08	2.5542E-09	4.19916E-08							
39	J	11	J	3.93574E-08	2.33593E-09	5.93516E-08							
150	J	20	J	5.47159E-06	4.1188E-09	7.52413E-06							
79	J	39	J	1.79449E-08	1.78213E-09	9.98084E-08							
70	J	32	J	4.8548E-08	4.59739E-09	9.87666E-08							
48	J	24	J	2.73779E-08	3.49834E-09	1.2778E-07							
				9					Weighted		Weighted		
				9.28286E-08			Mass Fraction:	0.12	Average:	1.114E-08	Variance:	3.023E-15	
				2.51922E-14									
3.2	J	13	J	3.9137E-08	8.02795E-09	2.05124E-07							
2.9	J	83	J	9.3257E-08	1.57173E-08	1.68537E-07							
4.8	J	8	J	6.75054E-08	1.23508E-08	1.82959E-07							
3.4	J	191	J	7.26663E-08	1.119E-08	1.53992E-07							
4.1	J	79	J	1.57942E-07	3.33289E-08	2.1102E-07							
4.4	J	26	J	1.37812E-07	2.82211E-08	2.04631E-07							
4.9	J	15	J	1.32971E-07	2.33004E-08	1.7523E-07							
3.7	J	19	J	5.91929E-08	1.0556E-08	1.78332E-07							
				8					Weighted		Weighted		
				9.50729E-08			Mass Fraction:	0.02	Average:	1.901E-09	Variance:	3.087E-17	
				1.84304E-15									
2.18	J	1.92	J	2.67073E-09	1.90242E-10	6.7488E-08							
8.31	J	5.07	J	3.25367E-08	1.11682E-09	3.43249E-08							
8.95	J	10.4	-	4.60935E-08	1.64422E-09	3.5213E-08							
39.2	-	9.19	-	9.42456E-07	9.04334E-09	9.5955E-09							
				4					Weighted		Weighted		
				2.56099E-07			Mass Fraction:	0.06	Average:	1.537E-08	Variance:	1.258E-14	
				2.09714E-13									
76	J	25	J	2.4418E-08	1.03234E-09	4.22779E-08							
64	J	14.1	J	1.91304E-08	1.18473E-09	6.08837E-08							
10	J	6.59	J	1.52773E-08	4.0423E-10	2.64595E-08							
78	J	26.4	J	8.79994E-08	3.66509E-09	4.1649E-08							
170	J	21.4	J	7.26514E-08	3.2927E-09	4.53219E-08							
43	J	12.7	J	5.19823E-08	3.1214E-09	6.00489E-08							
				6					Weighted		Weighted		
				4.52431E-08			Mass Fraction:	0.01	Average:	4.524E-10	Variance:	9.276E-18	
				9.27647E-16									
				39									
				3.22722E-07					Weighted		Weighted		Weighted
				3.97907E-13			Totals:	1	Average:	5.243E-07	Variance:	4.69E-13	STD: 6.849E-07

Number Sx's	39
Weighted Mean	5.24E-07
Std Dev	6.85E-07
Std Dev * Std Dev	4.69E-13
t.20 (Deg F = #Sx's - 8)	1.289
t.20 * t.20	1.662
RT (Reg Threshold)	1.00E-06
n (Recommend Sx's)	3.44
sx	1.10E-07
CI (90% Confindence Interval)	6.66E-07
90% Chebyshev Limit	2.69E-06

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Sample Number Calculator:				
		LSAI - Factor		
		N =	39	
		s =	6.85E-07	
		x =	5.24E-07	
		RT =	0.000001	
		RT - x =	-4.8E-07	
		90% CI =	7.66E-07	
	Chebyshev Level =		2.69E-06	
N	F	t.20	n	
1	0			
2	1	3.078	19.62025	
3	2	1.886	7.366321	
4	3	1.638	5.55642	
5	4	1.533	4.86689	
6	5	1.476	4.511697	
7	6	1.44	4.294298	
8	7	1.415	4.146485	
9	8	1.397	4.041663	
10	9	1.393	4.018551	
11	10	1.372	3.898302	
12	11	1.363	3.847326	
13	12	1.356	3.807909	
14	13	1.35	3.774286	
15	14	1.345	3.74638	
16	15	1.341	3.72413	
17	16	1.337	3.701946	
18	17	1.333	3.679828	
19	18	1.33	3.663283	
20	19	1.328	3.652274	
21	20	1.325	3.635792	

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DRAFT

Waste Pits Remedial Action Project (WPRAP)

Performance Test Criteria

***

PREPARED
for
Fluor Daniel Fernald, Inc.
Fernald, Ohio

FDF Subcontract No. 98SC000001

***

PREPARED
by
IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

IT Project No. 773481

***

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Issue Date: September 25, 1998

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Date	Rev. No.	Description of Issue/Revision
6-25-98	A	Original Issue of Draft
8-20-98	B	Draft Issue for FDF Review
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List of Acronyms/Abbreviations

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ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
BSL	Bureau of Labor Statistics
CEM	continuous emissions monitoring
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
EC	electrical conductivity
EPA	U.S. Environmental Protection Agency
FDF	Fluor Daniel Fernald
FID	flame ionization detector
g	grams
GC	gas chromatography
GET	General Employee Training
GPM	gallons per minute
HEPA	high-efficiency particulate air
Hg	mercury
ID	induced draft
L/min	liters per minute
lb/hr	pounds per hour
MS	mass spectrometry
NDIR	nondispersive infrared
O_2	oxygen
OU	operable unit
THC	total hydrocarbons
VOA	volatile organic analyte
VOC	volatile organic compound
VOST	volatile organic sampling train
WESP	wet electrostatic precipitator
WPRAP	Waste Pits Remedial Action Project
WTS	Wastewater Treatment System

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1.0 INTRODUCTION

This Performance Test Criteria is for the Dryer off gas vent stack at the Fernald OU1 Remedial Action Project. This document is intended to provide the supplemental information required by the State of Ohio in the Intent to Test Notification procedures.

The "Intent to Test Notification" form is attached. The general layout of this document follows the outline provided by the Ohio EPA intent to test notification additional information document.

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2.0 TECHNICAL APPROACH

2.1 Performance Test Overview

To collect the required information, one sampling run will be performed. All testing will be performed using EPA Reference Methods or Methods contained in SW-846.

The Performance Test will involve conducting emissions testing during normal full load operations of both dryers. The material processed by the dryers will consist of actual waste pit materials. Before the Performance Test, WPRAP will check the stockpiled wastepit material to verify that the waste is representative of the wastes that are generated during routine operations.

2.2 Description of Test Methods

The following sections provide summary descriptions of the test methodologies to be used to quantify emissions of the targeted parameters.

2.2.1 Location of Traverse Points

To insure representative sampling of particulate and the other non-gaseous target constituents, the cross section of the stack will be divided into discreet sampling points according to the procedures described in 40 CFR 60; Appendix A, Method 1. The stack gas characteristics (i.e., flow, temp.) will be measured at each of the traverse locations during the test run.

2.2.2 Velocity and Volumetric Flow Measurements

Velocity measurements will be performed prior to sampling so as to characterize the gas stream flow characteristics, and during each sampling run. Velocity measurements on each source will be performed using the procedures outlined in 40 CFR, Part 60, Appendix A, Method 2, Determination of Stack Gas Velocity and Volumetric Flow Rate. The velocity pressures will be measured using a "S"-type pitot tube and standard oil filled manometers.

Cyclonic flow patterns with angles greater than 10° off vertical are not expected at the sampling location. However, cyclonic flow checks will be performed using a S-type pitot tube as described in Method 1, Section 2.4. If the average yaw angle exceeds 20° an alternative particulate sampling location will be considered or alternate methods to measure velocity and particulate emission rates will be proposed.

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2.2.3 Temperature Measurements

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The temperature of the stack gas will be measured prior to sampling and during each test run using K-type thermocouples and dedicated digital temperature readouts. Each isokinetic sampling train will be equipped with a thermocouple. The temperature will be recorded on the sampling data sheet at each traverse point location. The stack temperatures will be arithmetically averaged and used to calculate the volumetric flow rates at standard and dry standard conditions.

2.2.4 Moisture Determinations

The moisture content of the stack gas will be determined using procedures outlined in 40 CFR 60; Appendix A, Reference Method 4. The Method 4 sampling will be incorporated with the isokinetic sampling train, and as a separate sample train for moisture determinations prior to any isokinetic sampling. The moisture will be determined for the sampling train by gravimetrically measuring the weight gain of the chilled impingers over the length of the sampling run.

2.2.5 Carbon Dioxide and Oxygen

The CO_2 and O_2 stack gas concentrations will be determined according to procedures specified in CFR 40, Part 60, Appendix A, Method 3, Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight. Stack gas samples for CO_2 and O_2 will be collected utilizing a stainless steel sampling probe attached to an isokinetic sample train. The sample will be collected in either a 10 liter aluminized polyethylene or Tedlar® bag using a multi-point grab sampling technique. A grab sampling train, as illustrated in CFR 40, Part 60, Appendix A, Method 3, will be used to draw equal volumes of stack gas at each traverse point. The composite sample collected during the test run will be analyzed using an Orsat analyzer. All samples will be analyzed within four hours of collection.

2.2.6 Particulate

The gas stream will be sampled for particulate using an EPA Method 5 sampling train. A schematic of the sampling train is shown in Figure 1. The sampling train will collect approximately 180 dry standard cubic feet of gas during the six hour sampling run. Particulate matter will be collected on a glass fiber filter in the M5 train according to EPA Method 5. The weight gain of this filter will be used determine the total particulate concentration in the gas stream, and the resulting particulate mass emission rate. The M5 procedure includes measurement of the stack gas flow rate and temperature according to EPA Methods 1 and 2. The train will also be used to determine the moisture of the gas stream according to EPA Method 4.

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The samples will be recovered from the M5 train as follows: 1730

- **Particulate Filter.** Will be removed from the filter holder, placed in a petri dish, and sealed.

- **Probe Rinse.** The nozzle, probe, and front half of the filter holder and any connecting glassware will be brushed and rinsed with acetone. The rinses will be placed in glass jars with Teflon-lined lids.

- **Impinger Solutions.** The contents of each impinger will be volumetrically measured and placed in a glass sample bottle with a Teflon-lined lid. The impingers and connecting glassware will be rinsed with measured amounts of the appropriate impinger solutions and the rinses added to the appropriate sample bottle.

- **Silica Gel.** The silica gel impinger will be weighed to the nearest 0.5 g to determine the amount of moisture collected.

Quality control samples for the M5 train will consist of blanks for the filter, acetone, and impinger solutions.

2.2.7 Volatile Organic Compounds

Volatile Organic Sampling Train Method 0030, *Test Methods for Evaluating Solid Wastes, SW-846*, 3rd Edition, September, 1986 will be used to measure the emission rates of specific volatile compounds from the process stack. Sampling will take place during the sampling run with replacement of sorbent tube pairs after each 40 minutes of sampling. Each pair of tubes will be used to sample approximately 20 liters of stack gas. The VOST condensate is to be collected one time at the end of each sampling run in 40 ml VOA vials eliminating head space. All VOA samples will be stored on ice from the time of collection. Four pairs of sorbentcartridges will be collected during the run, three of the pairs will be targeted for analysis and one pair will serve as a back-up pair in the event of breakage or sample loss.

2.2.7.1 Sorbent Tube Preparation and Handling

The laboratory will prepare the sorbent tubes and deliver them to the field sampling crew for sampling. The field sampling crew will recover the samples for subsequent analysis at the laboratory. The procedures for preparing, handling, storing, and analyzing the tubes will be those described in the EPA SW-846 Method 0030 referenced below. As described in the protocol, sorbent material (Tenax™ resin and charcoal) will be Soxhlet extracted, vacuum dried,

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thermally conditioned with organic-free nitrogen, and loaded into tubes which are then tested individually for background contamination using gas chromatography. A batch of resin tubes will be prepared specifically for the performance tests. Two pairs of these VOST tubes will be spiked with surrogate compounds and analyzed by the analytical laboratory as spiked resin blanks. Each sorbent tube will be labeled and tracked through its individual project identification number.

The sorbent tubes will be protected from contamination by placing them in glass culture tubes during shipping and storage. These tubes will contain clean charcoal as a fugitive contaminant scavenger. For shipment to the site, the tubes will be packed separately and kept at $\leq 4°C$ on ice, blue ice or ice in insulated storage containers.

At the test site VOST handling area, the tubes will be stored on ice until needed. Before each replicate sampling run, the sample coordinator will supply numbered resin tubes, including a numbered field blank pair, to the stack sampling specialist conducting the VOST sampling.

At the end of each run, the process sample coordinator will recover the tubes along with a VOST sample collection sheet. VOST samples will then be re-packed on ice and shipped, along with the sample documentation, via overnight delivery to the analytical laboratory.

2.2.7.2 VOST Operation

A schematic of the VOST is shown in Figure 2. The sample collection procedures will be as described in the standard EPA protocol. As described in the protocol, the dry gas meter will be calibrated before arriving at the test site, and the sample train will be cleaned and assembled before installing the resin tubes. The end caps of the tubes will be stored in each tube's corresponding clean glass culture tube while the Tenax™ tubes are in the train. The train will be leak tested at a minimum of 10 in. Hg in such a manner as to prevent exposure of the train components to the ambient air. Leak tests will be conducted before and after the sampling interval for each sorbent cartridge pair.

Before sampling is commenced, ice water will be circulated through the condensers, and the probe will be inserted into the sampling port and purged with stack gas. The condenser trap will also be cooled with an ice bath for the duration of the run. The probe will be heated above 130°C. The train will be operated under "slow VOST" conditions, i.e., at the reduced sample

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flow rate discussed in the protocol. The stack will be sampled at a rate of 0.5 L/min for 40 min to collect a nominal sample volume of 20 L for each pair of sorbent tubes.

Four pairs of tubes will be collected during each test run. After collecting the samples, the tube pair will be removed from the VOST, their end caps replaced, returned to their culture tubes, and stored in coolers on dry ice. At the conclusion of the sampling run, the volume condensate water will be measured and collected in a VOA vial with no headspace. A measured volume of organic free deionized water will be added, if needed, to fill the VOA vial. All VOA samples will be stored on ice from the time of collection.

During the sampling run, the end caps will be removed from the field blank tube pair to simulate the handling of the test sample tubes. The tubes will remain open for approximately 10 minutes. This approximates the amount of time the sample tubes are exposed to the ambient air during a tube changeout.

For each sample shipment to the laboratory, a VOST tube pair will be removed from storage, assigned a sample number, and logged in as the VOST trip blank pair. This pair will remain sealed during the test.

Samples will be placed on ice in clean coolers, which will be stored in an area away from other samples and potential contamination sources. The VOST condensate sample will be shipped in a separate cooler and preserved by chilling to $\leq 4°C$ with ice. VOST samples will be shipped daily by overnight service to the laboratory.

The expected detection limit ≤ 5 μg/resin tube for each of the targeted compounds listed in Table 1. The analysis will be performed in a fixed base laboratory using GC/Mass Spectroscopy. The VOST tube samples will be spiked with the appropriate surrogate compounds before analysis. The sample tubes will then be thermally desorbed using a Nutech desorption apparatus.

The Tenax™ and Tenax™/charcoal sample tubes will be analyzed separately for the target compounds following Method 8240/5040 for volatile organics. Field blank and travel blank tubes may be analyzed as a sample pair. VOST condensate samples will be analyzed by Method 5040, Protocol for Analysis of Sorbent Cartridges from Volatile Organic Sampling Train, SW-846 and Method 8240, Purge and Trap, Gas Chromatograph/Mass Spectroscopy

(GC/MS) Method for Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition, September, 1986 and updates.

TABLE 1

SUMMARY OF COMPOUNDS FOR ANALYSIS FROM THE VOST

1,1,1-Trichloroethane	Chloroform
1,1-Dichloroethane	Ethyl benzene
1,1-Dichloroethene	Isobutyl alcohol
1,2-Dichloroethane	Methylene Chloride
1,2-Dichloroethylene	Styrene
1,4-Dioxane	Tetrachloroethene
2-Butanone	Toluene
Acetone	Total Xylene
Benzene	Trichloroethene
Carbon Tetrachloride	Trichlorofluoromethane
Chlorobenzene	

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2.8 Carbon Monoxide

The stack gases will be sampled for carbon monoxide (CO) concentration using a dedicated nondispersive infrared (NDIR) gas analyzer. The key components of this analyzer include an infrared light source, a rotating gas filter wheel, a bandpass filter, a sample measurement chamber and a solid state detector. CO sampling will conform to procedures presented in EPA Method 10. A schematic of the sampling train is shown in Figure 3. Access to the stack will be through a dedicated CEM sample port and sample line. A stainless steel probe will be used to extract the gas sample from the stack. A heated, 1/4 inch Teflon® line will transport the sample from the point of extraction to the gas conditioning system. The sample will pass through a refrigerated chiller which will be thermostatically controlled to remove moisture from the gas stream with minimal contact with the sample gas stream. The analyzer will be located in a temperature controlled area to minimize thermal affects on the calibration of the instrument.

Quality control procedures implemented during the testing would include three-point calibrations, calibration drift tests, bias tests, and response time tests for the CO monitor. The CO monitor will be calibrated daily before and after each test run. These calibrations will consist of introducing prepurified nitrogen as a zero gas and three known concentrations of CO. EPA Protocol 1 calibration gases will be used to perform these calibrations.

Bias checks will be also performed in conjunction with the monitor calibrations. These checks will be performed by introducing calibration gas at the point of sample extraction on the stack. This will allow calibration gases to travel through the complete CO monitoring system.

Response time tests will be performed in conjunction with the bias checks. Alternating the introduction of span and zero calibration gas during the bias checks three times and recording the time required for the monitor to reach 95 percent of the final stable value will enable the determination of mean upscale and downscale response times.

The computer controlled data acquisition system will sample the analyzer once per second. The DAS will then average 60 individual data points and store the one minute averages electronically. The mean of the one minute averages will be calculated over the length of each sampling run. Stack concentrations will then be corrected for drift and bias as required by the Method. The mass emission rate of CO will be reported in pounds per hour (lb/hr) and parts per million by volume. The emission rate will be calculated using the hourly average

concentration in ppmv, the dry standard volumetric flow rate determined using EPA Methods 1 and 2.

2.9 Total Hydrocarbons

Emissions of total hydrocarbons will be determined using EPA Method 25A. A schematic of the sampling system is shown in Figure 4. A gas slipstream is extracted from the stack through a heated sample line and heated glass fiber filter and introduced to a flame ionization detector, (FID). The concentration of hydrocarbons measured by the analyzer is proportional to the number of carbon-hydrogen bonds present in the sample stream. The analyzer is calibrated using EPA protocol 1 propane. Access to the stack will be through a dedicated sample port and sample line. A borosilicate glass probe will be used to extract the gas sample from the stack. A heated, 1/4 inch Teflon® line will transport the sample from the point of extraction to the analyzer. The analyzer will be located in a temperature controlled area to minimize thermal affects on the calibration of the instrument.

Quality control procedures implemented during the testing will include three-point calibrations, calibration drift tests, bias tests, and response time tests for the THC monitor. The THC monitor will be calibrated daily before and after each test run. These calibrations will consist of introducing prepurified nitrogen as a zero gas and three known concentrations of propane.

Bias checks will be also performed in conjunction with the monitor calibrations. These checks will be performed by introducing calibration gas at the point of sample extraction on the stack. This will allow calibration gases to travel through the complete THC monitoring system.

Response time tests will be performed in conjunction with the bias checks. Alternating the introduction of span and zero calibration gas during the bias checks three times and recording the time required for the monitor to reach 95 percent of the final stable value will enable the determination of mean upscale and downscale response times.

The mass emission rate of total hydrocarbons will be reported in pounds per hour (lb/hr) and parts per million by volume. The emission rate will be calculated using the hourly average concentration in ppm, the dry standard volumetric flow rate generated using EPA Methods 1 and 2.

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3.0 DESCRIPTION OF OPERATIONS AND PROCESS

A simplified process flow diagram is shown as Figure 5. The process is initiated by excavating waste from pits and transferring it to a feed preparation and storage building. A front-end loader will be used to transfer solid waste materials from the staging bins to the feed hoppers of the mass flow screw feeders. Material is transferred from the mass flow screw feeders to the belt feed conveyors which include belt scales. The speed of each mass flow feeder is automatically controlled to adjust the mass rate of waste material being fed as measured and indicated by the belt scale. The feed material discharges from the belt feed conveyors into the dryer feed screws that extend into the rotary dryers. The screw feeders provide a positive feed mechanism to assure uniform transfer of the material into the rotary dryers, and it also provides a positive seal that limits the amount of infiltration air into the rotary dryers.

Two indirectly heated rotary dryers (F-2001 A/B) receive and process wet waste material of various moisture contents, depending on the type of waste. The design basis moisture content is 40 percent (wet basis). The rotary dryers reduce the moisture content of the waste materials to 10 - 15 percent (wet weight basis). Waste materials are fed to each rotary dryer primarily as solids through the feed screws. The feed screws extend inside the rotary dryers to deposit wet waste within the heated zone.

Each rotary dryer system consists of a cylindrical shell rotated with a variable speed drive. The rotating cylinder is heated externally by a furnace with adequate length and diameter to satisfy heat transfer requirements. Using natural gas as fuel for combustion, heat energy for the indirect drying is produced in multiple furnace zones by a set of burners located in each zone. Burners are operated with adjustable primary air/fuel ratio and secondary air addition to control the flame temperature so the rotating cylinder does not exceed its design temperature. Air to the burners is supplied by combustion air fans.

Burner exhaust gases from each furnace zone are vented directly to the atmosphere through multiple vent stacks. Heat energy from each furnace zone is indirectly transferred to the material advancing inside the rotating shell.

Each rotary dryer has multiple furnace zones and is provided with individual temperature control of each zone. This ability to control the temperature throughout the rotary dryer provides flexibility and simplicity in drying wastes with varying levels of incoming moisture content to achieve

the desired moisture content in the dried product. It is anticipated that the rotary dryer shell temperature may vary from 1200°F to 1600°F.

The slope and speed of the cylinder's rotation determine the retention time in the rotary dryer. The slope is fixed, but the rotation speed is variable and is used to adjust the retention time as necessary, providing additional control of the drying process.

The product from each rotary dryer is discharged to the product conveyors. An enclosed drag flight conveyor will be used for this application. Atomized water sprays will be utilized at the outlet of the conveyors to control dust as required. A set of airlock valves will be located at the discharge of each dryer product conveyor to minimize air infiltration. The dryer product mixers will be used as required to intermix rotary dryer product to a uniform consistency.

Infiltration air enters the rotary dryers operating under a vacuum at a predetermined rate to aid in carrying the water vapor produced during the drying process through the gas cleaning system. Inert gas is introduced as necessary to control the ultimate oxygen concentration in the system. After exiting the rotary dryers, the process off-gas stream is routed to the gas cleaning.

The off-gas from each rotary dryer initially passes through the high efficiency cyclone separators to remove large, entrained particulate. The solids removed from the off-gas are transferred from the cyclones via the cyclone solids transfer screws to the rotary dryer product system and combined in a mixing operation to assure the proper product consistency and moisture content. This design mitigates dust generation and minimizes worker exposure as defined in the ALARA concept.

The off-gas from the cyclones is conditioned in the scrubber to cool the rotary dryer off-gas, remove a portion of the entrained particulate, and partially condense water vapor generated by the drying process. The scrubber spray water is recirculated at a nominal rate of 150 GPM. The water and condensate pass from the scrubber into the scrubber sump tank. The scrubber pumps recycle water from the scrubber sump tank back to the scrubber. A continuous blowdown circulates to the process blowdown pre-treatment system to control suspended solids concentration in the scrubber water. The majority of the blowdown stream is then returned as makeup to the scrubber. Sodium hydroxide (caustic) from the caustic tank and/or acid from the acid tank is added to the Scrubber recycle stream to neutralize the process as needed.

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The off-gas from the scrubber flows to the subcool quench. Cooling water is recirculated through the subcool quench at a nominal rate of 1600 GPM by the subcool quench recirculation pumps. This recycle water is cooled in the quench heat exchangers prior to introduction into the off-gas stream in the subcool quench. This further reduces the temperature of the off-gas to a nominal 100° F. Subcooling the off-gas generates a nominal 30 GPM of condensate which flows to the Process Blowdown Pre-treatment System and ultimately to the Wastewater Treatment System.

A cooling tower and recirculating cooling water loop is used as the cooling medium for the subcool quench heat exchangers. Cooling water is recycled by the cooling tower recirculation pumps from the cooling tower through the heat exchangers back to the tower. A small purge stream is discharged from the cooling tower to the Clearwell. This water does not contact contaminated materials and is not expected to be contaminated.

Off-gas from the Subcool Quench flows into a wet electrostatic precipitator (WESP) for the removal of submicron particulate and water droplets. Water and particulate collected in the WESP are pumped to the Process Blowdown Pretreatment System.

The off-gas from the WESP is slightly reheated in the electrically heated off-gas reheater to prevent any condensation in the HEPA filters. The HEPA filters are mounted in parallel with only one set being used at a time, with the other on standby or being replaced as necessary. The HEPA filters remove particulate greater than 0.3 microns that may have passed through the WESP. Two induced-draft fans are used to pull the off-gases through the system from the rotary dryer through the HEPA filters, keeping the entire system under negative pressure so that any leakage is into the system. The two ID Fans are arranged as an inline spare configuration with one fan normally operating and the other on standby.

The filtered off-gas from the HEPAs is directed into the Thermal Oxidizer which provides an effective means for the treatment of remaining volatile organic compounds (VOCs) and carbon monoxide (CO) in the off-gas stream. The system off-gasses are finally released to the atmosphere through the vent stack.

The condensed and purged liquids from the GCS are directed to the Process Blowdown Pretreatment System. All liquid blowdown streams flow to the primary clarifier and then to the secondary clarifier for solids settlement using polymer and pH controlled clarification. The

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outflow from the secondary clarifier is accumulated in the clarifier surge tank and pumped via the clarifier discharge pump through dual sand filters, dual bag filters, and recycled to the drying process as scrubber makeup. Sludge from the clarifier bottoms is directed to the sludge mix tank. Raked or skimmed organic materials are collected in the organic condensate surge container and subsequently pumped to the sludge mix tank. The sludge mix tank also receives site sump flows and the Wastewater Treatment System (WTS) solids blowdown. Solid materials are separated from the sludge in the filter press with the liquid collected in the filtrate storage tank. Oily liquids are pumped to the organic condensate storage tank. The water fraction will be routed to the WTS influent tank for pretreatment prior to discharge to the BSL. The oil fraction will be turned over to FDF for subsequent handling and disposal.

4.0 STACK DESCRIPTION

The process stack will be directly attached to the exhaust of the Thermal Oxidizer Unit and will have an exit plane 60 feet above grade. The inside stack diameter will be 2'4". The stack will be insulated from top to bottom with two inches of high temperature ceramic fiber insulation.

5.0 HEALTH AND SAFETY REQUIREMENTS

The following paragraphs describe the general site requirements. A detailed discussion is contained in the Health & Safety Plan for Remedial Action Operations.

5.1 Medical Monitoring and Training

Medical clearance for work at hazardous waste sites shall be submitted to Flour Daniel Fernald four days prior to work at the site. Drug screening may be required for individuals who will be working in areas were safety is a concern. Individuals with documented proof of previous training (e.g. Hazwoper Training) which is equivalent to Flour Daniel Fernald, Inc. Site Worker Training may receive exemption from Site Worker Training. However, General Employee Training (GET) will be required.

5.2 Natural Occurrence (Weather)

Weather affected work will be stopped if lighting , heavy persistent rain, wind, or other adverse conditions are in the area. This includes any weather conditions whose impact is judged to be detrimental to safety by Flour Daniel Fernald, Inc. Any operations utilizing cranes, drill rigs or personnel working on elevated steel will be suspended if any wind velocity reaches 25 mph.

5.3 Eye Protection

All eye protection shall comply with ANSI Z87.1 rigid side shields are required with safety glasses. Safety glasses are a minimum requirement into any area associated with this project.

5.4 Hard Hats

All hard hats shall be Z89.1 listed. Hard hats are to be worn at all times within defined areas and during the excavation phase.

5.5 Safety Shoes

All personnel shall wear ANSI Z41 listed boots when working in all areas associated with this project.

5.6 Work Uniform

All personnel shall wear as a minimum, long pants and shirt with four (4) inch long sleeves in all work areas associated with this project. Additional PPE may be required in certain areas as deemed necessary by Flour Daniel Fernald, Inc.

5.7 Buddy System

As required in 29 CFR 1910.120 the buddy system shall be required for all work on this project.

5.8 Hearing Protection

Hearing PPE will be required in areas where the noise exposure or noise dose of personnel is equal or greater than 85 dBA for any duration of time.

5.9 Fall Protection

Fall protection will be required for heights above 6 feet. Apparatus used (depending on situation) will be outlined in the IT WPRAP Fall Protection Program.

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6.0 TEST REPORT

The final test report will contain, at a minimum, the following information:

- All raw data sheets, including strip charts for CO,
- Process data relevant to the source's emission rates,
- Results of audit samples, if any,
- Certificates of analysis, Chains of Custody, analytical backup,
- Instrument calibration data,
- Example calculations
- Descriptions of relevant process and sampling disruptions or upset conditions.

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FIGURES

INTENT TO TEST NOTIFICATION
(One Emission Unit Per Sheet)

AGENCY USE ONLY
Date Received _____
No. Assigned _____

Proposed Test Date _____
Pre-Test Meeting Desired? Yes ☐ No ☐
Facility Premise No. _____
SCC Code _____

A. Facility Information
Name _____ Address _____
Contact Person _____ Phone Number _____

B. Testing Firm Information
Name _____ Address _____
Contact Person _____ Phone Number _____

C. Test Plan and Emissions Unit Information Table: List the applicable information under each respective column heading.

Emissions Unit #	Control Equipment	Monitoring Equipment	Pollutant(s) to be Tested	EPA Test Method(s)	Filter Box Temperature	Number of Sampling Points	Total Time for Test Run	Number of Sampling Runs

Source is testing to comply with (check all that apply): ☐ State PTI ☐ State PTO ☐ Title V ☐ NSPS ☐ MACT ☐ BIF ☐ Title IV ☐ Other ____

D. What is the maximum rated capacity? _____
Will Emissions Unit be operated at the maximum capacity given in its permit-to-operate? Yes ☐ No ☐ If no, attach explanation.
Specify how operation rate will be demonstrated during testing (*See notes 1,2, and 3 on page 2.): _____
Are any modifications to USEPA Reference Method(s) proposed? Yes ☐ No ☐ If "no" is checked, then no modification, however minor, wil be accepted. If yes, explain proposed modification(s): _____

Sampling Location(s): Inlet ☐ Outlet ☐ Simultaneous ☐ Will Cyclonic flow check(s) be conducted? Yes ☐ No ☐
Fuel Sampling: Coal-Proximate ☐ Ultimate ☐ Other ☐ If other, specify _____
Emission rate to be calculated using: F-Factor ☐ Ultimate Coal analysis ☐ Other ☐ If other, specify _____
Are concurrent Method 9 readings to be performed? Yes ☐ No ☐ Does the test method require audit samples? Yes ☐ No ☐

E. Sample Train Calibration: All affected measuring and monitoring equipment should be calibrated within 60 days of the scheduled testing.

STARTING DATE: 6/3/98	DATE LAST REV.:	DRAFT. CHCK. BY: R. MOORE	INIATOR: R. MOORE	DWG. NO.:
DRAWN BY: K. KINDER	DRAWN BY:	ENG. CHCK. BY: R. MOORE	PROJ. MGR.:	PROJ. NO.: 773481

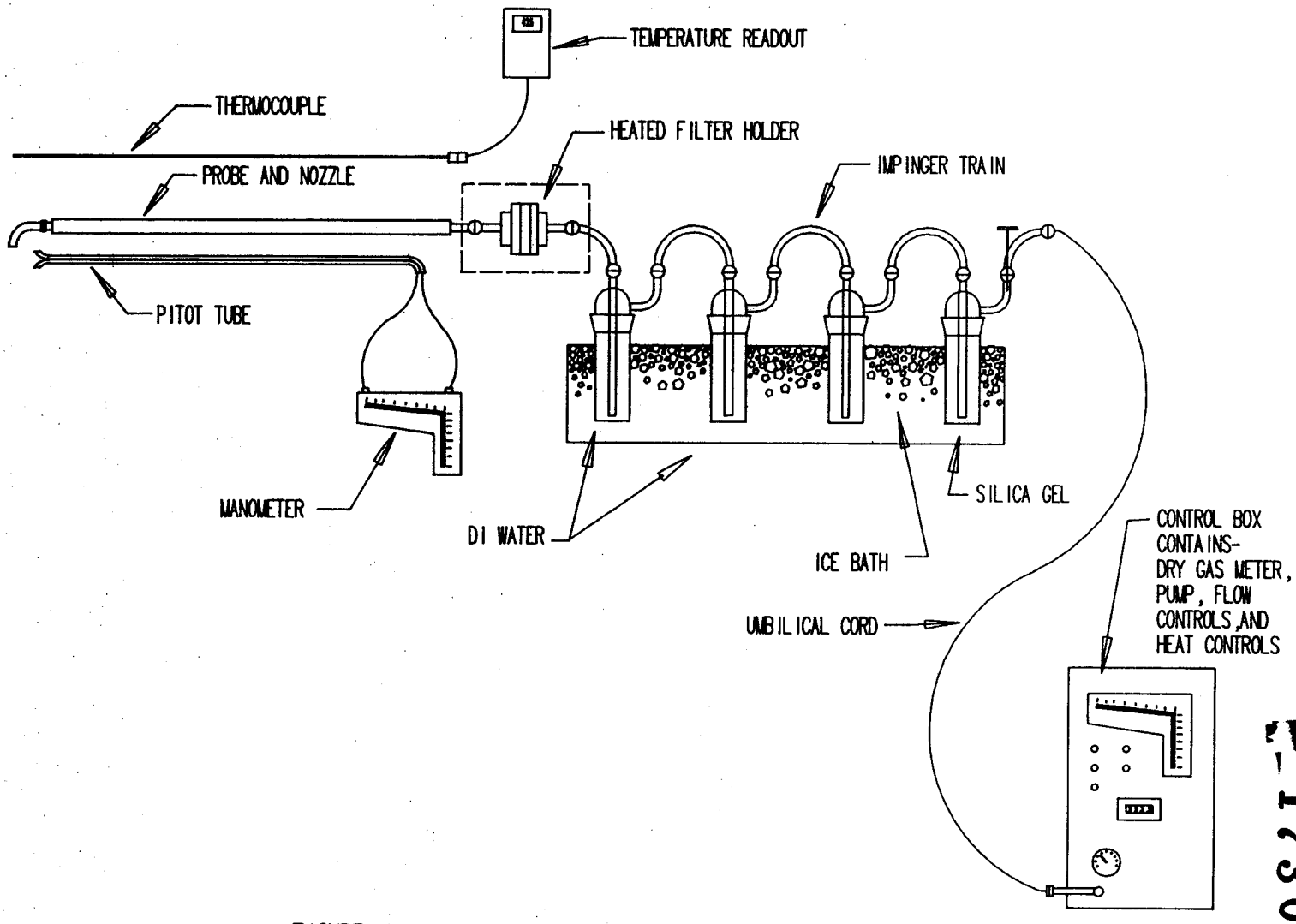

FIGURE 1
METHOD 5 PARTICULATE SAMPLING TRAIN

INTERNATIONAL TECHNOLOGY CORPORATION

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DRAWN BY: K. KINDER	DRAWN BY:	ENG. CHCK. BY: R. MOORE	PROJ. MGR.:	PROJ. NO.: 773481

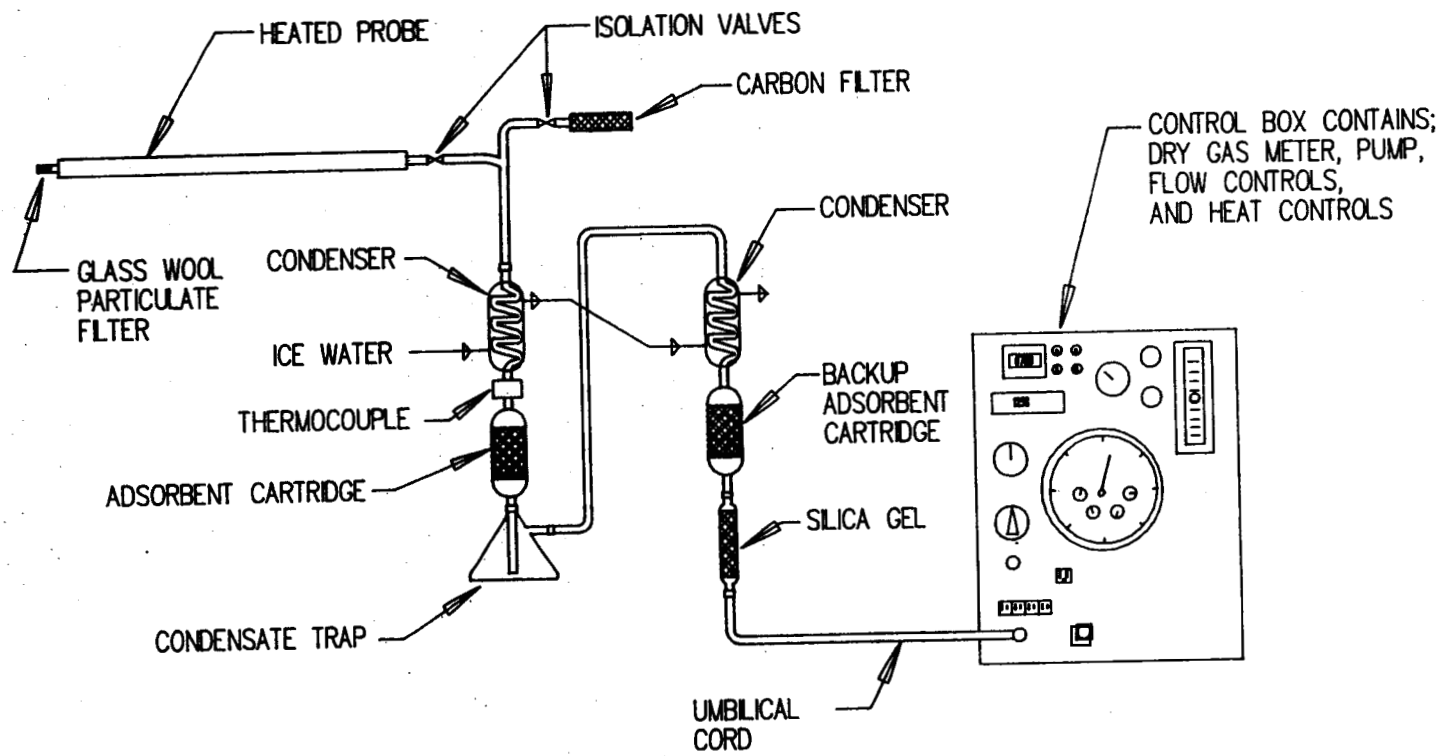

FIGURE 2
VOLATILE ORGANIC SAMPLING TRAIN

INTERNATIONAL TECHNOLOGY CORPORATION

1730

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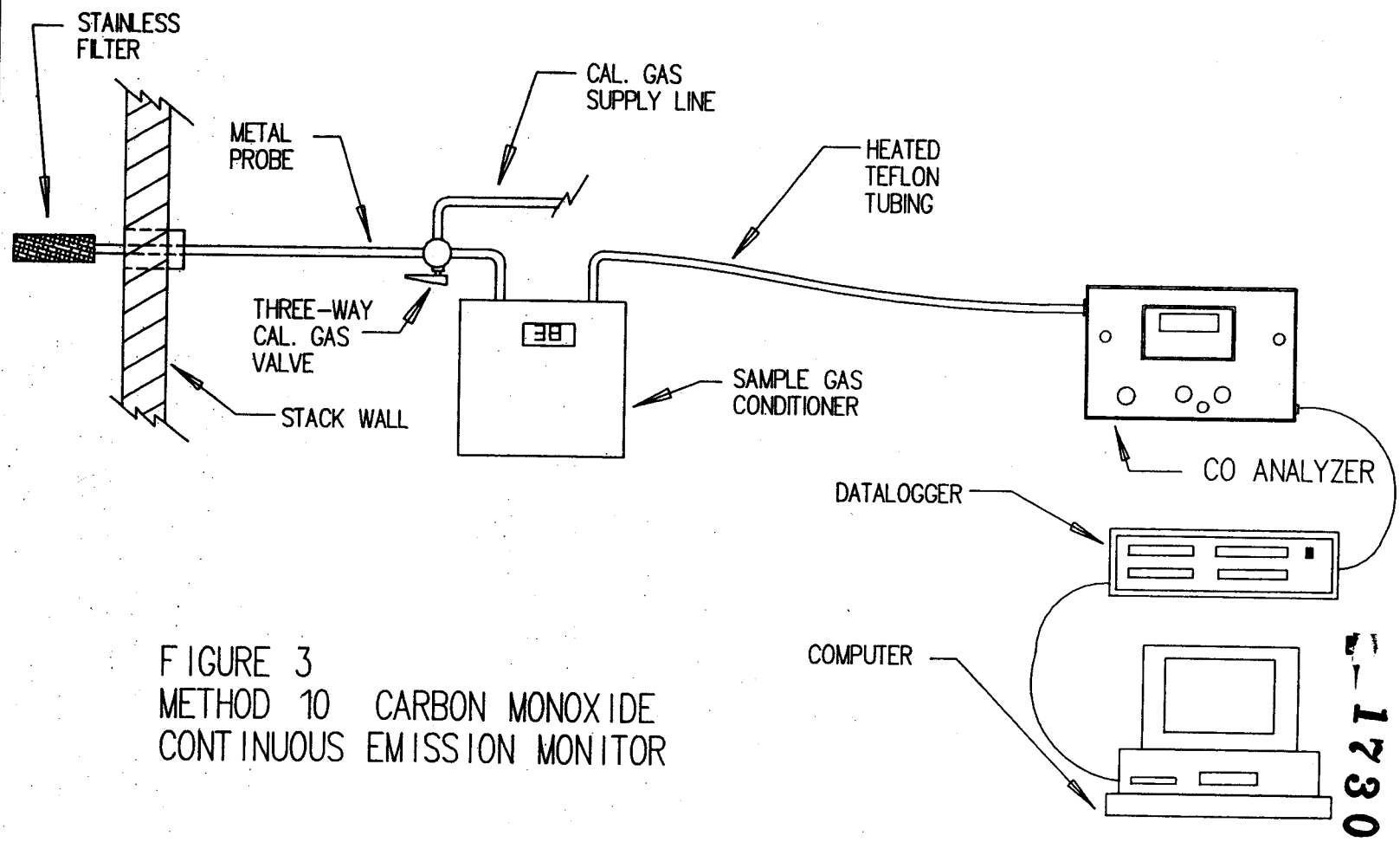

FIGURE 3
METHOD 10 CARBON MONOXIDE
CONTINUOUS EMISSION MONITOR

INTERNATIONAL TECHNOLOGY CORPORATION

F-1730

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DRAWN BY: K. KINDER	DRAWN BY:	ENG. CHCK. BY: R. MOORE	PROJ. MGR.:	PROJ. NO.: 773481

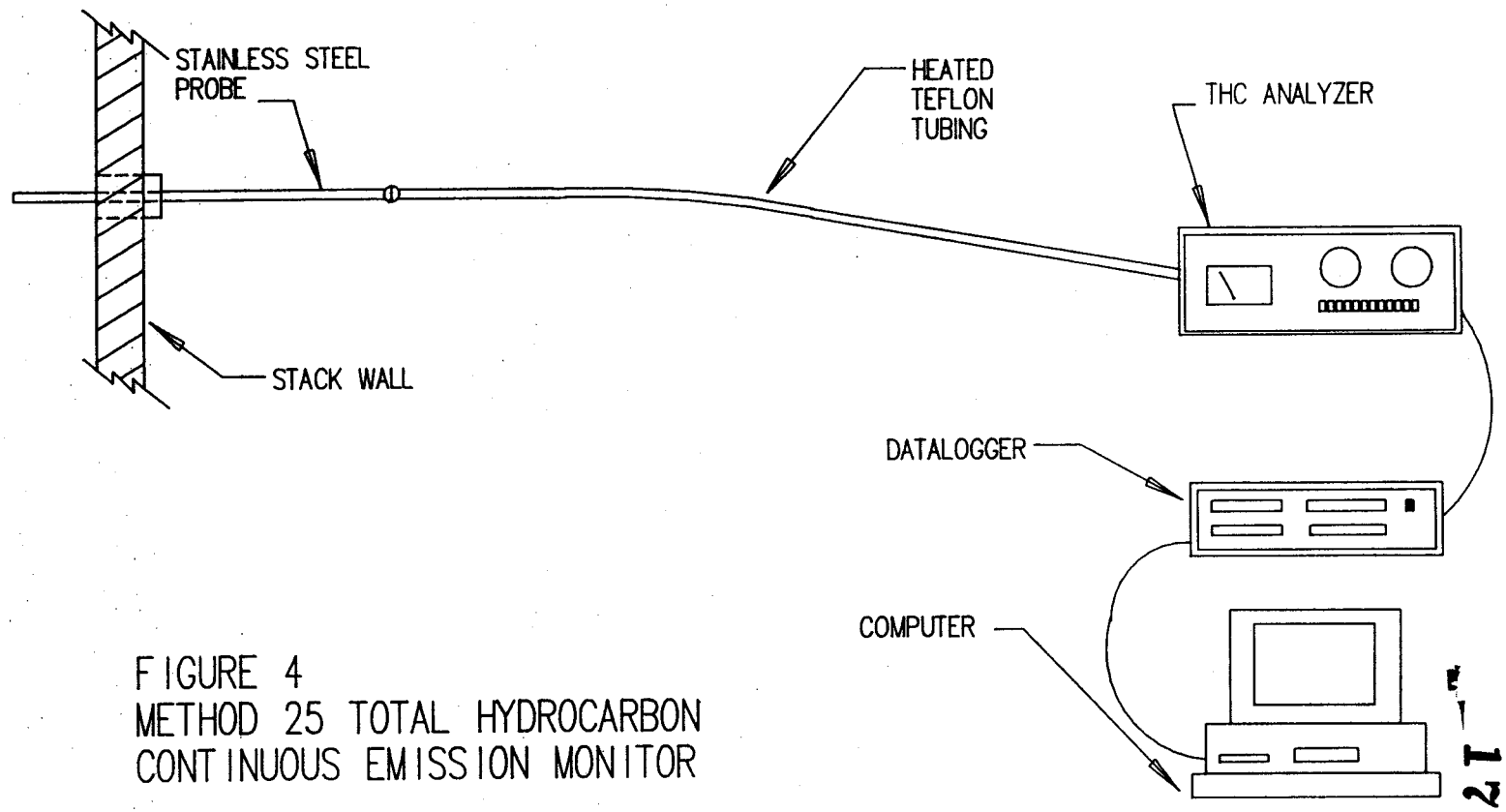

FIGURE 4
METHOD 25 TOTAL HYDROCARBON
CONTINUOUS EMISSION MONITOR

INTERNATIONAL TECHNOLOGY CORPORATION

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STARTING DATE: 6/3/98	DATE LAST REV.:	DRAFT. CHCK. BY: R. MOORE	INIATOR: R. MOORE	DWG. NO.:
DRAWN BY: K. KINDER	DRAWN BY:	ENG. CHCK. BY: R. MOORE	PROJ. MGR.:	PROJ. NO.: 773481

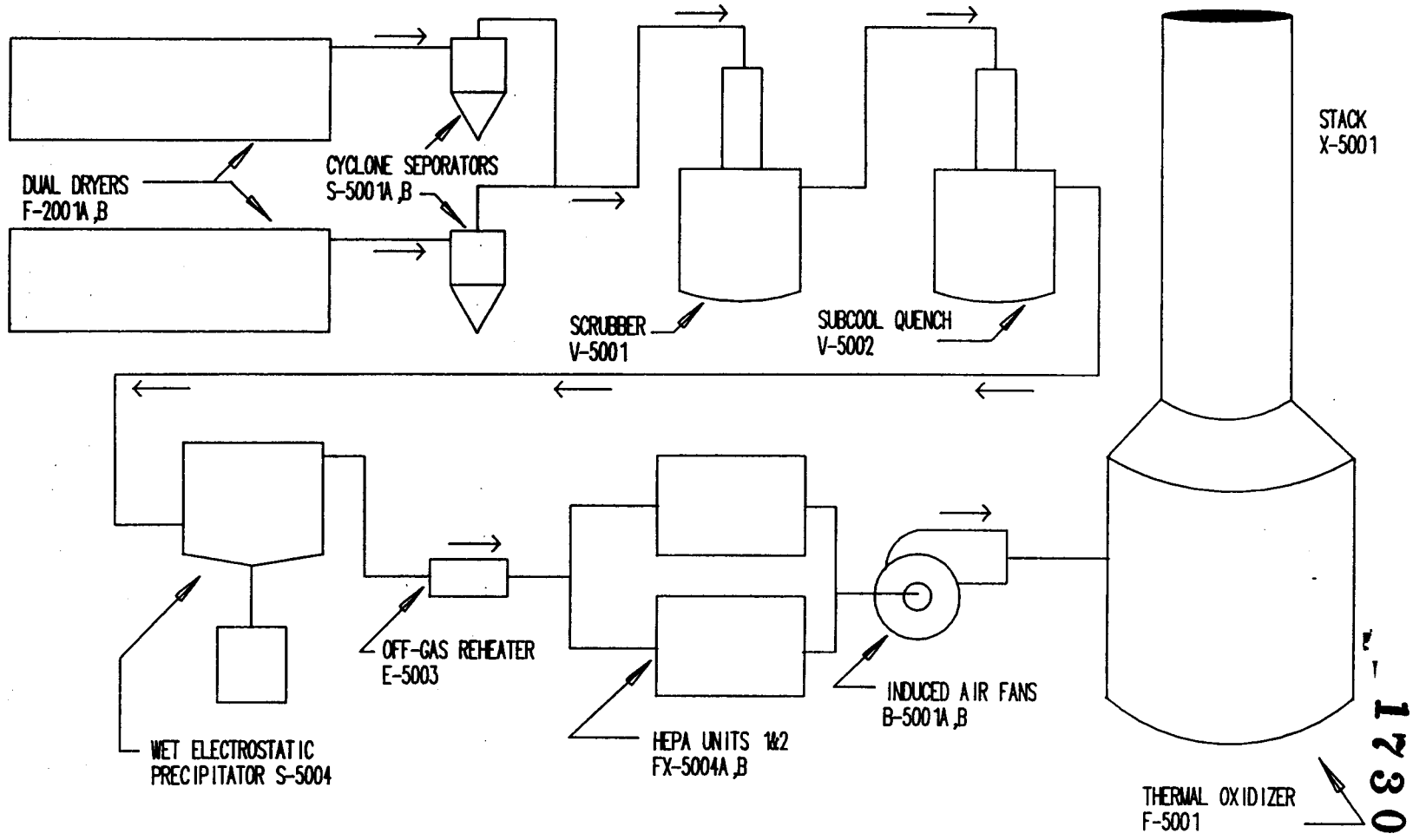

FIGURE 5
DRYER OFF-GAS PROCESS FLOW DIAGRAM

INTERNATIONAL TECHNOLOGY CORPORATION

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DRAFT

Waste Pits Remedial Action Project
(WPRAP)
STORM WATER/WASTEWATER MANAGEMENT PLAN

***

PREPARED
for
Fluor Daniel Fernald, Inc.
Fernald, Ohio

FDF Subcontract No. 98SC000001

***

PREPARED
by
IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 773481

***

Revision No.: C
Issue Date: September 25, 1998

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Record of Issue/Revisions

1730

Date	Rev. No.	Description of Revision
9/14/98	A	Original Issue of Draft
N/A	B	Not Issued
9/25/98	C	Draft Issue for EPA Review

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D-90-10-002	Site Water Balance

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List of Acronyms/Abbreviations

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AASHTO	American Association of State Highway Transportation Officials
ABMA	American Bearing Manufacturers Association
ACGIH	American Conference of Government Industrial Hygienists
ACI	American Concrete Institute
ACM	Asbestos Containing Material
ACOE	United States Army Corps of Engineers
AFBMA	Anti-Friction Bearing Manufacturers Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
ALARA	As Low As Reasonably Achievable
ALTER	Accelerated Life Testing and Environmental Research Facility
AMCA	Air Movement and Control Association
ANS	American Nuclear Society
ANSI	American National Standards Institute
APC	Air Pollution Control
API	American Petroleum Institute
ARAR	Applicable or Relevant and Appropriate Requirement.
ARI	American Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
AWWT	Advanced Wastewater Treatment
BAT	Best Available Technology
BSL	Biodenitrification Surge Lagoon
CAM	Continuous Air Monitor
CBR	California Bearing Ratio
CDF	Commercial Disposal Facility
CEM	Continuous Emissions Monitor
CEMA	Conveyor Equipment Manufacturers Association
CERCLA	Comprehensive, Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Constituent of Concern
CPT	Cone Penetrometer Test
CRSI	Concrete Reinforcing Steel Institute
CRU	CERCLA/RCRA Unit
CWA	Clean Water Act of 1977, as amended
D&D	Decontamination and Dismantlement

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List of Acronyms/Abbreviations *(continued)*

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DAC	Derived Air Concentration
DCD	Design Criteria Document
DEEP	Dewatering Excavation Evaluation Program
DOE	United States Department of Energy
DOE-NV	United States Department of Energy - Nevada Office of Operations
DOT	United States Department of Transportation
EJMA	Expansion Joint Manufacturers Association
ERDA	Energy Research and Development Administration
F	Fahrenheit
FDF	Fluor Daniel Fernald, Inc.
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
FFCA	Federal Facilities Compliance Agreement
fpm	feet per minute
FS	Feasibility Study
FSAR	Final Safety Analysis Report
ft^2	square foot (feet)
GCS	Gas Cleaning System
GFCI	Ground Fault Circuit Interrupter
GLC	Ground Level Concentration
gpd	gallons per day
gpm	gallons per minute
HEPA	High Efficiency Particulate Air (filter)
hr	hour
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineers Society
ID	Induced Draft
IPC	Inclined Plate Clarifier
ISA	International Society for Measurement and Control
IT	IT Corporation
kg	kilogram
kV	kilovolt
kVA	kilovolt-ampere
kW	kilowatt
lb	pound
LLRW	Low Level Radioactive Wastes
m^2	square meter
MAGLC	Maximum Allowable Ground Level Concentration
MAWC	Maximum Average Waste Concentration
MBMA	Metal Building Manufacturers Association

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List of Acronyms/Abbreviations *(continued)*

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MCC	Motor Control Center
MEI	Maximally Exposed Individual
MHB	Material Handling Building
MHBCT	Material Handling Building Collection Tank
µCi/cc	microcurie per cubic centimeter
mrem	millirem
MSS	Manufacturers Standardization Society
NAD	North American Datum
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NESHAP	National Emission Standards for Hazardous Air Pollutants
NETA	National Electrical Testing Association
NFC	National Fuel Code
NFPA	National Fire Protection Association
NP	Nonplastic
NPDES	National Pollutant Discharge Elimination System
NPH	Natural Phenomenal Hazard
NTS	Nevada Test Site
OAC	Ohio Administrative Code
OBBC	Ohio Basic Building Code
ODNR	Ohio Department of Natural Resources
ODOT	Ohio Department of Transportation
OEPA	Ohio Environmental Protection Agency
OMMP	Operations and Maintenance Master Plan for the Aquifer Restoration and Wastewater Treatment Project
OSDF	On Site Disposal Facility
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PC	Performance Category
PCB	Polychlorinated Biphenyl
pcf	pounds per cubic foot
pCi/L	picoCuries per liter
PFD	Process Flow Diagram
PID	Photoionizing Detector
PLC	Programmable Logic Controller
PPE	Personal Protective Equipment
psf	pounds per square foot
psi	pounds per square inch
psig	pounds per square inch gauge
PTI	Permit to Install
PTO	Permit to Operate

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List of Acronyms/Abbreviations *(continued)*

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PVC	Polyvinyl Chloride
QAP	Quality Assurance Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
RLB	Railcar Loadout Building
ROD	Record of Decision
SAE	Society of Automotive Engineers
SCS	Soil Conservation Service
scfm	standard cubic feet per minute
SDI	Steel Deck Institute
sec	second
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPT	Standard Penetration Test
SSC	Structure, System and Component
STD	Standard (DOE)
SWM	Storm Water Management
SWMP	Storm Water/Wastewater Management Plan
SWPPP	FERMCO Storm Water Pollution Prevention Plan
TBC	To Be Considered
TBP	Tributyl Phosphate
TEMA	Tubular Exchanger Manufacturers Association
TOC	Total Organic Carbon
TSDF	Waste Treatment, Storage or Disposal Facility
UBC	Uniform Building Code
UCRL	University of California Research Laboratory
UL	Underwriters Laboratory
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency (EPA)
V	Volt
WAC	Waste Acceptance Criteria
WESP	Wet Electrostatic Precipitator
WPRAP	Waste Pits Remedial Action Project
WTS	IT Corporation Wastewater Treatment System
yd^3	cubic yard
yr	year

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1.0 Introduction

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1.1 Project Background

IT Corporation (IT) has been contracted by Fluor Daniel Fernald, Inc. (FDF) to complete the Waste Pits Remedial Action Project (WPRAP) which involves remediation of Waste Pits Nos. 1 through 6, the Burn Pit, the Clearwell, and the Operable Unit 1 (OU1) Contaminated Soil Stockpile at the former Fernald Feed Materials Production Center Plant in Fernald, Ohio. This facility was formerly operated for and by the U.S. Government to process and produce high purity uranium metal and thorium products for the U.S. Department of Energy (DOE) and its predecessor agencies. The facility operated from 1952 until 1989, when production was discontinued. Since that time, the facility has been officially closed and is in the process of environmental restoration.

1.2 Site Description

The former feed materials site comprises an area of 1,050 acres. The waste pits to be remediated under the scope of work for the WPRAP are located in an area known as OU1, a well defined 37.7-acre area located in the northwest quadrant of the Fernald site. An overall map of the waste pit area and the OU1 facilities is provided in Figure 1-1. Specific details of topography, drainage patterns, and storm water management facilities of the site are provided in Figure 1-2. As shown in Figure 1-2, the relief of the site is generally flat, with moderate grading and contouring to facilitate drainage from clean areas outside the waste pit area and containment within the waste pit area. Since the site has previously been developed for industrial use, most vegetation is limited. The greatest extent of vegetative cover is within the waste pit area. Portions of OU1 outside the waste pit area have been converted into facilities for the remediation of the waste pits. The plant facilities area (as it is referred to here) is laid out such that storm water which comes in contact with raw waste material or surfaces upon which this material is stored/transported, etc., is segregated from noncontact storm water. The plant facilities layout is shown in Figure 1-3.

1.3 Site Climate and Weather Data

The Fernald site is located approximately 18 miles northwest of the City of Cincinnati, Ohio. The climate is somewhat tempered due to its southern location and situation in the Ohio River Valley. The site is located in U.S. Department of Agriculture Zone 6, meaning average winter low temperatures in the range of -10°F and 0°F, and accumulations of snow are normal during the winter months. The region has seen both flood and drought conditions over the past few years during the spring and summer.

The National Oceanic and Atmospheric Administration reports in their publication "Climatic Averages and Extremes for U.S. Cities" published May 1991, that the average rainfall in the Cincinnati area is 40.14 inches of precipitation per year. The U.S. Department of Agriculture reports in their Technical Paper No. 40, titled "Rainfall Frequency Atlas of the United States," that the 25-year, 24-hour duration storm intensity would produce approximately 4.8 inches of precipitation in the region. Although greater intensity storm events are certainly possible, for the purposes of design, this has been accepted as the reasonable maximum design criteria to be used for the sizing of storm water management facilities.

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3.0 Storm Water Management

This section describes the various storm water streams from the WPRAP. The section is divided into two subsections: noncontact storm water and contact storm water. Each of the minor sections describes a different storm water stream, where it originates, where it is transferred, the means by which it is conveyed (e.g., sump pump, gravity drain line, etc.) and the expected average daily flow rate and 25-year/24-hour storm flow rate. Wastewater streams are discussed in similar detail in Section 4.0. The water management features that are used to receive, store and treat the storm water and wastewater are described in Section 5.0.

ITs approach to the management of the various storm water streams is discussed in the following subsections. In general, the overall approach to managing storm water is to: 1) segregate contact and noncontact storm water; 2) treat contact storm water; 3) allow noncontact storm water in the waste pit area to follow existing flow patterns; and 4) monitor noncontact storm water in the SWM Pond to allow discharge to Paddys Run.

3.1 Noncontact Storm Water

Noncontact storm water is managed differently in the plant facilities area and the waste pit area. The following sections describe the streams referred to as "noncontact storm water" in these two areas. As stated in Section 2.3, the term "noncontact storm water" is used in discussions of the plant facilities area to indicate water collected in the SWM Pond that is expected to be uncontaminated and storm water that flows to drainage ditches along the southern portion of the WPRAP site that drain directly to NPDES Outfall *4005. The term is used in discussions of the waste pit area to describe runoff from undisturbed waste pits that drains to the K-65 Runoff Basin. Waste pit area noncontact storm water is not pretreated in the WTS, however it is treated in the AWWT prior to discharge to the Great Miami River.

3.1.1 Plant Facilities Area

The majority of the noncontact storm water in the plant facilities area is directed to the SWM Pond. The contents of the SWM Pond will be monitored to ensure that the water being collected in the pond is suitable for discharge to Paddys Run via NPDES Outfall *4006. SWM Pond water may be used for dust suppression in the waste pit area, along the haul roads, and in the buildings to minimize the total volume of water being managed at the site. The area south of the Railcar Prep and Liner Storage Building, around the Warehouse and Laboratory, and the portions of the road that runs along the north and east sides of the BSL flows to a drainage ditch that leads to NPDES Outfall *4005 which empties into Paddys Run.

3.1.1.1 Storm Water Management Pond Collection Basins

There are five catch basins in the plant facilities area that drain to the SWM Pond. The total area that drains to these catch basins is approximately 133,600 ft^2. This consists of the majority of the plant facilities area. The storm sewers connected to the collection basins are located along the north and east sides of the BSL, on the facilities side of the access road around the BSL. The site is graded to enhance storm water drainage to these catch basins. The location of the collection basins and gravity drains are shown on the site grading plan included as Figure 4-1. Water collected in the catch basins drains by gravity to the SWM Pond. The average storm water flow being collected by the catch basins is 9,160 gallons per day (gpd). This water stream is shown as stream no. 918 on the Site

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Water Balance (Drawing Nos. D-90-10-001/-002). In the event of a 25-year/24-hour storm event, the catch basins would collect approximately 399,785 gallons in a 24-hour period.

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3.1.1.2 Roof Drains

The roofs of the smaller portable buildings in the plant facility area (e.g., changeout facility, laundry facility) drain via down spouts to the ground and follow the same pattern as other noncontact storm water to the collection basins, as discussed in Section 3.1.1.1. The area of these roofs is included in the collection basin storm water calculations.

The roofs of the primary buildings drain to the SWM Pond via downspouts and storm sewers that gravity drain to the SWM Pond. These storm sewers are shown on Figure 4-1. The roofs of the following buildings are tied to these storm sewers:

- Material Handling Building
- Railcar Loadout Building
- Railcar Prep & Liner Storage Building
- GCS/WTS Building

The total roof area for these buildings is approximately 115,100 ft^2. The average storm water flow rate from these roof drains is approximately 7,891 gpd. This water stream is shown as stream no. 923 on the Site Water Balance. In the event of a 25-year/24-hour storm event, the roof drains would collect approximately 344,425 gallons in a 24-hour period.

3.1.1.3 Plant Facility Area Drainage to Paddys Run

A portion of the plant facility is not graded to drain to the catch basins that lead to the SWM Pond. This area consists of the area south of the Railcar Prep and Liner Storage Building, around the Warehouse and Laboratory, and the portions of the road that runs along the north and east sides of the BSL. This area is estimated to be 150,000 ft^2. The average noncontact storm water flow rate that follows this drainage pattern is estimated to be 10,290 gpd. This water stream is shown as stream no. 922 on the Site Water Balance. In the event of a 25-year/24-hour storm event, this area would produce approximately 448,860 gallons in a 24-hour period. This storm water follows the existing drainage pattern to NPDES Outfall *4005.

3.1.2 Waste Pit Area - Undisturbed Areas

Noncontact storm water in the waste pit area flows to the K-65 Runoff Basin. The contents of the K-65 Runoff Basin are pumped to the BSL for treatment by the AWWT. Storm water from the water-covered waste pits, active areas of waste excavation, and haul roads in the waste pits is considered contact storm water and is therefore segregated from the noncontact storm water to reduce the required treatment capacity of the WTS. The total area within the waste pit area that drains to the K-65 Runoff Basin is approximately 358,366 ft^2. This area includes Waste Pits Nos. 2 and 4, the burn pit, portions of Waste Pits Nos. 1 and 3, and the perimeters of the waste pits. The management of storm water which falls on the other portions of Waste Pits Nos. 1 and 3 is discussed in Section 3.2.2.1. The average noncontact storm water flow rate from the waste pit area to the K-65 runoff Basin prior to excavation of any of these areas is approximately 24,569 gpd. This water stream is shown as two streams on the Site Water Balance: stream no. 920 is the noncontact storm water from Waste Pit No. 4 and stream no. 921 is the remaining noncontact storm water from the

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waste pit area. In the event of a 25-year/24-hour storm event, the total noncontact storm water flow would be approximately 1,072,374 gallons in a 24-hour period. During each excavation phase, portions of this drainage area are excavated and the storm water falling on the area is transferred to the Clearwell instead of the K-65 Runoff Basin. The Site Water Balance shows how stream nos. 920 and 921 change as the undisturbed areas are excavated.

3.2 Contact Storm Water

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All contact storm water at the WPRAP site is transferred to the Clearwell for subsequent treatment by the WTS and the AWWT. During storm events, storm water will be transferred from the excavations and the contaminated concrete surfaces in the plant facilities area as rapidly as practical to minimize the potential for contaminant infiltration into the groundwater.

3.2.1 Plant Facilities Area

Contact storm water in the plant facilities area comes from the following concrete surfaces (the associated sump or lift station is listed in brackets):

- Truck Turn Around Area [Truck Turn Around Area Lift Station]
- Dryer Pad [Dryer Pad Sump]
- Decontamination Pad [Haul Road Lift Station]
- Haul Road [Haul Road Lift Station]
- Truck Wash [Haul Road Lift Station]

Water is collected from these surfaces by catch basins and lift stations or by individual sumps. The lift station pumps and sump pumps are connected to a common header that allows transfer of water from the plant facilities area to the Clearwell. The top-of-curb elevation for the concrete surfaces is fixed for each pad and has been selected such that the minimum curb height is five inches. This provides a contingency storage volume such that storm water generated during a 25-year/24-hour storm event can be held in the event of a pump failure. In addition, the lift stations are designed with top elevations higher than the curbed areas that drain to them to prevent them from overflowing in the event of flooding on the pads.

3.2.1.1 Truck Turn Around Area

The Truck Turn Around Area is sloped to two collection basins that drain to the Truck Turn Around Area Lift Station located along the southern side on the area. This area will see high truck traffic, and although the truck tires are cleaned prior to entering this area, there is a possibility that contamination will exist on the pad and storm water falling in the area may contact contaminated material. The area of the Truck Turn Around Area is approximately 26,450 ft^2. The average contact storm water flow being collected in the area is approximately 1,800 gpd. This water stream is shown as stream no. 910 on the Site Water Balance. In the event of a 25-year/24-hour storm event, the Truck Turn Around Area will collect approximately 79,149 gallons in a 24-hour period.

3.2.1.2 Dryer Pad

The rotary dryers are located on a concrete pad located between the GCS/WTS Building and the Material Handling Building. The pad is sloped to a collection sump. Although the waste material entering and leaving the area is in enclosed conveyor systems, there is a possibility that contamination will exist on the pad and storm water falling on the pad may contact contaminated

material. The area of the Dryer Pad is approximately 6,100 ft^2. The average contact storm water flow being collected on the pad is approximately 418 gpd. This water stream is shown as stream no. 907 on the Site Water Balance. In the event of a 25-year/24-hour storm event, the Dryer Pad will collect approximately 18,254 gallons in a 24-hour period.

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3.2.1.3 Decontamination Pad

The Decontamination Pad is located along the southern side of the Haul Road, next to the Maintenance Building. The pad is sloped to a catch basin in the center of the pad. The pad is used to decontaminate trucks or equipment before it enters the maintenance building. The area of the Decontamination Pad is approximately 800 ft^2. Water collected by the catch basin flows by gravity through a storm sewer leading to the Haul Road Lift Station. The floor drains in the maintenance building also drain to this storm sewer. The average contact storm water flow being collected on the pad is approximately 55 gpd. The average volume of decontamination water (considered nonprocess wastewater) produced on the pad is approximately 1,428 gpd. The total amount of water being transferred from the pad is estimated to be 1,500 gpd. This combined water stream is shown as stream no. 909 on the Site Water Balance. In the event of a 25-year/24-hour storm event, the Dryer Pad will collect approximately 2,394 gallons of storm water in a 24-hour period. During such a storm event, decontamination water generation is expected to be negligible.

3.2.1.4 Haul Road

The Haul Road leading from the Truck Wash to the Truck Turn Around Area is sloped to collection basins that drain to the Haul Road Area Lift Station located along the southern side of the road. This road will see high truck traffic, and although the truck tires are cleaned prior to entering the road, there is a possibility that contamination will exist on the road and storm water falling on the road may contact contaminated material. The area of the Haul Road is approximately 8,450 ft^2. The average contact storm water flow being collected from the road is approximately 579 gpd. This flow is included with water from the Truck Wash in stream no. 911 on the Site Water Balance (combined average flow estimated to be 1,000 gpd). In the event of a 25-year/24-hour storm event, the Haul Road will collect approximately 25,286 gallons of storm water in a 24-hour period.

3.2.1.5 Truck Wash

The Truck Wash (and Personnel Boot Wash) is located at the west end of the Haul Road, near the southwest corner of Waste Pit No. 4. The concrete pad is sloped to a catch basin in the center of the pad. The pad is used to decontaminate trucks (primarily truck tires), equipment and personnel boots as they leave the waste pit area. The area of the Truck Wash pad is approximately 1,000 ft^2. Water collected in the catch basin flows by gravity through a storm sewer leading to the Haul Road Lift Station. The average contact storm water flow being collected on the Truck Wash pad is approximately 68 gpd. The average volume of decontamination water produced on the pad is approximately 343 gpd. The average combined flow from the pad is approximately 411 gpd. This is included in stream no. 911 on the Site Water Balance (combined average flow estimated to be 1,000 gpd). In the event of a 25-year/24-hour storm event, the Truck Wash pad will collect approximately 2,992 gallons in a 24-hour period. During such a storm event, wash water generation is expected to be negligible.

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3.2.2 Waste Pit Area - Water Covered Areas

Storm water falling on the water covered pits is managed as contact storm water because the water cover is in contact with raw waste. Water is transferred from the water covers to the Clearwell as needed to maintain the minimum water coverage as dictated by existing FDF technical procedures. Excess capacity afforded by freeboard in the water covered pits provides storage capacity in the event of a storm.

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3.2.2.1 Clearwell

Storm water that falls directly into the Clearwell or on portions of Waste Pits Nos. 1 and 3 that are sloped to drain into the Clearwell is managed as contact storm water. The sections of Waste Pits Nos. 1 and 3 that currently drain to the Clearwell will continue to drain in this way until some time during excavation phases 4 and 9, respectively. Storm water that falls in the Clearwell must be treated until the Clearwell is excavated starting during phase 18. The area that drains to the Clearwell (including the Clearwell itself) is approximately 105,984 ft^2. The average storm water flow rate from the Clearwell and surrounding drainage areas (i.e., during excavation phase 1) is approximately 7,266 gpd. This water is shown as stream no. 912 on the Site Water Balance. When the drainage area in Waste Pit 1 (approximately 45,000 ft^2) is removed (i.e., excavation phase 7), the average storm water flow from the remaining area (approximately 60,984 ft^2) is approximately 4,181 gpd. When the drainage area in Waste Pit 3 (approximately 32,670 ft^2) is removed (i.e., excavation phases 8-17), the average storm water flow from the remaining area (approximately 28,314 ft^2) is approximately 1,941 gpd. The 25-year/24-hour storm water volumes associated with these three periods are approximately 317,147 gallons, 182,489 gallons, and 84,727 gallons, respectively.

3.2.2.2 Waste Pit No. 5

During excavation phases 1 thru 8, the water cap on Waste Pit No. 5 will be maintained. The source of water entering Waste Pit No. 5 is storm water that falls within the limits of the pit (an area of approximately 162,914 ft^2). Water is drained from the pit through a concrete "well" structure located near the southwest corner of the pit. The "well" is equipped with several slide gate valves which act as weirs to control the water level in the pit. Water that drains into the "well" flows by gravity through a buried line to the Clearwell. The average storm water flow rate from Waste Pit No. 5 is approximately 11,169 gpd. This appears as stream no. 916 on the Site Water Balance. In the event of a 25-year/24-hour storm event, the freeboard in the pit will be used to contain the storm water (4.8 inches). The total volume of water collected in Waste Pit No. 5 during a 25-year/24-hour storm is approximately 487,504 gallons.

Managing the water level in Waste Pit No. 5 may also involve adding water to the pit during especially dry periods, although this is not common. Water must be added to the pit when the level drops lower than a specified level below the top of the pit.

Beginning in excavation phase 9, the entire water cap on Waste Pit 5 will be pumped to the Clearwell. When the water has been removed, the surface of the material in the pit will be sprayed with Poly-Shell (or equivalent). For phases 9 through 16 of the excavation, any storm water that lands on the covered portion of the waste pit is shown in stream no. 916 on the Site Water Balance. Physically, this water may be combined with the excavation water.

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3.2.2.3 Waste Pit No. 6

During excavation phases 1 though 7, the water cap on Waste Pit No. 6 will be maintained. The source of water entering Waste Pit No. 6 is storm water that falls within the limits of the pit (an area of approximately 32,234 ft^2). Water is transferred from the pit to the Clearwell using a portable pump and temporary piping located in the waste pit area. In the event that the contents of the water cover on Waste Pit No. 6 meet the BSL influent criteria, the water can be pumped directly to the BSL via the existing buried piping. The average storm water flow rate from Waste Pit No. 6 is approximately 2,210 gpd. This appears as stream no. 917 on the Site Water Balance. In the event of a 25-year/24-hour storm event, the freeboard in the pit will be used to contain the storm water (4.8 inches). The total volume of water collected in Waste Pit No. 6 during a 25-year/24-hour storm is approximately 94,457 gallons.

Managing the water level in Waste Pit No. 6 may also involve adding water to the pit during especially dry periods, although this is not common. Water must be added to the pit when the level drops lower than a specified level below the top of the pit.

Beginning in excavation phase 8, the water cap on Waste Pit 6 will be pumped to the Clearwell. When the water has been removed, the surface of the material in the pit will be sprayed with Poly-Shell (or equivalent). For phases 8 through 19 of the excavation, stream no. 917 on the Site Water Balance drops to zero and the storm water falling on the waste pit is treated as excavation water or water from pits awaiting certification.

3.2.3 Excavation Water

Excavation water consists of contact storm water from open excavations, drainage of free water from excavated materials, and seepage of perched water into the excavation. Contact storm water from the haul roads within the waste pits will be directed into the excavations and transferred to the Clearwell by the excavation pumps. Standing water will not be allowed to remain in the open excavations for longer than necessary. Depending on the available capacity in the water management facilities, storm water removal from the excavations will occur as soon and as rapidly as practical.

3.2.3.1 Working Excavations

During the excavation of a waste pit, several means will be employed to reduce the amount of contact storm water in the excavation area. These methods include: minimization of exposed material surface; and placement of berms around open areas to minimize run-on. Although all storm water falling within the waste pit area is treated, minimizing the volume of storm water entering the excavations will result in a decreased potential for contaminated water infiltrating into the groundwater.

The amount of excavation water generated will change constantly during the excavation process. Stream no. 913 on the Site Water Balance is the excavation water from all the open excavations. The water in the excavations will be collected to "sumps" by grading the bottom of the excavations and/or digging shallow (e.g., 6-inch) trenches in the excavations to direct the water to the sumps. One or more sumps may be required in each excavation (i.e., each waste pit) depending on the amount of open area. Portable gasoline or diesel powered pumps will be used to transfer water from the excavations to the Clearwell. Stream no. 915 is the combined flow rate being transferred by the excavation pumps. Additional laterals may be added to the main header pipe running from the plant

facilities area to the Clearwell in order to facilitate operation of the excavation pumps. The excavation pumps will be equipped with isolation valves and check valves to ensure that water from the main header does not back flow into the excavations.

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In the event of a 25-year/24-hour storm event, the amount of excavation water will increase. As the project approaches completion and the majority of the waste pit area is being excavated or awaiting certification, the maximum amount of storm water will result from such a storm. Using a combined area of approximately 659,498 ft^2 for the entire waste pit area, a 4.8-inch storm in 24 hours will generate approximately 1,973,482 gallons of storm water. This value does not include the ground water seepage.

3.2.3.2 Haul Roads

The haul roads within the waste pits that lead from the excavations to the truck wash will change as the excavation proceeds. The total area of the haul roads is estimated to be 30,000 ft^2 and is expected to remain relatively constant throughout the project. The average contact storm water flow rate from the haul roads into the excavations is estimated to be 2,060 gpd. Storm water flow from the haul roads is shown as stream no. 914 on the Site Water Balance. In the event of a 25-year/24-hour storm event, the total volume of contact storm water from the haul roads is approximately 89,772 gallons.

3.2.3.3 Areas Awaiting Certification

After a waste pit has been excavated and directed excavation of the subsoils has occurred, storm water from the pit has to be managed as contact storm water until the pit has been certified as clean by FDF. It is estimated by FDF that this period may last up to 6 months. Stream 926 on the Site Water Balance is the contact storm water pumped from the pits awaiting certification to the Clearwell. The average flow rate for this stream for each phase of the excavation is given in the Site Water Balance. In the event of a 25-year/24-hour storm event, the volume of water from this area would also vary depending on phase. An estimate of the maximum volume of contact storm water flowing from the waste pit area during a 25-year/24-hour storm event is given in Section 3.2.3.1.

4.0 Wastewater Management

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This section describes the various wastewater streams from the WPRAP. The section is divided into two subsections: process and nonprocess wastewater. Each of the minor sections describes a different wastewater stream, where it originates, where it is transferred, and the expected average daily flow rate. Storm water streams are discussed in similar detail in Section 3.0. The water management facilities that are used to receive, store and treat the storm water and wastewater are described in Section 5.0.

ITs approach to the management of the various wastewater streams is discussed in the following subsections. In general, the overall approach is to pretreat wastewater through the WTS prior to discharge to the BSL. The WTS process will vary based upon wastewater characteristics (e.g., use of settlement if influent water has high suspended solids content).

4.1 Process Wastewater

Process wastewater is the designation for any water streams generated in the treatment systems (i.e., the thermal drying system, the GCS, and the WTS). Process wastewater at the site is generated through the treatment of the waste material and therefore will contain the same contaminants (at varying levels) as the storm water streams. Process wastewater will be treated in the WTS and the AWWT. The following streams are considered to be process wastewater streams:

- Cooling tower blowdown
- GCS blowdown pre-treatment system effluent
- WTS backwash/recycle

4.1.1 Cooling Tower Blowdown

A blowdown stream from the cooling tower in the rotary dryer system will be routed to the Clearwell for subsequent treatment by the WTS. This stream is shown as stream no. 511 on the Site Water Balance and is estimated to be 14,400 gpd. The stream should remain relatively constant throughout the project. Cooling tower blowdown water will be transferred to the Clearwell through the main header running from the plant facilities area to the Clearwell. The cooling tower is critical to operation of the rotary dryers and it is important that this blowdown stream is maintained during dryer process operation. This will result in prioritizing cooling tower blowdown flow to the Clearwell during a storm event such that this stream is allowed to continue flowing to the Clearwell any time the rotary dryers are operating.

4.1.2 Gas Cleaning System Blowdown

A blowdown stream from the GCS will be pre-treated by a dedicated treatment system prior to being transferred to the WTS. This pre-treatment system consists of clarification and sand filtration for the removal of free-phase organics and suspended solids. The effluent from this system, stream no. 613 on the Site Water Balance, is pumped directly to the influent tank in the WTS. This stream is estimated to be 47,520 gpd. The GCS is critical to operation of the rotary dryers and it is important that this blowdown stream is maintained during dryer process operation. A temporary holding tank (approximately 20,000 gallons) has been included in the design of the WTS to handle this stream in the event of a temporary shutdown of the WTS.

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4.1.3 Wastewater Treatment System Backwash/Recycle

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Wastewater generated during the backwashing of the sand filters and ion exchange beds in the WTS flows to the Clearwell through the main header from the plant facilities area. This stream appears as stream no. 664 on the Site Water Balance. The average flow of backwash water from the WTS to the Clearwell is approximately 15,000 gpd. This stream will have a high suspended solids concentration. Treated effluent water from the WTS is used as the source of backwash water. Suspended solids transferred back to the Clearwell in the backwash stream are solids that originated in the Clearwell or were precipitated during treatment of the water from the Clearwell.

Recycle water from the WTS to the Clearwell is partially treated water from the WTS which may or may not meet the BSL influent criteria. Partially treated water may be diverted to the Clearwell during startup of the WTS or at times during which it is suspected that the WTS effluent does not meet the BSL WAC. Recycle water has an intermittent flow.

4.2 Nonprocess Wastewater

The following is a list of nonprocess wastewater sources that originate outside the waste pit area:

- Laboratory wastewater
- Laundry wash water
- Respirator wash water
- Decontamination shower water (from the Changeout Facility)
- Material Handling Building collection sumps
- Railcar Loadout Building decontamination sumps
- GCS/WTS Building sumps
- Truck wash water
- Decontamination pad water

These streams will remain relatively constant throughout operations at the site. They are not expected to change during the various excavation phases. Due to the relatively small flow rates associated with these sources, most of the streams will be directed to the Clearwell (for subsequent treatment by the WTS) at all times, regardless of contaminant levels (the exception is water collected in the Grey Water Collection Sump). The sections below describe the method by which the water will be collected and transferred and the expected flow rate.

The following sections describe the various wastewater sources, collection tanks and transfer pumps used to manage nonprocess wastewater generated outside the waste pit area.

4.2.1 Laboratory Wastewater

Laboratory wastewater is generated during the analysis of water and soil samples taken at the site. Contaminant levels in this stream are expected to be low enough to meet the BSL influent criteria. Wastewater from the laboratory will be collected in a local sump and subsequently transferred to the Grey Water Collection Sump. The laboratory wastewater flow rate is expected to be approximately 100 gpd averaged over a 7-day week. This is shown as stream no. 925 on the site water balance.

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4.2.2 Laundry Wash Water

Wastewater from the washing machines in the laundry facility will flow by gravity from the laundry facility to the Grey Water Collection Sump as needed. The laundry facility will generate approximately 750 gpd averaged over a 7-day week. Because the clothes being washed are worn under PPE, the laundry water is not expected to contain contaminants at levels higher than the BSL influent criteria. Laundry facility wastewater is shown as stream no. 901 on the Site Water Balance.

4.2.3 Respirator Wash Water

Wastewater from the respirator wash facility will flow by gravity from the respirator wash facility to the Grey Water Collection Sump. The respirator wash facility will generate approximately 100 gpd averaged over a 7-day week. Because the cartridges of the respirator will be disposed of prior to cleaning, the wash water is not expected to contain contaminants at levels higher than the BSL influent criteria. The respirator wash wastewater is shown as stream no. 902 on the Site Water Balance.

4.2.4 Decontamination Shower Water

Water from the personnel decontamination showers in the changeout facility is not considered contaminated and will be pumped to the sanitary sewer. However, a dedicated personnel decontamination shower will be installed in the changeout facility and will be piped to allow gravity drainage to the Grey Water Collection Sump. This shower is not expected to be needed during normal operations and is therefore stream no. 903 on the Site Water Balance has an average flow rate of 0 gpd. In the event that the decontamination shower is used, the water is not expected to contain contaminants at levels higher than the BSL influent criteria.

4.2.5 Material Handling Building Sumps

The Material Handling Building contains three collection sumps:

- MHB Mixing Pit Sump
- MHB Storage Bin Sump
- MHB Filter Press Area Sump

Water from the material being handled in the mixing pits will collect in the Mixing Pit Sump located along the west wall of the building, to the south of the mixing pits. The trench from the mixing pits to the sump contains a weir to minimize the accumulation of solids in the sump. Water draining from material stock piles in the bins along the east wall of the building is collected by an open trench behind the storage bins. This trench is sloped to a Storage Bin Sump in the center of the trench. The connection between the trench and the sump contains a weir to minimize the accumulation of solids in the sump. The third sump in the Material Handling Building is located in the southwest corner of the building near the filter press (associated with Area 60). The floor in this area is sloped to drain free water to the collection sump.

Each collection sump is equipped with a sump pump. The sump pumps will transfer water to the Material Handling Building Collection Tank (MHBCT) located along the south wall of the Material Handling Building. This combined flow from the Material Handling Building sumps to the MHBCT is shown as stream no. 905 on the Site Water Balance. The average flow rate of this stream is estimated to be 228 gpd. From the MHBCT, the water is pumped to the Clearwell.

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4.2.6 Railcar Loadout Building Sumps

The Railcar Loadout Building contains four collection sumps: two loading area sumps and two decontamination sumps.

The two loading area sumps in the Railcar Loadout Building are situated along the rail spur near the weigh scale. They will be used to collect any excess water from dust suppression sprays. The two decontamination water sumps are located in the track area of the Railcar Loadout Building and will collect wastewater generated should railcars require any decontamination. It is expected that railcar exteriors will not contact contaminated material during loading and should not require washing.

Each collection sump is equipped with a sump pump. The sump pumps will transfer water to the MHBCT located along the south wall of the Material Handling Building. This combined flow from the Railcar Loadout Building sumps to the MHBCT is shown as stream no. 906 on the Site Water Balance. The average flow rate of this stream is estimated to be 1,200 gpd and is comprised primarily of wash water (should railcars require any decontamination). From the MHBCT, the water is pumped to the Clearwell.

4.2.7 GCS/WTS Building Sumps

The GCS/WTS Building contains three collection sumps:

- GCS/WTS Building North Sump
- GCS/WTS Building South Sump
- GCS/WTS Building West Sump

The floor in the GCS/WTS Building is sloped to drain to the north or south sump. The north sump is located near the WTS equipment and the south sump is located near the GCS equipment. These sumps will collect wash water, tank overflow water, process drainage water, etc. The west sump is located in the annex off the south side of the GCS/WTS Building and will be used primarily to drain the cooling tower when needed.

Each collection sump is equipped with a sump pump. The north sump pump will transfer water to the influent tank in the WTS. The south sump pump will transfer water to a tank in the GCS blowdown pretreatment system. The west sump pump will transfer water to the temporary holding tank in the WTS. The sumps may alternately discharge to the clearwell as a contingency should insufficient holding volume be available in the temporary holding tank. The average flow rate from each of these streams is 0 gpd. The streams from the north, south, and west sumps are streams nos. 927, 928, and 929, on the Site Water Balance, respectively.

4.2.8 Truck Wash Water

Nonprocess wastewater is generated at the Truck Wash during washing operations. Because this pad is located outdoors, contact storm water can not be separated from nonprocess wastewater but this is not problematic because both of these types of water are transferred to the Clearwell for subsequent treatment by the WTS. Nonprocess wastewater generated at the Truck Wash is included in stream no. 911, which is described in Section 3.2.1.5.

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4.2.9 Decontamination Pad

Nonprocess wastewater is generated on the Decontamination Pad during washing operations. Because this pad is located outdoors, contact storm water can not be separated from nonprocess wastewater but this is not problematic because both of these types of water are transferred to the Clearwell for subsequent treatment by the WTS. Nonprocess wastewater generated at the Decontamination Pad is included in stream no. 909, which is described in Section 3.2.1.3.

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5.0 Water Management Facilities

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This section describes the facilities utilized at the WPRAP to manage the storm water and wastewater. These facilities consist of the various sumps, tanks, and basins used as surge/equalization volumes, the transfer pumps associated with these basins and the WTS. Each subsection describes one of the facilities, its use, capacity, and components (e.g., transfer pumps, WTS components, etc.). This section only describes the management of the facility and where it discharges. Sections 3 and 4 describe the individual streams that flow to the water management facilities and individual stream flow rates. Section 7 describes how the water management facilities are interrelated and presents contingency measures for overall site water management. Section 7 incorporates management of individual sources discussed in Section 3 and 4 and operation of the water management facilities in the event of heavy storms or other nonroutine operating scenarios.

5.1 Storm Water Management Pond

The Storm Water Management (SWM) pond is an approximate 1,000,000 gallon, plastic lined earthen pond located in the northeast corner of the IT work area in OU1, due north of the Material Handling Building. The SWM Pond collects noncontact storm water from the plant facilities area via a series of collection basins, roof drains and storm sewers.

A monitoring program for the SWM Pond will be established in the Sampling and Analysis Plan to allow discharge of this water directly to Paddys Run. If suitable for discharge, the water will be pumped directly to the drainage swales that lead to Paddys Run. If not suitable for direct discharge to Paddys Run, the water will be transferred to the Clearwell, WTS, or directly to the BSL. Water collected in the SWM pond may alternatively be used for dust suppression, Waste Pit 5 or Waste Pit 6 water cap management, or makeup water to the rotary dryer. Details of the SWM pond monitoring program will be given in the Sampling and Analysis Plan.

The average flow rate of noncontact storm water from the SWM Pond to Paddys Run is approximately 17,051 gpd. This is shown as stream no. 919 on the Site Water Balance. In order to discharge water from the SWM Pond to the NPDES outfall, the pump located in the pump station at the southwest corner of the SWM Pond will be manually operated and the water will be transferred through hoses to the drainage ditch located north of the pond. This drainage ditch runs in a westerly direction along the northern side of the waste pit area to NPDES Outfall *4006. This outfall discharges to Paddys Run. This drainage ditch is the path that the water would follow in the event of an overflow from the SWM Pond. In the event that the water level in the SWM Pond reaches its maximum level, water overflows to two smaller unlined ponds located to the northeast of the SWM Pond and from there to the drainage ditch.

In the event of precipitation in excess of the 25-year, 24-hour storm event, the water in the SWM Pond naturally overflows to a series of smaller ponds north of the SWM Pond and eventually to the drainage ditch which discharges to NPDES Outfall *4006.

5.2 Clearwell

The Clearwell is an approximate 1,000,000 gallon earthen basin located in the southwest corner of the waste pit area. The Clearwell was constructed originally to act as a runoff collection point for Waste Pit No. 3. The Clearwell currently collects storm water runoff from Waste Pit No. 5 and

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portions of Waste Pits No. 1 and 3. During the WPRAP, the Clearwell will be used as a surge point for water streams entering the WTS (except the blowdown stream from the GCS pretreatment system). The Clearwell will also act as the primary settling point for suspended solids in these streams, thus reducing the load on the WTS. As needed throughout the project, sediment may be removed from the Clearwell to maximize storage capacity.

The existing Clearwell pumps and below grade piping from the Clearwell to the BSL will be used during this project to transfer water from the Clearwell to the WTS. Water will be transferred to the WTS at a rate of approximately 250 gpm. However, the average daily flow from the Clearwell to the WTS will vary during the project based on the changing contact storm water and wastewater flow rates. The stream from the Clearwell to the WTS is shown as stream no. 924 on the Site Water Balance.

In addition to directing flow to the WTS, the buried pipe from the Clearwell to the BSL will contain a bypass that allows the contingency for water to be pumped directly to the BSL. This flow pattern is not expected to be used routinely but does provide the capability to lower the water level in the Clearwell more rapidly that normal. The WTS Influent/Effluent Valve Pit contains the valves, etc. to direct water flow from the Clearwell to the WTS or the BSL.

5.3 K-65 Runoff Basin

The K-65 Runoff Basin is a concrete basin located outside the waste pit area, due south of the Clearwell. The basin was constructed to collect storm water runoff from the perimeters of the waste pits, the Clearwell, the burn pit, and the K-65 silos. Water drains to the K-65 Runoff Basin via a series of existing drainage swale and culverts in the waste pit area. Water is pumped from the K-65 Runoff Basin to the BSL for treatment by the AWWT. The quality of the water in the basin is not expected to be impacted by excavation activities because only storm water from undisturbed portions of the waste pit area will drain to the basin. Storm water that drains to the K-65 Runoff Basin is referred to as "noncontact storm water" to distinguish it from storm water that contacts raw waste and must be pretreated by the WTS.

In the event of a 25-year/24-hour storm event in the early phases of excavation, the K-65 Runoff Basin will receive approximately 1,072,374 gallons of noncontact storm water from the waste pit area (based on pre-excavation areas) in addition to water from sources outside the waste pit area.

5.4 Biodenitrification Surge Lagoon

The BSL acts as a surge point for influent water to the AWWT. The BSL is an approximate 8,000,000 gallon, plastic lined earthen basin. All contaminated storm water and wastewater from the WPRAP ultimately enters the BSL. Because other wastewater streams also enter the BSL, all discharges to the BSL from IT activities must be coordinated with FDF personnel to ensure that the BSL does not overflow during peak water flow periods. In addition, all storm water and wastewater discharges to the BSL from the WPRAP are to expected to meet the BSL influent criteria which are given in Section 2.8 of the Design Criteria and Assumptions document which was previously submitted in Volume 1 of the Remedial Design Package.

Five streams can flow to the BSL (although not all streams will necessarily flow to the BSL):

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- The effluent stream from the WTS
- The stream from the Grey Water Collection Sump
- The K-65 Runoff Basin pumps discharge to the BSL
- The contents of the SWM Pond may be discharged to the BSL if the water does not meet NPDES discharge limits
- Water from Waste Pit No. 6 may be discharged directly to the BSL if the water meets the BSL influent criteria.

5.5 Waste Pit Water Covers

The water covers on Waste Pits Nos. 5 and 6 act as surge volumes for storm water landing on these pits. The water covers on these pits will be maintained until waste excavation activities begin for these pits. If the Clearwell is reaching its capacity during a heavy storm, extra capacity available in the water covers on Waste Pits Nos. 5 and 6 may be used as surge capacity for excavation water to minimize the amount of water left in the excavations. The practice of transferring water to these water covers will not be routine and will only occur with FDF consent during heavy storms.

5.6 Grey Water Collection Sump

Water from the laboratory, the laundry facility, the respirator wash facility and the decontamination shower in the changeout facility will be collected in the Grey Water Collection Sump, located to the north of the laundry facility. This water will be transferred directly to the BSL via sump pump. The average combined flow rate is approximately 950 gpd. The contents of the sump will be sampled per the monitoring program described in the Sampling and Analysis Plan. In the event that analysis shows that this stream does not meet the BSL influent criteria, the water will be pumped to the Clearwell for subsequent treatment by the WTS. This stream is shown as stream no. 904 on the Site Water Balance.

5.7 Material Handling Building Collection Tank

Water originating in the areas around the Material Handling Building will be pumped to the Material Handling Building Collection Tank (MHBCT). The transfer pump attached to this tank pumps the water to the main piping header that runs from the plant facilities area to the Clearwell. This arrangement reduces the amount of buried piping that has to be run from these areas to the treatment system. This water stream from the MHBCT to the Clearwell is stream no. 908 on the Site Water Balance. The flow rate of this combined stream will be approximately 1,428 gpd.

5.8 Wastewater Treatment System

The Wastewater Treatment System is located inside the GCS/WTS Building and is used to pretreat WPRAP wastewater and storm water streams as necessary to meet the BSL influent criteria. The system will be designed for approximately 250 gpm. Unit operations in the WTS include metals precipitation, clarification, filtration, ion exchange, and pH adjustment. Further description of the WTS is given in Section 2.9 of the Description of Operation and Process document given in Volume 1 of the Remedial Design Package. Effluent from the WTS to the BSL will be monitored as described in the Sampling and Analysis Plan.

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6.0 Erosion Control

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6.1 Plant Facilities Area

Prior to construction, the plant facilities area will be graded to promote proper drainage of storm water into the existing storm water collection system as shown on Figure 1-2. In addition, disturbed areas which are not to be used for roads, parking, laydown/storage, or other purposes will be vegetated in accordance with ODNR Rainwater and Land Development Guidance. Silt fencing which was installed at the plant facilities area during the pre-operations phase of the project will be maintained until sufficient vegetative cover is provided to protect against erosion. After construction activities in the plant facilities area is completed, erosion and sediment control is not expected to require frequent corrective actions.

6.2 Excavations

Silt fences will be utilized in the excavation area to prevent excessive erosion and/or sedimentation during excavation activities. In accordance with the ODNR Rainwater and Land Development Guidance, hay or straw bales will not be used for temporary erosion control. Silt fence locations will be selected based upon the location of the excavation activities as they progress. At a minimum, silt fences will be positioned along the perimeter of open, disturbed areas which are under excavation. Silt fences may also be used within individual working areas within excavations as well, providing protection from sedimentation or erosion of adjacent areas as needed.

Silt fence fabric will conform to the American Society for Testing and Materials (ASTM) standards given in the Site Clearing Specification of the Site Preparation Package (see Volume 3 of 3, of the Remedial Design Package). Silt fence installation, inspection and maintenance, and removal will be in accordance with the requirements provided therein.

6.3 Waste Pit Area - Undisturbed Areas

Silt fencing will be used in undisturbed area in the waste pit area to control erosion and sedimentation, as needed. Placement of silt fencing will be based on routine observations of the storm water drainage patterns and the appearance of ruts in the waste pit area. In addition to silt fencing, IT will take advantage of the natural vegetative cover which currently exists over the surfaces of Waste Pits Nos. 1, 2, and 3, and the Burn Pit and the elastomeric liner covering Waste Pit No. 4 to control erosion in the waste pit area. These covers will be left undisturbed, to the extent practicable, until such time as the excavation sequence reaches the respective locations.

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7.0 Water Management Contingencies

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7.1 Prevention of Cross Contamination

The storm water and wastewater management facilities are designed to maintain segregation of water streams based on potential contaminant levels to avoid the spread of contaminants and minimize the total volume of contaminated water at the site. The following is a summary of the contingency features in the design of the water management facilities:

- The curbs around the outdoor concrete surfaces are designed to contain the entire volume of water falling on that surface in a 25-year/24-hour storm event.
- Sump pumps and pipe diameters have been sized to allow the use of common model sump pumps in all the sumps and lift stations. In addition, spare pumps will be available such that a pump experiencing operating problems can be replaced/maintained.
- The buildings containing contaminated material have sumps to collect and transfer potentially contaminated water to treatment.
- Lift stations that collect water from several catch basins have top elevations higher than the curbs surrounding the areas draining to lift station. This will ensure that the lift station does not overflow even in the event of a pump failure.
- The Temporary Holding Tank in the WTS is used to collect water from the Gas Cleaning System process blowdown pretreatment system in the event of a WTS system shutdown.
- Installed spare pumps have been installed throughout the WTS.

In addition to contingencies included in the design of the water management facilities, storm water and wastewater management procedures have been developed to minimize cross contamination and the potential for contaminated water infiltration into the groundwater table. The following is a summary of the storm water and wastewater management procedures that constitute contingency measures:

- Storm water management in the waste pit area may be accomplished by operating the Clearwell at the lowest level practical, thus maximizing the available holding volume for storm events.
- Storm water management in the plant facility area may be accomplished by operating the SWM Pond at the lowest level practical, thus maximizing the available holding volume for storm events.

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- If the water level in the Clearwell exceeds a predetermined value, and/or if flow to the BSL is terminated, water discharges to the Clearwell may be throttled or shut down in a prioritizing manner (See Section 7.2 of this plan).

- During a storm event, WPRAP may be able to operate Waste Pits Nos. 5 and 6 with an increased water level (up to approximately one foot) above the normal operating level. This could provide additional surge volume for short term water storage.

- Runon/runoff controls in the excavation areas such as drainage ditches, low-point sumps, earthen "curbs", and the "top-down" excavation approach will be utilized as needed to minimize the amount of storm water entering the excavations and keep excavation water from draining out of the excavations.

- In the event that a heavy storm event is anticipated and the water level in the BSL permits, FDF may choose to direct IT to transfer water directly from the Clearwell to the BSL, bypassing the WTS, at the maximum rate possible to make additional surge volume available in the Clearwell or to ensure that the Clearwell does not overflow.

7.2 Termination of Discharge to the BSL

In the event that IT is directed by FDF to terminate discharge of water to the BSL (e.g., during a storm event), the following prioritization will be implemented (in roughly the order presented) when managing storm water and wastewater:

- Transfer of water from the water cover on Waste Pit No. 6 to the Clearwell will stop (i.e., the transfer pumps will not be operated).

- Transfer of water from the water cover on Waste Pit No. 5 to the Clearwell will stop (i.e., the slide gate valves in the concrete "well" will be adjusted to allow the water level to rise before gravity discharge to the Clearwell begins).

- The sand filters in the WTS will not be backwashed.

- Decontamination operations generating non-process wastewater will be curtailed.

- The WTS may be operated until the effluent tank is full and the influent tank reaches the high-level shut down (thus taking advantage of the available holding capacity in the WTS).

- Based on the water level in the Temporary Holding Tank in the WTS, the thermal dryers, the cooling tower, and the gas cleaning system process blowdown pretreatment system will be shut down.

- Transfer of excavation water to the Clearwell (or the water cover on Waste Pit No. 5 or 6 as an alternate) will receive the second highest water management priority during a storm event to minimize the possibility of impact on the Greater Miami Aquifer. However, in the event that discharge to the BSL is terminated and the surge capacity

at the WPRAP is utilized, water will accumulate in the excavation until it can be transferred to an appropriate holding point.

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- The highest priority for storm water management will be given to the containment of WPRAP contact storm water. The sump pumps and lift stations associated with the outdoor concrete surfaces will operate at all times regardless of storm events to ensure that contact storm water from these surfaces continues to be transferred to the Clearwell and the potential for overflow/cross-contamination is minimized.

- As a continency to prevent overflow of the Clearwell it may be necessary to transfer water from the Clearwell to the excavation area.

The overall prioritization governing water management activities in the WPRAP is a follows:

1. Minimization of cross contamination of noncontact storm water and non-contaminated surfaces outside the waste pit area.

2. Minimization of the impact on the Greater Miami Aquifer by infiltration of excavation water.

3. Attainment of influent criteria limits for discharge to the BSL.

The prioritization and interrelationship between the WPRAP streams and other streams entering the BSL is addressed in the Operations and Maintenance Master Plan (OMMP) for the Aquifer Restoration and Wastewater Treatment Project.

7.3 25-Year/24-Hour Storm Event

In the event of a heavy storm event (e.g., a 25-year/24-hour storm or heavier), storm water management activities will focus primarily on keeping the water management facilities from flooding and potentially cross contaminating other areas. Contingencies for the 25-yr/24-hr storm event have been described throughout previous sections of this plan.

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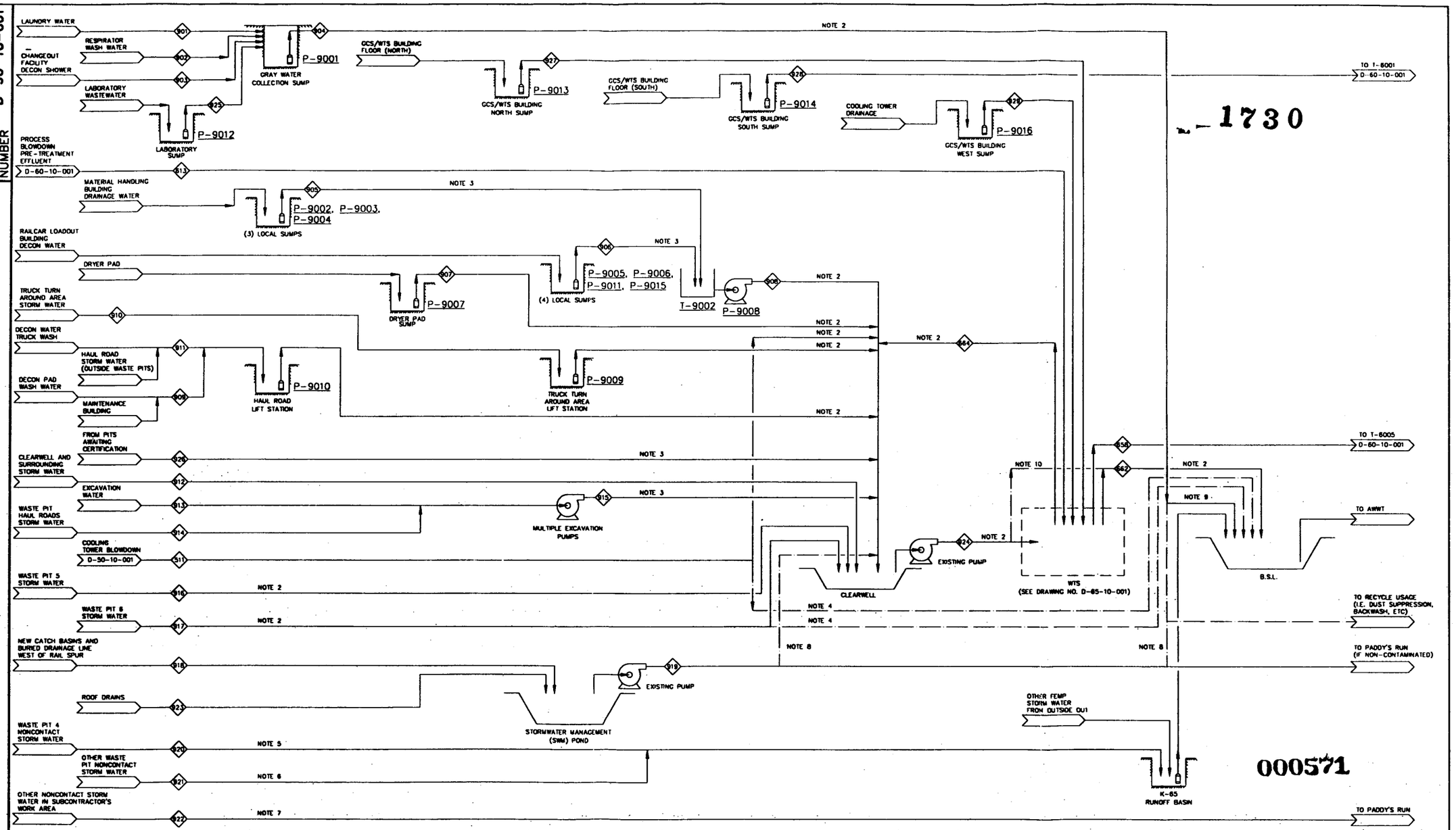
FIGURES

DRAWINGS

DRAWING NUMBER D-90-10-001



P-9001	GRAY WATER PUMP
P-9002, 9003, 9004	MATERIAL HANDLING BUILDING (MHB) SUMP PUMPS
P-9005, 9006	RAILCAR LOADOUT BUILDING (RLB) SUMP PUMPS (NORTH AND SOUTH)
P-9015	RAILCAR LOADOUT BUILDING WASH WATER SUMP PUMP
P-9011	RAILCAR LOADOUT BUILDING (RLB) DECON SUMP PUMP
P-9012	LABORATORY SUMP PUMP
P-9007	DRYER PAD SUMP PUMP
T-9002	MHB COLLECTION TANK (MHBCT)
P-9008	MHBCT TRANSFER PUMP
P-9009	TRUCK TURN AROUND AREA SUMP PUMP
P-9010	TRUCK WASH SUMP PUMP
P-9013	GCS/WTS BUILDING SUMP PUMP (NORTH)
P-9014	GCS/WTS BUILDING SUMP PUMP (SOUTH)
P-9016	GCS/WTS BUILDING SUMP PUMP (WEST)

STREAM NUMBER (NOTE 1)	511	613	901	902	903	904	905	906	907	908	909	910	911	912	913
	COOLING TOWER BLOWDOWN	PROCESS BLOWDOWN PRE-TREATMENT EFFLUENT	LAUNDRY WATER	RESPIRATOR WASH WATER	DECON SHOWER	GRAY WATER SUMP	MATERIAL HANDLING BLDG SUMPS	RAILCARD LOADOUT BLDG. SUMPS	DRYER PAD SUMP	MHBCT TRANSFER PUMP	DECON PAD WATER	TRUCK TURN AROUND AREA SUMP	TRUCK WASH SUMP	CLEARWELL STORM WATER	EXCAVATION WATER

STREAM NUMBER (NOTE 1)	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	658	662	664
	HAUL ROAD STORM WATER	EXCAVATION PUMPS	WASTE PIT 5 STORM WATER	WASTE PIT 6 STORM WATER	SWM POND COLLECTION BASINS	SWM POND EFFLUENT	WASTE PIT 4 NONCONTACT STORM WATER	OTHER WASTE PIT NONCONTACT STORM WATER	NONCONTACT STORM WATER OUTSIDE PITS	ROOF DRAINS	CLEARWELL TRANSFER PUMP	LABORATORY WASTEWATER	FROM PITS AWAITING CERTIFICATION	GCS/WTS BUILDING (NORTH)	GCS/WTS BUILDING (SOUTH)	COOLING TOWER DRAINAGE	WATER IN WTS SLUDGE DISCHARGE	WTS EFFLUENT	WTS BACKWASH

NOTES:

1. STREAM DESCRIPTIONS ARE GIVEN ON DWG. D-90-11-002, BY PHASE.
2. BURIED LINE.
3. SHOWN AS A SINGLE STREAM FOR CALCULATION PURPOSES. ACTUAL FIELD CONDITIONS MAY REQUIRE SEVERAL SEPARATE STREAMS.
4. STREAM CAN GO TO THE BSL IF IT MEETS THE WAC FOR DISCHARGE TO THE BSL.
5. COLLECTION TRENCH AROUND PIT AND THROUGH EXISTING CULVERTS.
6. EXISTING TRENCHES AND CULVERTS.
7. DRAINAGE SWALES AROUND NORTH AND SOUTH SIDE OF BSL; AND AREA NORTH OF PIT 6 AND SWM POND.
8. STREAM CAN GO TO BSL OR CLEARWELL IF IT DOES NOT MEET CRITERIA FOR NPDES DISCHARGE.
9. EXISTING BURIED LINE FROM SWM POND TO BSL.
10. EXISTING BURIED LINE FROM CLEARWELL TO BSL.

FOR INFORMATION ONLY
NOT FOR CONSTRUCTION

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	JRH	JAN	CHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: AREA 90 SITE WATER BALANCE PROCESS FLOW DIAGRAM

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	P. STEARNS	CHECKED BY	JAN	REVISION
DRAWN BY	RJC	APPROVED BY	CHH	0
DATE	17 DECEMBER 97	DWG. SCALE	NO SCALE	
IT PROJECT NO.	773481	DRAWING NO.	D-90-10-001	

DRAWING NUMBER D-90-10-002

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NO.	DESCRIPTION	UNITS	PH. 1	PH. 2	PH. 3	PH. 4	PH. 5	PH. 6	PH. 7	PH. 8	PH. 9	PH. 10	PH. 11	PH. 12	PH. 13	PH. 14	PH. 15	PH. 16	PH. 17	PH. 18	PH. 19
511	COOLING TOWER BLOWDOWN	gpd	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400
613	PROCESS BLOWDOWN PRE-TREATMENT	gpd	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520	47,520
901	LAUNDRY WATER	gpd	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
902	RESPIRATOR WASH WATER	gpd	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
903	DECON SHOWERS	gpd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
904	GWCT TRANSFER PUMP	gpd	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950
905	MATERIAL HANDLING BLDG SUMPS	gpd	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
906	RAILCAR LOADOUT BLDG SUMPS	gpd	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
907	DRYER PAD SUMP	gpd	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
908	MHBCT TRANSFER PUMP	gpd	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428	1,428
909	DECON PAD WATER	gpd	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
910	TRUCK TURN-AROUND AREA STORM WATER	gpd	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
911	TRUCK WASH SUMP	gpd	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
912	CLEARWELL STORM WATER	gpd	7,266	4,181	4,181	4,181	4,181	4,181	3,136	1,941	1,941	1,941	1,941	1,941	1,941	1,941	1,941	1,941	1,941	0	0
913	EXCAVATION WATER	gpd	20,578	28,037	29,030	70,344	92,405	97,488	98,410	124,114	125,597	109,195	112,406	56,189	63,230	109,598	122,659	114,984	19,930	15,336	0
914	WASTE PIT HAUL ROAD STORM WATER	gpd	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060
915	EXCAVATION PUMPS	gpd	22,638	30,097	31,090	72,404	94,465	99,548	100,470	126,174	127,657	111,255	114,466	58,249	65,290	111,658	124,719	117,044	21,990	17,396	2,060
916	WASTE PIT 5 STORM WATER	gpd	11,169	11,169	11,169	11,169	11,169	11,169	11,169	11,169	8,153	6,242	5,794	4,569	4,241	2,598	2,568	1,672	0	0	0
917	WASTE PIT 6 STORM WATER	gpd	2,210	2,210	2,210	2,210	2,210	2,210	2,210	0	0	0	0	0	0	0	0	0	0	0	0
918	SWM POND COLLECTION BASINS	gpd	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160
919	SWM POND EFFLUENT	gpd	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051	17,051
920	WASTE PIT 4 N.C. STORM WATER	gpd	4,480	4,480	4,480	4,480	2,598	2,598	2,538	2,538	2,538	2,538	2,538	2,329	2,329	0	0	0	0	0	0
921	OTHER WASTE PIT N.C. STORM WATER	gpd	19,791	11,199	8,959	6,719	2,240	1,493	1,493	1,493	1,493	1,493	1,493	0	0	0	0	0	0	0	0
922	NONCONTACT STORM WATER OUTSIDE PITS	gpd	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290	10,290
923	ROOF DRAINS	gpd	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891	7,891
924	CLEARWELL TRANSFER PUMP	gpd	78,829	83,203	84,197	125,510	156,974	152,654	152,531	181,785	180,252	177,376	180,139	157,286	141,607	195,160	173,602	165,030	163,215	147,766	146,052
925	LABORATORY WASTEWATER	gpd	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
926	WATER FROM PITS AWAITING CERTIFICATION	gpd	0	0	0	0	9,403	0	0	6,955	6,955	22,392	22,392	56,981	34,589	43,416	8,827	8,827	103,738	94,824	108,446
927	GCS/WTS BUILDING NORTH SUMP	gpd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
928	GCS/WTS BUILDING SOUTH SUMP	gpd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
929	GCS/WTS BUILDING WEST SUMP	gpd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
658	WATER IN WTS SLUDGE DISCHARGE	gpd	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747	12,747
662	WTS EFFLUENT	gpd	98,602	102,976	103,969	145,283	176,747	172,427	172,304	201,558	200,024	197,149	199,912	177,059	161,380	214,932	193,374	184,803	182,987	167,539	165,825
664	WTS BACKWASH	gpd	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000

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FOR INFORMATION ONLY
NOT FOR CONSTRUCTION

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	9/25/96	JMH	JAN	GHH	FINAL RD PACKAGE

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: AREA 90 SITE WATER BALANCE PROCESS STREAM TABLE

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PWS	CHECKED BY	JAN	REVISION
DRAWN BY	JMH	APPROVED BY	GHH	0
DATE	7/8/96	DWG. SCALE	NO SCALE	
IT PROJECT NO.	773481	DRAWING NO.	D-90-10-002	

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Waste Pits Remedial Action Project (WPRAP)

****

REMEDIAL ACTION HEALTH & SAFETY PLAN
REVISION C

****

FLUOR DANIEL FERNALD, INC.
Fernald, Ohio

FDF Subcontract No. 98SC000001

****

Submitted
by
IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146-2790

IT Project No. 773481

****

September 25, 1998

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Record of Issues/Revisions

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Date	Rev. No.	Description of Issues/Revisions
06/24/98	A	Issue of Remedial Action Health & Safety Plan - Draft
08/20/98	B	Incorporates IT Comment Resolution to FDF Comments on Rev. A
09/25/98	C	Issued for EPA Review

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B	RAHASP Acknowledgment Form

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LIST OF ACRONYMS AND ABBREVIATIONS

α,β,γ	Alpha, beta, gamma respectively
μCi	Microcurie
ACGIH	American Conference of Government Industrial Hygienists
AEDO	Assistant Emergency Duty Officer
ALARA	As Low As Reasonably Achievable
ANSI	American National Standards Institute
ARARs	Applicable or Relevant and Appropriate Requirements
ASTM	American Society for Testing Materials
BSL	Biodenitrification Surge Lagoon
BZ	Breathing Zone
°C	Degrees Centigrade
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CO	Carbon Monoxide
CONOPS	Conduct of Operations
DAC	Derived Air Concentration
D&D	Decontamination & Dismantlement
DOE	U.S. Department of Energy
EMT	Emergency Medical Technician
EPA	U.S. Environmental Protection Agency
ERT	Emergency Response Team
ES&H	Environmental Safety & Health
FAT&LC	Fernald Atomic Trades & Labor Council
FDF	Fluor Daniel Fernald, Inc.
FEMP	Fernald Environmental Management Project
FID	Flame Ionization Detector
FRL	Final Remediation Levels
GA	General Area (air sample)
GCBCTC	Greater Cincinnati Building and Construction Trades Council
GET	General Employee Training
GFCI	Ground Fault Circuit Interrupter
HAZOP	Hazard and Operabilty
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air (filter)
IR	Investigation Report
IT	International Technology Corporation
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
NTS	Nevada Test Site
OSHA	Occupational Safety and Health Administration

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OSWP	Operations Safe Work Plan
OU1	Operable Unit 1
PCDF	Permitted Commercial Disposal Facility
PCM	Personnel Contamination Monitor
PEL	Permissible Exposure Limit
PHA	Preliminary Hazard Assessment
PID	Photo Ionization Detector
PM	Project Manager
POHASP	Pre-Operational Health And Safety Plan
PPE	Personal Protective Equipment
ppm	parts per million
RAHASP	Remedial Action Health and Safety Plan
RCM	Radiological Control Manager
RCRA	Resource Conservation Recovery Act
RWP	Radiological Work Permit
SHR	Safety and Health Representative
SSHR	Site Safety and Health Representative
SWP	Safe Work Permit
Th	Thorium
$Th\ O_2$	Thorium Oxide
TLD	Thermoluminescent Dosimeter
TLV	Threshold Limit Value
TWA	Time Weighted Average
UL	Underwriters Laboratories, Inc.
USCG	United States Coast Guard
WAC	Waste Acceptance Criteria
WPRAP	Waste Pits Remedial Action Project

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REMEDIAL ACTION HEALTH & SAFETY PLAN (RAHASP)

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1.0 INTRODUCTION

The Waste Pit Remedial Action Project (WPRAP) consists of a 37.7 acre area located in the northwest quadrant of the Fernald Environmental Management Project (FEMP) site (see Figure 1). More definitively, the WPRAP consists of Waste Pits 1, 2, 3, 4, 5, and 6 which contain sludge, waste materials, debris, and water; the Burn Pit (used for disposal and burning of waste); the Clearwell (a settling basin for surface water runoff from the waste pits and supernatant from Waste Pit 5); miscellaneous structures and facilities such as the material handling building, railcar loadout facility, analytical laboratory, supply warehouse, dryer facility, laundry and respirator decontamination facilities, haul roads, underground utilities, railroad tracks, and fencing.

International Technology (IT) is conducting the WPRAP in two phases. The first phase was the Pre-Operations phase which consisted of pre-mobilization, mobilization, site preparation, facility construction, and pre-operational programmatic activities. The first phase has been completed. The second phase is the Remedial Action phase which consists of excavation of wastes from the pits and residual contaminated soils from beneath the pits, preparation of the wastes (e.g. segregating and shredding), treatment by thermal drying, blending to achieve a uniform product for loading into railcars or boxes as applicable, and the decontamination and dismantlement (D&D) of the soil processing facilities.

2.0 PURPOSE/OBJECTIVE

This Health & Safety Plan, hereafter referred to as the Remedial Action Health & Safety Plan (RAHASP), describes the safety and health hazards associated with all of the WPRAP remedial action activities with the exception of those activities associated with the Decontamination and Decommissioning (D&D) of the processing facilities. A D&D Health & Safety Plan will be prepared and submitted for FDF review and approval prior to starting D&D. The information and guidance provided in this RAHASP has been prepared in compliance with current Occupational Safety and Health Administration (OSHA) regulations, FEMP requirements, and Fluor Daniel Fernald, Inc. (FDF) Subcontract 98SC000001 requirements.

This RAHASP is used in conjunction with the IT WPRAP Health & Safety Program, Safety Basis Documents, Safe Work Plans and Operations Procedures to ensure the safety of personnel during the implementation of on-site operations activities.

3.0 RESPONSIBILITIES

3.1 General

To ensure a safer workplace and in accordance with IT's long-term commitment to safety, all personnel are given the responsibility to work safely and to recognize conditions that

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compromise safety or that could be potentially adverse to quality. This responsibility includes maintaining individual awareness of conditions that could:

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- Jeopardize the health & safety of themselves or others.
- Jeopardize the health & safety of the public.
- Cause damage to facility structures or equipment or place the facilities, equipment, or personnel in imminent danger should unsafe operations continue.
- Violate procedural, regulatory, or FDF Subcontract 98SC000001 requirements, including working to a procedure that is inadequate.

With this affirmative responsibility, each person has the authority to stop work that he/she considers meets one or more of the above conditions. When stop work authority is exercised, the person stopping the work shall notify the IT WPRAP Project Manager and initiate a Stop Work Order in accordance with IT WPRAP Safety Instruction #10 "Stop Work Authority" which is available for review at the on-site IT WPRAP Health & Safety office.

All personnel entering the WPRAP area, as delineated in Figure 1, must be oriented on the contents of this RAHASP and must sign an acknowledgment log stating that they have received orientation on this RAHASP and understand and will comply with its requirements.

3.2 IT WPRAP Project Manager

The IT WPRAP Project Manager (PM) is responsible for utilizing the resources provided by corporation management to ensure: employees have appropriate and continuing training; safety is implemented in the planning and execution of all work; and safety commitments, regulatory requirements, and site requirements are met.

3.3 IT WPRAP Radiological Control Manager

The IT Radiological Controls Manager (RCM) is responsible for the development of a complete safety program for the WPRAP. The RCM manages the interface with Fluor Daniel Fernald (FDF) Radiological Control personnel to ensure compliance with radiological requirements. The RCM reports directly to the IT National Director of Safety and indirectly to the IT WPRAP Project Manager.

3.4 IT WPRAP Site Safety & Health Representative

The IT WPRAP Site Safety & Health Representative (SSHR) is assigned to the site on a full-time basis and is responsible for development and implementation of the RAHASP. The IT WPRAP SSHR reviews and, if required, amends the RAHASP every six months or sooner if changes in site conditions or events warrant. The IT WPRAP SSHR assures that revisions to the RAHASP are reviewed and approved by the IT WPRAP Project Manager, the IT WPRAP Project Engineer and FDF. The IT WPRAP SSHR is responsible for all health and safety documentation. The SSHR reports directly to the IT WPRAP Radiological Control Manager.

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3.5 IT WPRAP Health & Safety Representative

IT WPRAP Safety & Health Representatives (SHRs) are assigned to the site on a full-time basis. The IT WPRAP SHR is responsible for implementing the IT WPRAP Health & Safety Program and provides safety guidance to IT WPRAP personnel through participation in daily safety briefings and by performing informal safety audits. The SHR performs the duties associated with an industrial hygiene technician and a fire safety technician. The SHR reports directly to the IT WPRAP Site Safety & Health Representative.

4.0 REGULATIONS AND GUIDELINES

This RAHASP and all activities conducted by IT at the WPRAP will be in compliance with the applicable requirements of the following:

- FDF Subcontract 98SC000001
- 10 CFR 835 - Occupational Radiation Protection
- 29 CFR 1926 - Safety and Health Regulations for Construction
- 29 CFR 1910 - Occupational Safety and Health Standards
- 29 CFR 1910.120 - Hazardous Waste Operations and Emergency Response
- DOE/EH-0256T - DOE Radiological Control Manual
- RM-0020 - FDF Radiological Control Requirements Manual
- NIOSH/OSHA/USCG/EPA - Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities
- American Conference of Government Industrial Hygienists (ACGIH) - Threshold Limit Values and Biological Exposure Indices, latest edition
- IT Corp. - Waste Pits Remedial Action Project Health & Safety Program
- IT Corp. - Environmental Safety & Health Program Implementation Plan
- IT Corp. - Waste Pits Remedial Action Project Preliminary Hazard Assessment
- IT Corp. - Waste Pits Remedial Action Project HAZOP Analysis
- IT Corp. - Waste Pits Remedial Action Project Description of Operations
- IT Corp. - Waste Pits Remedial Action Project Excavation Plan
- IT Corp. - Waste Pits Remedial Action Project Operations and Maintenance Plan

Note: When multiple requirements cover a safety & health issue, the more protective requirement is enforced.

5.0 DEFINITIONS

5.1 Radiological

Airborne Radioactivity Area: Any area where the measured concentration of airborne radioactivity, above natural background, exceeds or is likely to exceed 10 percent of the applicable derived air concentration (DAC) as specified below:

Thorium (Th)-230 DAC = 3.0 E-12 μCi/ml
Uranium (U)-238 DAC = 2.0 E-11 μCi/ml

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Contamination Area: Any area where the removable contamination levels are within the ranges specified below:

Th-230 - >20 dpm/100 cm^2 and ≤ 2,000 dpm/100 cm^2 (alpha)
U-238 - >1,000 dpm/100 cm^2 and ≤100,000 dpm/100 cm^2 (alpha)

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Controlled Area: Any area to which access is managed in order to protect individuals from exposure to radiation and/or radioactive material. Individuals who enter only the controlled area without entering radiological areas are not expected to receive a total effective dose equivalent of more than 100 millirem in a year.

High Contamination Area: Any area where the removable contamination levels exceed the values specified below.

Th-230 - 2,000 dpm/100 cm^2 (alpha)
U-238 - 100,000 dpm/100 cm^2 (alpha)

High Radiation Area: Any area accessible to individuals, in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 100 millirem in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

Radiation Area: Any area accessible to individuals in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 5 millirem in 1 hour at 30 centimeters from the source or from any surface that he radiation penetrates.

Radiological Area: Any area with a Controlled Area that is posted as a Radiation Area, High Radiation Area, Very High Radiation Area, Contamination Area, High Contamination Area, or Airborne Radioactivity Area.

Radiological Buffer Area: An area established within a Controlled Area for the purpose of providing a secondary boundary to minimize the spread of contamination and to limit dose to workers who have not been trained as radiological workers to less than 100 millirem per year.

Soil Contamination Area: Any area where radioactive material contamination exists in a matrix (e.g., soil) at a level exceeding natural background and has not been released for unrestricted use in accordance with DOE Order 5400.5 "Radiation Protection of the Public and the Environment".

5.2 Chemical

Chemical: Any element , chemical compound, or mixture of elements and/or compounds.

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Combustible Liquid: Any liquid having a flash point at or above 100 °F (38 °C) but below 200°F (93.3 °C), except any mixture having components with flashpoints of 200

°F (93.3 °C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

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Flammable Gas: A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13% by volume or less.

Flammable Liquid: Any liquid having a flashpoint below 100 °F (38 °C), except any mixture having components with flashpoints of 100 °F (38 °C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.

Pyrophoric: A chemical that will ignite spontaneously in air at a temperature of 130 °F (54.4 °C) or below.

6.0 SITE ACCESS

Access to the WPRAP is controlled in accordance with the following:

6.1 Personnel Access to the Controlled Area

All IT WPRAP activities are conducted within a Controlled Area. Personnel are required to wear thermoluminescent dosimeters (TLDs) any time they are within a Controlled Area or a Radiological Area. At the WPRAP, personnel enter and exit the Controlled Area through the control point where they pick up their TLD from the storage rack when entering and return the TLD to the storage rack when exiting. In addition, personnel are required to log in and out on the access control (computer) logging system. When exiting from the Controlled Area, personnel are required to perform whole body monitoring using either a Personnel Contamination Monitor (PCM) or a hand-held contamination monitor. Monitoring instrumentation is located at the control point.

6.2 Personnel Access to Radiological Areas

Radiological Areas are established throughout the IT WPRAP Controlled Area as necessary to perform work. Access to Radiological Areas is controlled by FDF Radiological Control. Prior to entering a Radiological Area, personnel must be briefed on the contents of each Radiological Work Permit (RWP) or Safe Work Plan (SWP) under which they will be working. Personnel must sign an acknowledgment sheet, one time per each revision to the RWP or SWP, to indicate an understanding of the requirements of the RWP or SWP. In addition, personnel must sign RWPs upon every entry and exit indicating the time in/ time out, type of respirator worn, etc. A person may only be signed in on one RWP at a time.

After signing in on the appropriate RWP or SWP, personnel shall receive their respiratory protection (if required). The respiratory protection will be issued by an individual who has been adequately instructed to ensure that the correct respirator is issued. Personnel shall then log in their badge number and respirator serial number on the access control point computer logging system and proceed to the changing area to pick up and don the appropriate (as required by the RWP or SWP) protective clothing prior to entering the

Radiological Area.

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Each person required to wear anti-contamination garments (anti-C) shall inspect them for tears, holes, split seams, missing buttons or zipper damage prior to use. Defective items shall be replaced immediately with intact anti-C.

When exiting from a radiological area, all personnel are required to perform a whole body frisk using a PCM or a hand-held frisker.

Each person required to wear anti-C garments shall don and doff them in accordance with the procedures taught in Radiological Worker Training.

7.0 TRAINING REQUIREMENTS

7.1 Site Worker

Prior to performing work at the WPRAP, workers must provide up to date and verifiable documentation of having received the following training:

- FDF General Employee Training (GET)
- FDF Site Worker Training or Equivalent OSHA 29CFR 1910.120 (Hazardous Waste Operations and Emergency Response (HAZWOPER) Training
- FDF Radiological Worker II Training (RAD II)
- FDF Construction Rules and Regulations Training
- Respirator Safety Training and Fit Test
- Powered Air Purifying Respirator (PAPR) Training
- Airline Respirator Training (Excavation Heavy Equipment Operators only)
- Orientation on the Operations Health & Safety Plan (RAHASP)
- OSHA Supervised Field Experience (24 hours of supervised Hazardous Waste Site experience per 29 CFR 1910.120)

7.2 Visitor

Visitors to the WPRAP must meet the following training requirements before they will permitted unescorted access to the WPRAP:

- FDF General Employee Training (GET)
- FDF Site Worker Training or Equivalent OSHA 29CFR 1910.120 (Hazardous Waste Operations and Emergency Response (HAZWOPER) Training
- FDF Radiological Worker II Training (RAD II)
- FDF Construction Rules and Regulations Training
- Respirator Safety Training and Fit Test
- Orientation on the Operations Health & Safety Plan (RAHASP)
- OSHA Supervised Field Experience (24 hours of supervised Hazardous Waste Site experience per 29 CFR 1910.120)

Visitors to the WPRAP must meet the following training requirements before they will be

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permitted escorted access to the WPRAP:

- Radiological training, commensurate with the area(s) they are to enter, as determined by FDF Radiological Control.
- Orientation on the Operations Health & Safety Plan (RAHASP)
- Orientation on current site conditions and activities

7.3 General

Prior to the start of work each day, personnel receive safety briefings which address the scope of work to be performed and the radiological hazards and industrial/construction hazards associated with the work. IT WPRAP personnel, including FDF Radiological Control personnel and visitors are invited to participate in these safety briefings. All personnel attending the safety briefings are encouraged to play an active role by presenting concerns/questions regarding their safety and by providing suggestions on how to improve safety at the WPRAP.

IT WPRAP personnel receive formal safety training weekly. This formal safety training covers relevant safety topics such as ladder safety, hazard communication, fall protection, and hearing conservation.

7.4 Special

Personnel who are required to perform specialized activities, such as confined space entry and lockout/tagout, are given special training in accordance with applicable federal, state and local requirements and FDF Subcontract 98SC000001.

8.0 DESCRIPTION OF WORK

The waste materials in the pits are excavated, treated and/or blended as necessary, and ultimately transported to an off-site Permitted Commercial Disposal Facility (PCDF). This section provides a description of each process step from excavation through loading of railcars, including associated activities such as the control and treatment of storm and waste waters and inspection and maintenance of existing facilities. During the remedial action phase of the WPRAP, IT performs work as described below:

8.1 Task 1 - Inspections and Maintenance of Existing Facilities

The existing facilities consist of Wastes Pits 4, 5 and 6, the Clearwell, Roads (excluding haul roads), the Stormwater Management System and the Changeout Facility. IT performs the following inspection and maintenance activities on existing facilities:

8.1.1 Subtask A. - Waste Pit 4

Inspection and maintenance activities for Waste Pit 4 include the following:

Note: These activities will be discontinued when excavation begins on Waste Pit 4.

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- Monthly and post-storm inspections of the polyethylene liner.
- Monthly and post-storm inspection of dikes and trenches (run-on and run-off controls) for deterioration/erosion.
- Monthly and post-storm inspection of wind dispersal control systems, such as rubber panels and hold-down pillows (if present) to ensure they are operational.
- Monthly and post-storm inspection of the overtopping control systems for deterioration/damage and malfunctions, such as broken pipes or dikes, and inoperative pumps.
- Documentation of inspection findings.
- Rectifying any unacceptable findings from the inspection (e.g. tears in cover panels, missing postings, openings in seams, etc.).
- Immediate correction of an unacceptable condition that presents an imminent hazard, or where a hazard has already occurred.

8.1.2 Subtask B. - Waste Pit 5

Inspection and maintenance activities for Waste Pit 5 include the following:

Note: These activities will be discontinued when excavation begins on Waste Pit 5.

- Monthly, daily and post-storm inspections to ensure that the containment dike/ berm will prevent water run-off and run-on during rainfall events.
- Monthly, daily and post-storm inspections for dead vegetation around the dike/ berm.
- Monthly, daily and post-storm inspection of the dike/berm for cracks, holes, breaks, and areas where the dike has slumped.
- Monthly, daily and post-storm inspection of the dike/berm for erosion.
- Monthly, daily and post-storm inspection of the impoundment freeboard.
- Monthly, daily and post-storm inspection of the dike/berm and containment basin for damage or deterioration.
- Monthly, daily and post-storm inspection of visible liner sections (if installed) for rips/tears, holes, or seam separation.
- Documentation of inspection findings.
- Rectifying any unacceptable findings from the inspection (e.g. tears in cover panels, missing postings, openings in seams, etc.).
- Immediate correction of an unacceptable condition that presents an imminent hazard, or where a hazard has already occurred.

8.1.3 Subtask C. - Waste Pit 6

Inspection and maintenance activities for Waste Pit 6 include the following:

Note: These activities will be discontinued when excavation begins on Pit 6.

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- At least once every 7 calendar days, the water level is checked.
- When excess water is detected, the water is tested and treated (pH adjustment) as necessary to ensure that the water meets the discharge criteria. Depending on uranium concentration, the water is discharged to the surge lagoon or the general sump.
- Rectifying any unacceptable findings from the inspection (e.g. sufficiency of freeboard, condition of the dike/liner, missing postings, sudden drops in elevation, etc.).
- Immediate correction of an unacceptable condition that presents an imminent hazard, or where a hazard has already occurred.
- Documentation of inspection findings

8.1.4 Subtask D. - Clearwell

Inspection and maintenance activities for the Clearwell include the following:

Note: These activities will be discontinued when IT initiates remediation activities on the Clearwell.

- The influent line from Pit 5 and the freeboard level gauge are inspected twice every shift (every 4 hours).
- When the freeboard level is 5 feet or more, the water is pumped to the Bio-Surge Lagoon.
- Rectifying any unacceptable findings from the inspection (e.g. sufficiency of freeboard, missing postings, buildup of sediments, etc.).
- Immediate correction of an unacceptable condition that presents an imminent hazard, or where a hazard has already occurred.
- Documentation of inspection findings

8.1.5 Subtask E. - Storm Water Management System

Inspection and maintenance activities for the Storm Water Management System include the following:

Note: These activities will be conducted until completion of the WPRAP.

- IT maintains the Storm Water Management System in a manner which ensures continued operation pursuant to the design standards.
- Sediment buildup that reduces pond volumes below design capacities is removed and managed like similar waste.
- The integrity of the pond liner, diked areas of the ponds, etc. are maintained by repairing damage/deterioration in a timely manner.

8.1.6 Subtask F. - Roads

With the exception of the existing FDF haul road running parallel with the south and southwest sides of the WPRAP, IT maintains existing roads within the

WPRAP work area.

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Road maintenance activities include repair of damaged berms and potholes.

8.2 Task 2 - Waste Excavation

Waste excavation includes removal of the waste pit caps, removal of the waste in the pits and the waste pit liners, and removal of the contaminated soil below pit liners to a point where Final Remediation Levels (FRLs) are met. The depth of the excavation for the subsoils is determined by FDF field screening activities.

Excavation also includes the removal of any pumps, utility lines, monitoring wells and other appurtenances within the WPRAP boundary as defined by FDF Subcontract 98SC000001.

Mechanical excavation of the waste pits and the Clearwell is performed using conventional earth moving equipment. This equipment includes, but is not limited to, bulldozers, track mounted excavators, articulating dump trucks, and long reach excavators.

Access for mechanical excavation of waste pit materials is from existing berms and covers, constructed access ramps or the pit bottom.

More detailed information on the excavation activities can be found in the IT WPRAP Excavation Plan which is available for review at the onsite IT WPRAP Health & Safety Office

8.3 Task 3 - Waste Blending

Blending includes mixing of contaminated soil with front-end loaders or other mechanical devices to create a homogeneous blend that will satisfy the Waste Acceptance Criteria (WAC) for the Permitted Commercial Disposal Facility (PCDF).

Blending of the waste occurs at several locations. In the excavation areas, blending of waste materials from a single waste pit is performed to produce a consistent material coming from the pit. In the Material Handling Building, material from multiple sources may be combined to meet the WAC. In the Railcar Loadout Building, nonprocessable material is combined with dried waste in the railcars.

IT does not blend for the sole purpose of diluting characteristically hazardous waste (e.g. ignitable, corrosive, reactive, etc.) to render it non-characteristically hazardous.

During the blending activities, IT complies with all Applicable or Relevant and Appropriate Requirements (ARARs), including those pertaining to dust control and stockpiles.

More detailed information on blending activities can be found in the IT WPRAP

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Description of the Operation and Processes which is available for review at the onsite IT WPRAP Health & Safety Office.

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8.4 Task 4 - Waste Stockpiling

Stockpiles include, but are not limited to, indoor and outdoor waste material staging areas, storage bins within the Material Handling and Railcar Loadout Buildings and surge piles.

Nontypical waste is waste that does not meet the PCDF WAC or cannot be treated to meet the PCDF WAC. This nontypical waste is stockpiled in the excavation areas and managed until given to FDF for disposal.

Material from the OU1 Contaminated Soil Stockpile is conveyed across the rail spur into the Material Handling Building and is stockpiled in a designated bin.

Stockpiles are managed in accordance with the ARARs for waste piles. Specific substantive requirements include:

- Use of run-on/run-off control systems that are designed to prevent flow into or run-off from an active pile during peak flows from a 25 year, 24 hour storm event.
- Emptying run-on/run-off from collection and hold facilities after storms.
- Covering or otherwise managing the waste pile(s) to prevent wind dispersion.
- Inspecting waste pile(s) weekly and after storms to ensure the integrity of run-on/run-off controls.
- Processing all stockpiled material before any long-term shutdown (>6 months) or final shutdown prior to Decontamination & Dismantlement (D&D). In the event of an unscheduled shutdown, stockpiled material is maintained and managed as described above.

8.5 Task 5 - Waste Segregation

Segregation includes, but is not limited to, any separation of a portion of the waste for specialized handling and/or processing (e.g., material segregated for shipment to the Nevada Test Site [NTS]). Items identified for segregation include, but are not limited to, large structural steel, uranium derbies and/or metal, any unopened drums or containers, and intact bags of asbestos or enriched (fissile) material.

During excavation, waste materials within the Pits are segregated into three categories. They are as follows:

Category 1. Nontypical waste - waste that does not meet the PCDF WAC and cannot be treated to meet the PCDF WAC. This waste is segregated in the excavation area and stockpiled until a suitable quantity has been accumulated to transfer to FDF for disposal.

Category 2. Nonprocessable waste - waste that meets the PCDF WAC but cannot be

fed into the dryer due to size (greater than 4"). To the extent possible, nonprocessable waste is segregated in the excavation areas and transported to the Material Handling Building separately.

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Certain nonprocessable waste such as pallets, wood boards, and similar wastes that may be considered shreddable is transferred to the Material Handling Building for segregation and processing through the shredder.

Category 3. Processable waste - waste that is less than 4 inches in size, or can be reasonably size-reduced to less than 4 inches, and are not classified as Typical Waste.

In the Material Handling Building, oversize material from the screener may be separated (visually) into shreddable and nonshreddable waste. When such separation is made, the shreddable waste is moved to the storage bin for shreddable waste and the nonshreddable waste is segregated for size reduction and final blending with dryer waste.

Waste debris that cannot be processed through the primary treatment process is segregated and size-reduced in accordance with the PCDF WAC.

Waste that does not conform to, or cannot be processed to conform to the PCDF WAC is placed in containers and transferred to the designated area between Waste Pits 4 and 6, where the material can be containerized by IT (as-required) and the containers radiologically surveyed prior to being transferred to FDF for further handling and disposition. These nontypical wastes include but are not limited to the following:

- Pyrophoric materials
- Compressed gas cylinders
- Transformers
- Unopened intact drums
- Polychlorinated biphenyl (PCB) wastes
- Large debris (e.g., mechanical equipment or reinforced concrete)
- Thorium metal/oxide
- Asbestos

Waste having Pyrophoric (spontaneously ignitable) properties may be encountered in Waste Pits 1, 2, 3, 4, 5 and 6, the Clearwell and the Burn Pit. There is a greater potential for encountering pyrophoric waste in Waste Pits 2, 4, and 6. Uranium derbies and thorium fines are examples of pyrophoric waste that may be encountered at the WPRAP. Pyrophoric wastes are staged at locations within the excavations where minimal disturbance will occur.

More detailed information on waste segregation can be found in the IT WPRAP Excavation Plan and the IT WPRAP Operations Safe Work Plan which are available for review at the onsite IT WPRAP Health & Safety Office.

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8.6 Task 6 - Waste Screening

Waste screening takes place inside the Material Handling Building and is performed as directed by the IT Shift Supervisor. Waste material may be screened with or without blending. The primary objective of screening is to properly size waste material for processing through the dryer. Material handling equipment such as front end loaders are used to feed the screening device. The screen discharges oversize and onsize materials onto the floor where it is moved by front end loaders, or other material handling equipment, to the appropriate stockpile or stagging area.

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8.7 Task 7 - Size Reduction

Size reduction includes, but is not limited to, any of the methods used (e.g., physical separation and mechanical cutting or shredding) to reduce the size of any waste material to meet the PCDF or NTS WAC's.

Shredding is performed in the Material Handling Building and is accomplished using a stationary low-speed shear debris shredder. Conventional material handling equipment is used to move the waste out of a holding bin and into the shredder. The shredded material

is discharged onto the floor of the Material Handling Building where it is picked up by the material handling equipment and transferred to a segregated area to await final blending with dryer-processed waste.

Nonshreddable waste may be size reduced in the excavation areas or in the Material Handling Building using methods that may include cleavage of debris with equipment bucket or blade, run over by equipment track, cleavage with equipment mounted ram, jaws or other device, and by flame cutting.

8.8 Task 8 - Waste Transferring and Handling

Waste transferring includes, but is not limited to, the transfer of waste from one piece of process equipment or process area to another.

IT uses conventional earth moving equipment (e.g., excavators and covered dump trucks) to load and transfer wastes soils and debris to the Material Handling Building. Once the waste is in the Material Handling Building, front-end loaders are used to move the waste from temporary storage bins to mixing areas for blending, to load waste into the dryer feed hopper and to transfer waste to the Railcar Loadout Building.

Pyrophoric wastes are wetted as necessary for stabilization and packaged in a manner that will minimize disturbance during transport to the Non-Typical Waste Transfer Area located between Waste Pits 4 and 6. In the event that a pyrophoric waste ignites, it is smothered using available soils. Once extinguished, the waste is wetted and packaged as previously described.

Manual handling of wastes by onsite personnel is minimized to the extent practical.

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However some manual handling of waste is necessary. Manual handling includes, but is not limited to, the following activities:

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- Visual inspection of a drum or transformer to assess its integrity
- Over packing damaged drums or transformers
- Handling cylinders to minimize damage which may be incurred when using excavation equipment
- Visual inspection of a transformer to assess its integrity
- Dismantlement of equipment
- Removing asbestos materials

In order to minimize handling of potentially damaged drums by personnel, a drum grappler mounted to the excavator is used to extricate these items. Once extricated, personnel will visually inspect the drum to assess its integrity. Intact drums are overpacked and transferred to the Non-Typical Waste Transfer Area for subsequent disposal. The contents of damaged drums are emptied using the grappler and the contents are inspected to determine if they should be handled as processable or non-processable waste. Drum handling is performed in accordance with Section 7.0 of the Excavation Plan and Health & Safety Instruction #11"Drum Handling Procedure".

Cylinders are handled by onsite personnel to minimize the potential for damage which may be incurred if excavation equipment is used to remove them. Once extricated, the cylinders are stored at a stable and secure location within the excavation. The cylinders are secured and/or palletized, if necessary, for transport to the Non-Typical Waste Transfer Area.

Transformers are removed using the drum grappler. Once removed, the transformer is inspected by onsite personnel to assess its integrity. If necessary, the transformer will be overpacked for transport to the Non-Typical Waste Transfer Area. Absorbent materials are staged at the excavation areas to ensure that spills are contained. These materials will also be drummed prior to transport to the Non-Typical Waste Transfer Area.

Extremely large debris, such as concrete rubble and abandoned equipment, is removed from the excavation using the earthmoving equipment. These objects are sized as necessary to facilitate transport and placement into a railcar for subsequent disposal at the PCDF, or into other containers for disposal as directed by FDF. Sizing or debris is primarily achieved using the buckets or blades of the heavy equipment. Some dismantling of abandoned equipment may be necessary. Dismantling of abandoned equipment is performed using mechanical means to the maximum extent practical. If necessary, acetylene torches may be required. Hot work activities are performed in accordance with FDF RWP requirements and IT Hot Work Permit requirements. If it is necessary to perform rigging and lifting activities to remove or transfer extremely large debris, this work is performed in accordance with the FDF Hoisting & Rigging Requirements Manual.

Asbestos materials , are removed manually or with excavation equipment by asbestos trained personnel. Materials containing asbestos are double-bagged or double-wrapped

and labeled prior to transport to the Non-Typical Waste Transfer Area. 1730

Front-end loaders are also used in the Railcar Loadout Building to blend waste and to load waste into the railcars. The handling of loaded and unloaded railcars within the Railcar Loadout Building is specifically addressed in the IT WPRAP "Description of Operations and Processes" which is available for review at the onsite IT WPRAP Health & Safety Office.

In the event that the contents of a railcar is rejected at the PCDF, the railcar may be returned to the Railcar Loadout Building where it will be unloaded. Unloading is done with conventional earth-moving equipment during an off-shift. If the waste material was rejected because of radioactive content or moisture, it will be reblended with other pit waste until it satisfies the PCDF WAC. If the waste was rejected because of RCRA characteristics, it will be turned over to FDF for handling and disposal.

More detailed information on waste transferring and handling can be found in the IT WPRAP Excavation Plan and IT WPRAP Descriptions of Operations & Processes which are available for review at the onsite IT WPRAP Health & Safety Office.

8.9 Task 9 - Waste Drying

Drying includes, but is not limited to, any dewatering of waste through mechanical means (thermal drying), air drying, or free drainage. Waste-water from dewatering activities is collected and treated in accordance with the criteria specified in FDF Subcontract 98SC000001.

8.9.1 Thermal Drying

Thermal drying consists of dehydrating waste soil by processing the soil through an enclosed, natural gas fired, negative pressure thermal treatment device (Dryer). There are two (2) dryers at the WPRAP.

8.9.2 Air Drying

Air drying consists of drying by way of natural evaporation of water from the waste.

In the waste pits, conventional earth moving equipment is used to turnover soils and debris to expose the wet surfaces to natural elements (e.g., sunlight, air) that are conducive to air drying.

8.9.3 Free Drainage

Free drainage consists of the free flow of water from drainage which is concurrent with the excavation process. Free drainage may be enhanced by using conventional earth moving equipment for mixing waste and creating trenches to direct the flow of water away from the waste. 000597

8.10 Task 10 - Railcar Lining, Loadout and Lidding

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These operations involve moving four railcars at a time using a track mobile. Each railcar goes through five steps that are necessary for completing lining, loadout and lidding. These steps are as follows:

Step 1. The lid is removed and inspected
Step 2. A new liner is installed
Step 3. The railcar is loaded with waste
Step 4. The lid is installed and secured
Step 5. FDF Radiological Control performs radiological surveys (wipe tests) on railcars to ensure that the removable contamination levels are below 2.2 disintegrations per minute per square centimeter (dpm/cm^2) prior to transferring the railcars from the Railcar Loadout Building .

Railcar loadout also involves staging loaded and unloaded railcars along the rail spurs adjacent to the railcar loadout facility. Front-end loaders are used to load railcars.

8.11 Task 11 - Alternative Waste Production Strategy

Alternative waste production is a strategy that allows IT to direct load railcars with waste that does not require thermal treatment in order to meet the PCDF WAC. Alternative wastes may include, but are not limited to, successfully blended waste from the mixing pits, contaminated material from other FEMP Projects, excess material from waste pit access ramp construction, or waste pit cap material. Front-end loaders are used to direct load these materials into the railcars.

8.12 Task 12 - Inspections and Maintenance of Waste Carrying Systems

IT personnel implement a routine inspection and maintenance program to ensure the integrity of waste carrying systems (e.g., dump trucks, dryer conveyors, etc.) that is consistent with the IT WPRAP Operations and Maintenance Plan.

Emergency maintenance activities are closely coordinated with FDF for remedy as soon as possible.

More detailed information on inspection and maintenance of waste carrying systems is provided in the IT WPRAP Operations and Maintenance Plan which is available for review at the onsite IT WPRAP Health & Safety Office.

8.13 Task 13 - Dust and Fugitive Emissions

WPRAP work areas such as excavations, embankments, haul roads, service roads, waste stockpiles, and miscellaneous areas have been identified as dust sources.

More detailed information on dust and fugitive emissions can be found in the IT WPRAP Operations Safe Work Plan, IT WPRAP Description of Operation and Process, and the IT

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WPRAP Operations Environmental Control Plan which are available for review in the onsite IT WPRAP Health & Safety Office

8.14 Task 14 - Water Management

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Water management at the WPRAP consists of collecting, sampling, treating (as necessary) and discharging water from multiple sources. Proper water management is a key part of IT WPRAP operations and is critical to waste excavation. The water being managed is separated into the following categories:

8.14.1 Process Wastewater

Process wastewater is from the following sources:

- Cooling tower blowdown water from the dryer
- Backwash/recycle water from the waste treatment facility
- Oil/water separator discharge from the dryer air pollution control system

8.14.2 Nonprocess Wastewater and Contact Storm Water

Following is a list of nonprocess wastewater and contact storm water sources that originate outside the waste pit area:

- Laundry water
- Respirator wash water
- Changeout facility decontamination shower water
- Laboratory wastewater
- Material Handling Building collection sumps
- Railcar Loadout Building decontamination sumps
- Dryer enclosure collection sump
- Truck turnaround area collection sump
- Truck wash collection sump
- Decontamination pad water
- Storm water collected at the Waste Treatment System

8.14.3 Noncontact Storm Water

Following is a list of noncontact storm water sources that originate outside the waste pit area:

- The ground west and south of the Railcar Loadout Building, including the area around the Warehouse and Laboratory and the dedicated pathway from the Railcar Loadout Building to the onsite Laboratory.
- The access road that runs along the north and east sides of the Biodenitrification Surge Lagoon (BSL)
- The ground outside the waste pit area between Waste Pit 4 and the BSL, including the area around the trailers but not including IT's Haul Road.

- The roofs of the Material Handling Building, the Railcar Loadout Building, and the Dryer Enclosure

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8.14.4 Excavation Water and Contact Storm Water from the Waste Pit Area

Following is a list of wastewater sources that originate inside the waste pit area:

- Contact water from Waste Pit 6
- Contact water from Waste Pit 5
- Contact Storm water, drainage water and perched water seepage in the excavation area (collectively referred to as excavation water)
- Contact Storm water from haul roads in the waste pit area
- Contact Storm water from the Clearwell and surrounding portions of Waste Pits 1 and 3 (which drain to the Clearwell)

8.14.5 Noncontact Storm Water Inside the Waste Pit Area

There are locations in the waste pit area where Storm water is not contacting raw waste. These locations are as follows:

- Storm water from the covered section of Waste Pits 1, 2, 3 and 4
- Storm water from other areas bordering the waste pits

More detailed information on water management can be found in the IT WPRAP Description of Operation and Process and the IT WPRAP Environmental Control Plan.

8.15 Task 15 - Thermal Dryer Operation

Two indirectly heated rotary dryers receive and process wet wastes material of various moisture contents, depending on the type of waste. The rotary dryer system consists of a cylindrical shell rotated with a variable speed drive. Natural gas is used as fuel for combustion and nitrogen is used to regulate oxygen within the drying chamber.

Front end loaders are used to transfer waste materials from the staging bins in the Material Handling Building to the dryer feed hopper and mass flow screw feeder. Material is transferred from the mass flow feed screw to the belt feed conveyor. The feed material discharges from the belt feed conveyor into the dryer feed screw which extends into the dryer. The feed material passes through the dryer at a rate that is typically set to reduce the moisture content to 10 percent (weight basis).

More detailed information on waste drying can be found in the IT WPRAP Description of Operation and Process which is available for review at the onsite IT WPRAP Health & Safety Office.

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8.16 Task 16 - Treatment of Gaseous Effluent from the Waste Dryers

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Prior to discharging off-gas from the waste drying operation, IT uses cyclone separators to remove large entrained particulate, a scrubber to remove more of the particulate, a subcool quench system and cooling tower to cool the off-gas and partially condense most of the water vapor, a wet electrostatic precipitator to remove residual particulate, an electrically heated off-gas reheater to prevent any condensation, a prefilter (roughing) and high efficiency particulate air (HEPA) filter to remove particulate greater than 0.3 microns, a thermal oxidizer to remove any volatile organic compounds and finally discharged to the environment through the exhaust stack.

More detailed information on treatment of dryer off-gas can be found in the IT WPRAP Description of Operation and Process which is available for review at the onsite IT WPRAP Health & Safety Office.

8.17 Task 17 - Laundry Operations

The laundry is located onsite and is divided into contaminated and noncontaminated sections. In the contamination section, anti-contamination clothing is washed, dried surveyed for radiological contamination, inspected for defects, sorted and temporarily stored. In the noncontaminated section, modesty clothing and undergarments are washed, dried, inspected for defects, and temporarily stored.

8.18 Task 18 - Laboratory Operations

IT maintains and operates an onsite analytical laboratory to support WPRAP activities. Laboratory activities include, but are not limited to, preparation and analysis of soil, water, air, and other media samples. Sample preparation may require the use of drying ovens to drive off moisture or adding acids or bases to neutralize and/or to preserve samples. Sample analyses are performed using instrumentation such as an germanium detectors, alpha spectrometers, and low background alpha-beta counting systems for qualitative and quantitative radionuclide analyses and inductively coupled plasma mass spectroscopy or fluorier transform infrared systems for chemical analyses.

8.19 Task 19 - Respirator Cleaning

The respirator cleaning area is located within the laundry. Respirators are washed, dried, surveyed for radioactive contamination, inspected for defects, repaired (if necessary), bagged and temporarily stored within this area.

8.20 Task 20 - Warehouse Operations

IT maintains and operates an onsite warehouse to receive, store and issue materials and equipment as necessary to support WPRAP activities.

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8.21 Task 21 - Fuel Storage and Staging Station (5,000 Gallons)

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IT maintains and operates an onsite fuel storage and staging station to receive, store and distribute fuel as necessary to support WPRAP activities.

8.22 Task 22 - Maintenance

IT implements a routine maintenance program to ensure that WPRAP equipment and facilities are maintained in a manner that provides for the safety of the workers, the public and the environment and for efficiency of WPRAP processes.

9.0 WORKPLACE HAZARD ASSESSMENT

This is to certify that, during the period from April 1998 through May 1998, Mr. Thomas A. Bauman (IT Site Safety & Health Representative) performed a workplace hazard assessment of the WPRAP site in accordance with the requirements of 29 CFR 1910.132(d). The workplace hazard assessment was based on visual observation of current site conditions, review of hazard information provided in FDF Subcontract 98SC000001, and review of IT's proposed/planned activities for the IT WPRAP activities described in Section 8.0. As a result of the workplace hazard assessment, IT has identified WPRAP activity hazards and has developed the hazard mitigating actions/controls (engineering and administrative) described in Section 10.0 and further detailed in the Health & Safety Requirements Matrix (Attachment A). In addition, the Job Safety Analyses and Activity Hazard Analyses Sections of the IT WPRAP Operations Safe Work Plan (OSWP) address the potential hazards and action taken to protect workers, the public and the environment from those hazards. The OSWP is available for review at the onsite IT WPRAP Health & Safety Office.

A Hazard and Operability (HAZOP) analysis of the proposed/planned IT WPRAP Operations Systems was conducted during the facility design phase. The purpose of the HAZOP analysis was to identify potential hazards while they can still be corrected in an early design phase and to provide operating guidelines to ensure safety during process operations. The HAZOP analysis focussed on all of the WPRAP process systems (e.g., the dryer and air pollution control systems). The HAZOP analysis was performed in team meetings held February 10-12, 1998 and March 12, 1998 by representatives of IT Engineering. Project Management, Radiological Control, and Health & Safety as well as representatives of FDF Safety Analysis, Industrial Hygiene, Radiation Control, Fire Protection, and Engineering. The findings of this hazard assessment are provided in the IT WPRAP HAZOP. The findings of the HAZOP analysis are available for review at the onsite IT WPRAP Health & Safety Office.

Concurrent with the HAZOP analysis and as a precursor to subsequent hazard evaluation studies, the IT WPRAP Safety staff performed a Preliminary Hazard Assessment (PHA) to identify any major hazards and potential accident scenarios that could result in an undesired consequence. The findings of the PHA are available for review at the onsite IT WPRAP Health & Safety Office.

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10.0 WORKPLACE HAZARDS AND HAZARDS CONTROLS

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The potential hazards associated with WRAP activities fall within the radiological, chemical, physical, biological, and adverse weather categories. Each of the specific hazards identified within each category and the controls that are implemented to protect the workers, the public, and the environment from those hazards is discussed in this section.

10.1 Radiological Hazards and Controls

10.1.1 Hazards

The IT WPRAP site is located within a Controlled Area. The work tasks described in Section 8.0 are performed within Radiological Areas such as Contamination Areas, High Contamination Areas, Airborne Radioactivity Areas, Radiation Areas, High Radiation Areas (very low probability), Soil Contamination Areas or combinations of these areas depending upon measured contamination and radiation levels as determined by FDF Radiological Control.

FDF Radiological Control identifies all Radiological Areas at the WPRAP through postings and, with the exception of Controlled Areas, designating their boundaries using physical barriers such as rope, tape, chain, fence or similar barrier that is yellow and/or yellow and magenta in color.

Following are some examples of WPRAP Radiological Areas:

- The entire WPRAP site is within a controlled area and a soil contamination area.
- Contamination Areas may include the Railcar Loadout Building and personnel access routes.
- High Contamination Areas will include any areas where waste materials will be such as open waste pits and the Material Handling Building.
- Airborne Contamination Areas will designated in accordance with the potential for airborne contamination and will be determined by air sampling results. These areas will be posted accordingly.
- Radiation Areas may include open Waste Pits, the Material Handling Building, the Dryer, the Railcar Loadout Building. And portions of the Laboratory.
- High Radiation Area may include individual pieces of waste debris and specified sections of the gas cleaning system (e.g., Prefilters and HEPA filters).
- The Soil Contamination Areas include open Waste Pits, the Material Handling Building, the Dryer, and the Railcar Loadout Building.

Potential occupational radiological hazards that could involve radioactive material include the following:

- Clothing contamination

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- Skin contamination
- Inhalation of radioactive material
- Absorption (through contact) of radioactive material
- Injection of radioactive material
- Spread of contamination to previously uncontaminated areas
- Exposure to external radiation

FDF has provided IT with analyses results for samples collected from the Waste Pits, Burn Pit and Clearwell. These analyses have confirmed the presence of the radionuclides and corresponding maximum concentrations shown in Table 10-1.

Table 10-1
Waste Pit Inventory Data

Cesium-137	1.1	3.6	0.5	0.0	106	31	0.0	450
Neptunium-237	0.0	0.0	2.1	0.4	83	3.6	0.6	2.2
Plutonium-238	1.0	0.1	1.0	0.5	4.4	1.4	0.5	0.49
Plutonium-239	1.0	0.6	14	0.4	13	15	0.4	0.54
Potassium-230	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Radium-226	99.6	951	451	50.1	180	4.9	39.2	170
Radium-228	41	437	241	141	49	191	10.4	26.4
Ruthenium-106	2.4	11	4.2	1.1	3.3	0.0	1.5	3.07
Strontium-90	7.7	4.0	5.2	144	31	5.1	0.0	26
Technetium-99	15	618	1,110	225	3,020	164	64	695
Thorium-228	790	697	820	2,469	44	1.7	900	56
Thorium-230	5,460	18,400	11,370	1,815	8,480	62	4,530	5,600
Thorium-232	490	340	396	838	55	1.2	410	39
Uranium-234	1,180	18,200	991	4,100	1,250	5,330	1,711	1,050
Uranium-235	259	8,780	51.8	425	79	1,750	102	373
Uranium-238	16,160	17,900	1,740	41,900	2,800	28,746	1,996	1,640

pCi/gm = picocuries per gram

Thorium, in the form of thorium oxide ($Th\ O_2$) or thorium metal/powder, may be found as contamination in soil or water and in or on miscellaneous waste materials such as drums and wood. Tables 10-2 and 10-3 provide summaries of chemical data for thorium oxide and thorium metal/powder respectively.

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Table 10-2
Radiological Data
Thorium Oxide

Chemical	Thorium Oxide
Chemical Abstract Service Registry Number	001314-20-1
Occupational Exposure Limits: (FDF/DOE) Air Water	 3 E-12 μCi/ml (Th-230) 5 E-13 μCi/ml (Th-232) 3 E-07 μCi/ml (Th-230) 5 E-08 μCi/ml (Th-232)
Routes of Exposure	Inhalation and Ingestion
Toxic Properties	Toxic due to radioactivity not chemical. Recognized carcinogen
Target Organs	Bones, liver, lungs, lymphatic glands, and parenchymatous tissues
Chemical Properties	Radioactive, white crystalline powder or pills, odorless, Melting Point 3220 ± 50 ° C Nonflammable - Does not explode or burn
OSHA (PEL) ACGIH (TLV)	OSHA - None ACGIH -None

μCi/ml = microcuries per milliliter

Table 10-3
Radiological Data
Thorium Metal/Powder

Chemical	Thorium Metal/Powder
Occupational Exposure Limit: (FDF/DOE) Air Water	 3 E-12 μCi/ml (Th-230) 5 E-13 μCi/ml (Th-232) 3 E-07 μCi/ml (Th-230) 5 E-08 μCi/ml (Th-232)
Routes of Exposure	Inhalation and Ingestion
Toxic Properties	Toxic due to radioactivity not chemical. Recognized carcinogen
Target Organs	Bones, liver, lungs, lymphatic glands, and parenchymatous tissues
Chemical Properties	Radioactive, Greyish-white metal, odorless, Melting Point 1500-1750 ° C Solid pieces of metal will not burn Finely chipped metals or powders can ignite in air
OSHA (PEL) ACGIH (TLV)	OSHA 6 E-11 μCi/ml - ACGIH -None

μCi/ml = microcuries per milliliter

Other radioactive materials are present at the onsite WPRAP Analytical Laboratory in the form of radioactive sources which are used to perform calibration and operational tests on laboratory analysis equipment.

FDF Radiological Control uses radioactive sources to ensure that the WPRAP radiation detection instruments are calibrated and functioning properly.

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Table 10-4 contains a list of radioactive sources that are typically used within the onsite IT WPRAP Analytical Laboratory.

Table 10-4
Radiological Data
Radioactive Sources

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RADIONUCLIDE	RADIATION EMITTED	ACTIVITY	PURPOSE
Americium-241 Americium-243	α,γ α,γ	1-5 μCi 1-5 μCi	Pre-operational tests and instrument calibration
Uranium-232 Uranium-234 Uranium-235 Uranium-236 Uranium-238	α,γ α,γ α,γ α,γ α,γ	*m*Ci quantities 1-5 μCi 1-5 μCi 1-5 μCi 1-5 μCi	Pre-operational tests and instrument calibration
Radium-226 Tritium Technetium-99 Tin-113	α,γ β β β,γ	1-5 μCi 1-5 μCi 1-5 μCi 1-5 μCi	Pre-operational tests and instrument calibration
Plutonium-238 Plutonium-239 Plutonium-240 Plutonium-241 Plutonium-242	α,γ α,γ α,γ α,γ α,γ	1-5 μCi 1-5 μCi 1-5 μCi 1-5 μCi *m*Ci quantities	Pre-operational tests and instrument calibration
Thorium-228 Thorium-230 Thorium-229 Thorium-232	α,γ α,γ α,γ α,γ	1-5 μCi 1-5 μCi *m*Ci quantities 1-5 μCi	Pre-operational tests and instrument calibration
Strontium/Yttrium-90 Yttrium-88 Cobalt-57 Cobalt-60	β β γ γ	1-5 μCi 1-5 μCi 1-5 μCi 1-5 μCi	Pre-operational tests and instrument calibration
Cadmium-109 C Carbon-14 Cesium-137	β γ β,γ	1-5 μCi 1-5 μCi 1-5 μCi	Pre-operational tests and instrument calibration
Cerium-139 Mercury-203	γ β,γ	1-5 μCi 1-5 μCi	Pre-operational tests and instrument calibration
Natural Uranium	α	*m*Ci quantities	Pre-operational tests and instrument calibration
Depleted Uranium	α	*m*Ci quantities	Pre-operational tests and instrument calibration

α = alpha β = beta γ = gamma μ Ci = microcurie

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10.1.2 Controls

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IT Corporation and FDF Radiological Engineering ensures that personnel exposure to radioactive material is maintained As Low As Reasonably Achievable (ALARA) by implementing controls which include, but are not limited to, the following:

- All of the occupational radiological hazards listed in Paragraph 10.1.1 fall within the purview of the FDF Radiological Control Requirements Manual (RCRM), which IT adheres to when conducting remedial action activities. The RCRM provides specific guidance for protecting workers, the public and the environment from radiological hazards through preparation and use of RWPs and ALARA programs.

- In addition, IT has developed and implemented an ALARA Design Review Program to ensure that exposure to workers, the public, and the environment are minimized to the fullest extent practicable by incorporating effective and appropriate engineering and administrative controls during the design of the IT WPRAP facilities and processing systems.

- Whenever two or more radioactive materials are present at the same time, the radioactive material possessing the most restrictive occupational exposure limit will be used to control worker exposure. Accordingly, from the compiled list of nuclides within the waste pits, as shown in Table 10-1, the most limiting isotope of the predominant nuclides is thorium-230. In keeping with the ALARA philosophy, FDF Radiological Control has identified thorium-230 as the isotope of concern for radiological control purposes in Waste Pits 1-5, the Burn Pit, and the Clearwell, and uranium-238 as the controlling radionuclide for Waste Pit 6.

  Note: Once excavation has begun on any Waste Pit, other than Waste Pit 6, all radioactive contamination areas associated with the waste pits are controlled to thorium-230 limits. Until that time, work at Waste Pit 6 is controlled to uranium-238 limits.

- As determined by FDF Radiological Control, WPRAP personnel will be monitored for exposure to airborne radioactive material by using lapel-type air samplers to sample the air within a person's breathing zone (BZ) and general area (GA) air samples to sample air within the general work environment. FDF Radiological Control uses this air sampling data to assess radiological conditions to determine if there is a need to increase or decrease the level(s) of protection required to perform the work safely. IT WPRAP management uses this data to verify the effectiveness of engineering and administrative controls.

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- IT implements engineering controls, such as the use of long reach excavators and administrative controls such as continuous vigilance for visible dust, to maintain worker exposure to airborne radioactivity ALARA and to control emissions at the WPRAP boundaries such that 2% of the Derived Air Concentration (DAC) for the appropriate radiological isotope of concern is not exceeded on a weekly average.

- All personnel are required to perform a whole-body survey using a personnel contamination monitor (PCM) or equivalent instrumentation when exiting from Radiological Areas. At a minimum whole-body monitoring is required immediately when exiting Contamination, High Contamination, or Airborne Contamination Areas. However, a whole-body survey is not required for Controlled Areas established for radiation dose only.

- Hand and foot monitoring is required when entering designated break areas within a Controlled Area boundary and immediately upon exiting Radiological Buffer Areas.

- Monitoring instructions are posted at all personnel monitoring stations.

- FDF Radiological Control clearly posts those areas where, based on normal occupancy, personnel have the potential to receive an exposure to >100 millirem in one year.

- Access to Radiological areas is controlled by FDF Radiological Control. Workers requiring access to Radiological Areas receive a briefing from FDF Radiological Control Technicians on the area's radiological hazards (e.g., contamination levels) and the precautionary measures taken to ensure worker safety (e.g., PPE requirements).

- Unescorted access to WPRAP Radiological Areas requires a minimum of Radiological Worker II training.

- Unescorted access to WPRAP Controlled Areas requires a minimum of Radiological Worker II training.

- All hand carried items, materials, equipment and vehicles must be surveyed by FDF Radiological Control for contamination prior to removal from WPRAP Radiological Areas. a contamination survey is not required for those Controlled Areas established for radiation dose only.

- All on-site IT WPRAP personnel are required to participate in the FDF bioassay programs by submitting in-vitro (urine or feces) samples and by obtaining in-vivo (lung counts) at specified frequencies.

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- All on-site IT WPRAP personnel are required to comply with applicable FDF Radiological Work Permits and FDF approved IT WPRAP Safe Work Plans. All workers are briefed on the contents of each RWP or Safe Work Plan under which the worker will perform work. Workers are required to sign an acknowledgment form to indicate an understanding of the requirements of the RWP or Safe Work Plan.

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- Workers may not sign in on more than one RWP at a time. This is to ensure that PPE requirements are not compromised.

- All personnel are required to wear thermoluminescent dosimeters (TLDs) when designated by area postings, by Radiological Work Permits, or when designated by FDF Radiological Control. The FDF Dosimetry Section controls and maintains the TLDs and dosimetric records for all WPRAP workers.

- Only IT WPRAP laboratory personnel, who have been authorized to work with radioactive sources by the IT WPRAP Manager of Radiological Controls and who have been trained in the proper storage and handling of radioactive sources, are permitted to use these sources. When working with radioactive sources, authorized IT WPRAP personnel shall abide by the following basic rules:

  - Use sources only for their intended purposes.

  - Handle sealed sources in accordance with good radiological control practices.

  - Store sources in their proper storage location when not in use.

  - Notify the IT WPRAP Radiological Controls Manager immediately if a source is damaged or lost.

- Excavation or work activities that involve digging in or disturbing the soil require evaluation by FDF Radiological Control before and during the work to ensure that additional radiological hazards are not encountered.

- IT implements dust control measures that are designed to mitigate dust generation thereby preventing suspension of radioactive particulate into the air. These dust control measures include, but are not limited to, covering loaded dump trucks with tarps, using a tanker truck to apply water to haul roads, using a misting device at the railcar loadout and the dryer discharge conveyor and prohibiting the use of brooms in Contamination Areas.

- Whenever personnel may be exposed to sub-grade materials (e.g., excavated waste) a FDF Radiological Control Technician (RCT) must be

present to perform monitoring for radioactive materials. IT ensures that FDF RCTs are notified a minimum of 24 hours in advance of such activities.

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- IT will attempt to decontaminate equipment prior to entering into the maintenance facility. Decontamination will be performed in accordance with SOPs. Decontamination efforts may include techniques such as pressure washing or hand wiping and chemical cleaning,

- FDF Radiological Control performs radiological surveys (wipe tests) on railcars to ensure that the removable contamination levels are below 2.2 disintegrations per minute per square centimeter (dpm/cm^2) prior to transferring the railcars to and from the WPRAP.

10.2 Chemical Hazards and Controls

10.2.1 Hazards

WPRAP activities require using many different chemicals. Some of these chemicals are considered hazardous because they present a physical hazard or chemical hazard to those who are or may be exposed to them. IT has developed a comprehensive Hazard Communication Program to ensure that the hazards of all chemicals used at the WPRAP are evaluated and that the information concerning their hazards is transmitted to the workers. The IT WPRAP Hazard Communication Program specifies the requirements for labeling or other forms of warning, the use of Material Safety Data Sheets (MSDSs), and training. The IT WPRAP Hazard Communication Program is available for review at the onsite IT WPRAP Health & Safety Office.

WPRAP chemical hazards are associated with the following activities:

- Handling flammable materials that are used to power equipment and process machinery. These materials include, but are not limited to:
  - Fuel oil used to fuel trucks and excavators.
  - Propane used to fuel forklifts.
  - Natural gas used to fuel the dryer.

- Using flammable gases such as acetylene for hot work activities.

- Using oils and lubricants during routine maintenance on machinery and equipment.

- Using paints, thinners, solvents, etc. to apply protective barriers and to preserve materials.

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- Using adhesives such as plumbers glue and primers during installation and repair of utility lines.

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- Handling hazardous wastes inherent with using hazardous chemicals.

- Using hazardous chemicals in the onsite IT analytical laboratory for training IT laboratory personnel in safe laboratory procedures for sample preparation, sample preservation and for analyzing samples as required for laboratory certification and testing.

- Hazardous chemicals may be encountered during excavation and waste segregation activities.

- Inert gas (e.g. nitrogen), base chemicals (e.g., sodium hydroxide), and acids (e.g., nitric acid) will be used in the off-gas and blowdown systems for the dryer and to treat wastes at the Waste Treatment Facility.

Table 10-5 contains a list of chemicals used at the IT WPRAP on-site laboratory during the pre-operational phase of the WPRAP. These chemicals are used to prepare samples and calibrate analytical instruments. The use of these chemicals will vary from small quantities for sample preservation to larger quantities for sample extraction. For example, chemical preservation of water samples requires approximately 5 milliliters of concentrated acid while sample extraction requires 300 milliliters of methylene chloride. This is a tentative list and is dependent on the final target analyte list required to attain laboratory certification.

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Table 10-5
Chemical Data
Laboratory Chemicals

Compound	Quantity	Purpose	Compound	Quantity	Purpose
1,2 Dichloroethane	5 mL	Cal.	Hydrogen	2 Cylinders	Instrument Gas
1,1 Dichloroethylene	5 mL	Cal.	Hydrochloric Acid	1 gal.	Gen'l. Lab Use
1,1 Dichloroethane	5 mL	Cal.	Iso-octane	5 mL	Cal.
1,1,1 Trichloroethane	5 mL	Cal.	Isopropyl Alcohol	1 gal.	Gen'l. Lab Use
1,4 Dichlorobenzene	5 mL	Cal.	Lead	250 mL	Cal.
2,4 Dichlorophenylacetic Acid (DCAA)	5 mL	Cal.	Lindane	5 mL	Cal.
2,4 Dinitro toluene	5 mL	Cal.	m-Cresol	5 mL	Cal.
2,4,5 Tichlorophenol	5 mL	Cal.	Mercury	5 mL	Cal.
2,4 D	5 mL	Cal.	Methanol	1 gal.	Gen'l. Lab Use
2,4,5 TP	5 mL	Cal.	Methoxychlor	5 mL	Cal.
2,4,6 Trichlorophenol	5 mL	Cal.	Methyl Ethyl Ketone	5 mL	Cal.
4,4 Dibromooctafluorobiphenyl (DBOB)	5 mL	Cal.	Methylene Chloride	1 gal.	Gen'l. Lab Use
Acetic Acid	1 gal.	Gen'l. Lab Use	N-methyl-N-nitrso-p-toluene sulfonamide	5 mL	Cal.
Acetone	1 gal.	Gen'l. Lab Use/ Cal.	Nickel	250 mL	Cal.
Antimony	250 mL	Cal.	Nitric Acid	1 gal.	Gen'l. Lab Use
Arsenic	250 mL	Cal.	Nitrobenzene	5 mL	Cal.
Barium	250 mL	Cal.	Nitrogen	2 Cylinders	Instrument Gas
Benzene	5 mL	Cal.	o-Cresol	5 mL	Cal.
Cadmium	250 mL	Cal.	p-Cresol	5 mL	Cal.

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Table 10-5
Chemical Data
Laboratory Chemicals
(cont.)

Compound	Quantity	Purpose	Compound	Quantity	Purpose
Carbon Tetrachloride	5 mL	Cal.	PCB	5 mL	Cal.
Chlordane	5 mL	Cal.	Pentachloronitrobenze	5 mL	Cal.
Chlorobenzene	5 mL	Cal.	Pentrochlorophenol	5 mL	Cal.
Chloroethane	5 mL	Cal.	Potassium hydroxide	1 gal.	Gen'l. Lab Use
Chloroform	5 mL	Cal.	Pyridine	5 mL	Cal.
Chromium	250 mL	Cal.	Selenium	250 mL	Cal.
Copper	250 mL	Cal.	Silver	250 mL	Cal.
Decachlorobiphenyl	5 mL	Cal.	Sodium Sulfate	500 grams	Gen'l. Lab Use
Dethyl ether	500 mL	Gen'l. Lab Use	Sodium hydroxide	1 gal.	Gen'l. Lab Use
Endrin	5 mL	Cal.	Sodium Sulfate, anhydrous	1 gal.	Gen'l. Lab Use
Helium	2 Cylinders	Instrument Gas	Sulfuric Acid	1 gal.	Genl. Lab Use
Heptachlor	5 mL	Cal.	Tetrachloro-m-xylene	5 mL	Cal.
Heptachlor Epoxide	5 mL	Cal.	Tetrachloroethane	5 mL	Cal.
Hexachlorobenzene	5 mL	Cal.	Tetrachloroethylene	5 mL	Cal.
Hexachlorbutadiene	5 mL	Cal.	Toluene	5 mL	Cal.
Hexachloroethane	5 mL	Cal.	Toxaphene	5 mL	Cal.
Hexane	1 gal.	Gen'l. Lab Use	Trichloroethylene	5 mL	Cal.

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10.2.2 Controls

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Material Safety Data Sheets (MSDSs) are obtained by IT and submitted to FDF Industrial Hygiene for review and approval prior to allowing hazardous chemicals to be used on-site at the WPRAP. Workers are instructed to review these MSDSs prior to using the chemicals. The MSDSs are maintained in the on-site IT WPRAP Safety & Health office and are available for review by all personnel.

To confirm that workers have not been exposed to hazardous chemical concentrations at or above the PELs or TLVs, the IT WPRAP Safety & Health Representative ensures the following:

- IT uses such instrumentation as photoionization detectors, oxygen and explosive gas meters, and sampling pumps with tubes to monitor for hazardous chemicals and hazardous environments within the work areas. This instrumentation is calibrated before use in accordance with the manufacturer's instructions. The instruments are maintained in accordance with the manufacturer's specified maintenance policies. Personnel and area air monitoring for hazardous substances is conducted in compliance with 29 CFR 1910.120 (h).

- Monitoring for hazardous environments is conducted during excavation in the waste pits, confined space entries, hot work activities, whenever suspect containers (e.g., damaged drums) are encountered or whenever there is an indication (e.g., stained soil or debris) that would indicate that a hazardous chemical is present or a hazardous environment may exist. The results of this monitoring is compared to the appropriate TLV or PEL and the action levels shown in Table 10-6.

- Should a hazardous chemical or hazardous environment be encountered, IT Safety & Health and Operations Management will perform an assessment of the conditions and will establish the appropriate work practices and levels of personal protective equipment necessary to ensure protection of the worker, the environment and the public.

- IT has developed and will implement standard operating procedures to minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances. Further, all personnel exiting a chemically contaminated area shall be appropriately decontaminated in accordance with decontamination procedures that have been developed, communicated to employees, and implemented prior to performing work in areas where potential for exposure to hazardous substances exists.

- Whenever feasible, IT will implement protective measures such as the use of secondary containment devices (e.g., overpacks), spill containment kits, etc. to prevent or control chemical spills.

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- A medical surveillance program is conducted in accordance with 10 CFR 1910.120(f).
- All workers who are monitored are informed of the monitoring results.
- Monitoring results are provided to FDF on a weekly basis.

  Note: In accordance with FDF Subcontract 98SC000001, FDF has the right to conduct personal air monitoring on any person associated with the WPRAP.

All air monitoring, conducted by IT, will meet the sampling protocols set forth by OSHA and NIOSH. All instrumentation, used to perform air monitoring, is calibrated according to the manufacturer's specifications. Records of calibration are maintained in the on-site IT WPRAP Health & Safety office and are available for review upon request.

Personnel are informed of the hazards associated with chemicals at the WPRAP through orientation on Material Safety Data Sheets, orientation on this Pre-Operational Health& Safety Plan, labeling of containers, and through training performed in accordance with the IT WPRAP Hazard Communication Program and IT WPRAP Safety Instruction #1 "Working With Hazardous Chemicals." In addition, workers are informed of chemical hazards at pre-job briefings and daily safety briefings.

When required by OSHA, an IT WPRAP Safe Work Plan or a product MSDS, a safety shower/eyewash shall be located within 100 feet of the hazard.

All fuel handling equipment must be Underwriters Laboratory (UL) listed and/or Factory Mutual (FM) approved. Refueling is permitted only in designated areas and only by personnel who have been trained in the proper use of refueling equipment.

Areas in which at least five gallons or more of a flammable or combustible liquid is transferred from one tank or container to another must be separated from other operations by a minimum of 25 feet or by a barrier having a fire resistance of at least 1 hour.

All combustible or flammable liquid dispensing units must be protected against collision damage.

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Table 10-6
Hazardous Chemical Surveillance
Action Levels

Instrument	Action Levels	Level of Respiratory Protection and Corrective Action
Photoionization Detector (PID) or Flame Ionization Detector (FID)	**10 ppm unknowns above background (Bkgd) in the breathing zone (BZ) or 50% of the applicable PEL/TLV for known chemicals**	**Stop work and evacuate work area.** **Notify the IT WPRAP Safety & Health Representative immediately.**
Combustible Gas Indicator (CGI)	**< 5% LEL** **> 5% LEL** **> 10% LEL**	**Normal Monitoring** **Continuous Monitoring** **Stop work and evacuate work area. Allow to vent. Eliminate ignition sources. Notify the IT WPRAP Safety & Health Representative immediately.**
Carbon Monoxide (CO) Analyzer	**Background to 25 ppm** **>25 ppm <35 ppm** **> 35 ppm**	**Continue monitoring** **Investigate source and correct/ improve ventilation** **Shut down potential sources. Remove personnel and allow CO to dissipate. Notify the IT WPRAP Safety & Health Representative immediately.**

10.3 Physical Hazards and Controls

10.3.1 Physical Hazards

There are numerous physical hazards associated with the performance of remedial action activities. These hazards may be encountered throughout the site. Following are examples of the more prevalent physical hazards and the mitigating actions that are implemented to protect personnel, the public and the environment from those hazards:

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10.3.1.1 Noise Hazards

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Operation of heavy equipment and process machinery, such as the equipment and machinery used at the WPRAP during remedial action activities, often creates excessive noise. The effects of excessive noise can include:

- Workers being startled, annoyed or distracted.
- Physical damage to the ear, excessive pain, and temporary or permanent hearing loss.
- Communication interference that might increase potential hazards due to the inability to warn of danger and the proper safety precautions to be taken.

10.3.1.2 Noise Hazard Control

All on-site personnel (including visitors) are required to wear hearing protection in areas where noise levels are known to exceed or are expected to exceed an 8-hour time weighted average (TWA) of 85 dBA. The IT WPRAP Safety & Health Representative continuously monitors for excessive noise levels using sound level meters and/or personal noise dosimeters. Areas with consistently high (>85 dBA) noise levels are posted with signs notifying personnel that hearing protection is required. All on-site personnel are required to comply with the IT Corporation WPRAP Hearing Conservation Program. The IT WPRAP Hearing Conservation Program is available for review at the on-site IT WPRAP Health & Safety office.

The use of hearing protection may impede a workers ability to hear messages that are broadcasted over the FDF Emergency Message System (EMS). To ensure that personnel are made aware of these messages in a timely manner, IT personnel will relay the EMS messages via the IT radios or, if necessary, by using visual indicators such as flashing lights or waving of arms, or by direct conversation with the individual.

10.3.1.3 Heat and Cold Stress Hazards

Remedial action activities are conducted year round. This schedule presents the potential for worker exposure to extreme temperatures and the associated heat and cold stress hazards.

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10.3.1.4 Heat Stress Hazard Control

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Heat stress is a major hazard at the WPRAP, especially for workers wearing protective clothing. The same protective materials that shield the body from chemical or radiological exposure also limit the dissipation of body heat and moisture. Therefore, personal protective clothing can create a hazardous condition. Depending upon the ambient conditions and the work being performed, heat stress can occur very rapidly (within as little as 15 minutes). Heat stress can pose as great a danger to worker health and safety as chemical exposure. IT Corporation has developed a WPRAP Heat Stress Program to ensure that on-site personnel are made aware of the signs and symptoms of heat stress, as described below, and are provided with the appropriate protection against the heat stress hazards. The IT Corporation WPRAP Heat Stress Program is implemented as necessary to control worker exposure to heat stress. The IT WPRAP Heat Stress Program is available for review at the on-site IT WPRAP Health & Safety office.

IT provides IT WPRAP personnel with training on the hazards associated heat stress. This training includes recognizing the following signs and symptoms of heat stress:

If the body's physiological processes fail to maintain a normal body temperature because if excessive heat, a number of physical reactions can occur ranging from mild to fatal. Heat related physiological problems include:

- **Heat rash** - caused by continuous exposure to heat and humidity and aggravated by chafing clothes. Heat rash decreases the body's ability to tolerate heat as well as being a nuisance.

- **Heat cramps** - caused by profuse perspiration with inadequate fluid intake. Heat cramps cause painful muscle spasms and pain in the abdomen and extremities.

- **Heat exhaustion** - caused by increased stress on various organs to meet increased demand to cool the body. Heat exhaustion causes shallow breathing; pale, cool, moist skin; profuse sweating; and dizziness. Heat exhaustion can be promptly alleviated by moving the affected individual(s) to a cool place, having the individual lie down, and having the individual drink plenty of cool fluids.

- **Heat stroke** - is the most severe form of heat stress. Heat stroke symptoms include hot dry skin, no perspiration, nausea, dizziness, confusion, strong rapid pulse and coma. The body must be cooled immediately to prevent severe injury or death. Relief is possible

only by emergency measures which quickly reduce body temperature.

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IT also provides WPRAP personnel with training on heat stress hazard control. This training includes the following:

- Recognizing predisposing factors, danger signs, and symptoms of heat stress.
- Awareness of first-aid procedures for, and the potential health effects of, heat stroke.
- Employee responsibilities in avoiding heat stress.
- Dangers of using drugs, including therapeutic drugs, and alcohol in hot work environments.
- Use of protective clothing and equipment.
- Purpose and extent of environmental and medical surveillance programs and the advantages of worker participation in such programs.
- Before IT WPRAP activities commence which may expose workers to potential heat stress, on-site IT WPRAP personnel will be provided instruction in the correct methods for counting radial (wrist) pulse and measuring tympanic (ear) temperature.

Whenever possible, physiological monitoring will be used to establish work/rest regimens in accordance with the IT WPRAP Heat Stress Program.

Note: Whenever work is performed within a thorium controlled area where exposed skin is not permitted, physiological monitoring shall only be performed as approved by FDF Radiological Control.

Cool down areas will be established as necessary to ensure worker safety. IT WPRAP personnel will be informed of the locations of these cool down areas and will be instructed in the proper procedures for entering and leaving these areas.

Optional cooling methods, such as cool suits, may be used to protect workers from heat stress. When selecting an optional cooling method, consideration shall focus on worker safety and comfort.

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Adequate fluids will be provided to replace body fluids lost through perspiration. Workers will be instructed to force themselves to drink liquids because, under conditions of heat stress, the normal thirst mechanism is not adequate to bring about a voluntary replacement of lost fluids.

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Note: Due to FDF restrictions for thorium controlled areas, drinking water within a thorium controlled area is prohibited. Personnel working in these areas will be required to exit before drinking.

During the months of June through August, physically demanding work, where the worker is required to wear protective clothing, will be conducted during off-shifts. At other times during the year, work will be scheduled during the cooler hours of the day as necessary to protect workers from heat stress.

Workers will be acclimated to heat conditions.

Shade or shelter will be provided during rest periods.

When practical, workers will be rotated to various job duties to minimize their exposure to hot environments.

Whenever practical, IT will use air conditioning in the cabs of heavy equipment in order to minimize heat stress exposure to the operator.

10.3.1.5 Cold Stress Hazard Control

Cold stress is an important consideration when planning and conducting WPRAP activities. Low ambient temperatures can result in health effects ranging from reduced mental alertness and reduction of ability to make rational decisions to loss of consciousness with the threat of fatal consequences. IT Corporation has developed a WPRAP Cold Stress Program to ensure that on-site personnel are made aware of the signs and symptoms of cold stress, as described below, and are provided with the appropriate protection against the cold stress hazards. The IT Corporation WPRAP Cold Stress Program will be implemented as necessary to control worker exposure to cold stress. The IT WPRAP Cold Stress Program is available for review at the on-site IT WPRAP Health & Safety office.

IT provides IT WPRAP personnel with training on the hazards associated cold stress. This training includes recognizing the following signs and symptoms of cold stress:

If the body's physiological processes fail to maintain a normal body temperature because if excessive cold, a number of physical reactions can

occur ranging from mild to fatal. Cold related physiological problems include:

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- **Frost nip or incipient frostbite** - is characterized by sudden whitening or blanching of the skin.

- **Superficial frostbite** - gives the skin a waxy appearance and is firm to the touch, but the tissue beneath is resilient. Superficial frostbite can be treated by covering the cheeks with warm hands, placing frostbitten fingers under the arm pit next to the skin, or placing frostbitten feet beneath the clothing and next to the skin of a companion.

- **Deep frostbite** - is characterized by cold, pale and solid tissue. Deep frostbite is an extremely serious injury and affected individuals must seek medical attention.

- **Systemic hypothermia** - is caused by exposure to freezing and rapidly dropping temperatures. Hypothermia symptoms are visually exhibited in five stages:

  - Shivering

  - Apathy, listlessness, sleepiness, and sometimes rapid cooling of the body to less than 95.5 °F

  - Unconsciousness, glassy stare, slow pulse, and slow respiratory rate

  - Freezing of the extremities

  - Death

IT also provides WPRAP personnel with training on cold stress hazard control. This training includes the following:

- Instruction in the proper use of warm clothing such as avoiding over dressing and using a layering system.

- Instruction in the recognition of impending frostbite. Including the increased potential for frostbite when wearing a Powered Air Purifying Respirator (PAPR) in cold conditions.

- Proper eating and drinking habits.

- First-aid practices.

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- Safe work practices.
- Recognition of the signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
- Limitations on the use of PAPRs in cold environments

IT will arrange work in such a way as to minimize sitting still or standing for long periods.

IT will establish warm up areas as necessary to ensure worker safety. IT WPRAP personnel will be informed of the locations of these warm up areas and will be instructed in the proper procedures for entering and leaving these areas.

Adequate hot fluids will be provided to replace body fluids lost through perspiration. Workers will be discouraged from drinking or eating foods and beverages that contain caffeine or from taking medications that contain caffeine because of their diuretic and circulatory effects.

When practical, work will be scheduled during the warmer hours of the day.

When practical, workers will be rotated to various job duties to minimize their exposure to cold environments.

10.3.1.6 Motorized Vehicle and Mechanized Equipment Hazards

Motorized vehicles and mechanized equipment, such as water trucks and frontend loaders are in continuous use at the WPRAP. These vehicles and equipment present hazards to personnel who are operating them or are working around them.

10.3.1.7 Motorized Vehicle and Mechanized Equipment Hazard Control

All motorized vehicles and mechanized equipment will be operated in a manner for which it was intended. Operators will operate the vehicle or equipment in accordance with the manufacturer's instructions and within the safe operating parameters as defined by the manufacturer. The following guidelines will be adhered to while operating motorized vehicles or mechanized equipment:

- IT will ensure that qualification records are maintained for all IT WPRAP equipment operators for FDF review. Prior to beginning

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work on-site, each operator will become familiar with the specific equipment to be operated by reviewing the manufacturer's operating manual and by physically operating the equipment. IT will document this familiarization and will retain a copy in the IT WPRAP Document Control files.

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- Motorized vehicles and mechanized equipment will be checked at the beginning of each shift to assure that they are in safe working condition. These checks will be documented on inspection logs in accordance with IT WPRAP Safety Instruction #12 "Operation of Motorized Vehicles and Mechanized Equipment", which are kept with the vehicle. One needs only to consult this log to determine the condition of the vehicle. All defects must be corrected before the motorized vehicle or mechanized equipment is placed into service.

- Motorized vehicles or mechanized equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.

- Personnel working around heavy equipment are required to wear orange safety vests and are required to make eye contact or radio contact with the equipment operator before approaching the equipment.

- Getting on or off of motorized vehicles or mechanized equipment while it is still moving is prohibited.

- Determinations of road conditions and structures will be made in advance to assure that clearances and load capacities are safe for the passage of the motorized vehicle or mechanized equipment.

- Motorized vehicles or mechanized equipment will be shutdown prior to and during fueling operations. However, closed systems, with automatic shut-off which will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running

- Each motorized vehicle or mechanized equipment must be equipped with a fully charged dry chemical or carbon dioxide fire extinguisher with a minimum rating of 10-B:C.

- All motorized vehicles and mechanized equipment must be equipped with an audible reverse signal alarm.

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- Rollover protective structures and seat belts shall be installed on the following types of motorized vehicles and mechanized equipment:

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  - Crawlers and rubber tire tractors including bull dozers, winch tractors and mowers.
  - Off-highway self-propelled pneumatic-tire earth movers such as trucks, scrappers and dumps.
  - Motor graders.
  - Water trucks having a tank height less than the cab.
  - Other self propelled construction equipment such as front-end loaders and backhoes.

- Motorized vehicles and mechanized equipment may only be operated in areas designated for that purpose.

10.3.1.8 Hot Work Hazards

Although hot work activities, such as welding and cutting, are not conducted on a routine basis at the WPRAP, there remains the very real probability that a certain times hot work will be necessary to repair broken parts on machinery and or equipment and to a lesser extent, to size reduce waste materials to meet the WAC..

10.3.1.9 Hot Work Hazard Control

All safety requirements specified in IT Hot Work Permits, IT Safe Work Plans, IT WPRAP Safety Instruction #2 "Hot Work Activities", IT Safety Instruction #13 "Handling, Use and Storage of Compressed Gas Cylinders" and other documents approved by IT and FDF will be followed. Hot Work Permits and Safe Work Plans which include hot work activities are reviewed with the workers prior to implementation. The Hot Work Permit is posted at the work location. IT WPRAP Safety Instruction #2 is available for review at the on-site Health & Safety office.

Hot work activities (welding, thermal cutting, grinding, etc.) will be performed in a manner that provides for the protection of the workers, the public and the environment. This is accomplished by training personnel in the proper use of safe hot work techniques such as:

- Obtaining an IT HOT Work Permit from the IT WPRAP Safety & Health Representative. When preparing the Hot Work Permit, the

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IT Safety & Health Representative assesses the task to adequately address the following potential hazards:

- Fire from sparks or spatter. Sparks may travel as much as 35 feet and spatter can bounce on the floor or fall through openings.
- Fire or explosions from reactions with welding/cutting gases.
- Asphyxiation and/or inhalation of toxic fumes or gases. Welding and cutting gases create hazardous fumes which can displace oxygen resulting in oxygen deficient atmospheres.
- Eye hazards from heat radiation and flying objects.
- Electrical shock.
- Trip and fall hazards
- Confined space hazard.
- Airborne radioactive material hazards.
- Inadequate ventilation.
- Appropriate respiratory protection.

- Wearing proper fire retardant protective clothing and appropriate eye protection. This includes helpers and fire watch personnel.
- Removing combustible material and equipment from the work area prior to beginning the hot work activity. Combustible material and equipment that cannot be moved, (e.g. building surfaces and openings in ducts, tanks or other confined spaces) within 20 feet or are below the work, must be covered with fire resistant welding blankets.
- Maintaining a fire watch during hot work activities and continuing the fire watch for a minimum of 30 minutes (60 minutes for roof work) following the suspension of the hot work activity.
- The proper use of portable fire extinguishers.

- Maintaining good housekeeping at all times in accordance with IT WPRAP Safety Instruction #5 "Housekeeping", which is available for review at the on-site IT WPRAP Health & Safety office.

- Using shields, such as welding screens, to protect personnel from heat radiation and flying objects.

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- Inspecting hot work equipment including; connections, cables, gas hoses, fluxes, rods, coatings and electrodes prior to use.

- Assuring that oxygen-fuel gas systems are equipped with listed and approved back flow valves and pressure relief devices.

- Medical surveillance requirements.

- Safe handling, use and storage of compressed gas cylinders in accordance with IT WPRAP Safety Instruction #13 "Handling, Use and Storage of Compressed Gas Cylinders", which is available for review at the on-site IT WPRAP Health & Safety office.

10.3.1.10 Electrical Hazards

The use of electrical power is essential to the WPRAP remediation activities. Maintenance and repairs on electrical circuits and other components are WPRAP activities that present the highest potential for worker exposure to electrical hazards..

10.3.1.11 Electrical Hazard Control

IT WPRAP Safety & Health representatives will verify that electrical equipment is suitable for its intended purpose as evidenced by listing, labeling, or certification for that purpose.

All electrical equipment will be operated in accordance with the manufacturer's instructions.

Unless specifically exempted by OSHA, a Ground Fault Circuit Interrupter (GFCI) will be used on each 15 and 20 ampere, 120 volt circuit at the WPRAP. The GFCI will be placed at the source of the electrical services to protect both the cord and the devices connected.

IT will not use assured grounding programs at the WPRAP.

All electrical appliances will be UL listed for the potential hazards of the atmospheres in which they will be used. Electric tools and equipment (saws, drills, compressors, etc.) will be double insulated or grounded. All electrical connections will be made through a GFCI.

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Fire extinguishers consistent with OSHA 1926.150 will be kept in sufficient number to allow on-site personnel to extinguish incipient fires.

Prior to use, electrical equipment will be inspected for proper insulation, damage, defects, and operability.

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Electrical equipment operating at 50 volts or more will be guarded against accidental contact and appropriate signs will be posted.

On-site electrical equipment will be bonded and grounded, spark proof, and explosion resistant as appropriate.

Electrical equipment will be de-energized before inspection or maintenance in accordance with the FDF Lockout/Tagout (Hazardous Energy And Material Control) Procedure which is available for review in the on-site IT WPRAP Health & Safety office.

All electrical tools will be inspected frequently and defective tools or tools that are questionable will be removed from service and a warning tag applied. An example of the warning tag is provided as Figure 2.

Personnel using equipment, such as ladders and cranes, will maintain a minimum safe distance of 10 feet from energized overhead lines.

Personnel will wear proper protective equipment in accordance with work permits, safe work plans, or other applicable documents.

10.3.1.12 Portable Ladder Hazards

At the WPRAP, portable ladders may be used to access equipment components for the purpose of maintenance and repairs. Ladders may also be used as a means of entry and exit from an excavation.

10.3.1.13 Ladder Hazard Control

Portable ladders are inspected by a competent person at least once each quarter. An inspection tag stating who performed the inspection and when re-inspection is due must be affixed to the ladder. Personnel are instructed not to use any ladder that does not have an inspection tag attached. Defective ladders are removed from service immediately.

Ladders are inspected and maintained in accordance with the following guidelines:

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- Ladders shall be maintained in good condition at all times. The joint between the steps and side rails shall be tight. All hardware and fittings must be securely attached. Moveable parts must operate freely without binding or undue play.

  - Metal bearings of locks, wheels, pulleys, etc. shall be frequently lubricated.

  - Frayed or badly worn rope must be replaced.

  - Safety feet and other auxiliary equipment shall be kept in good condition to insure proper performance.

  - Rungs shall be kept free of grease, oils or other slippery substances.

  - Defective portable ladders must be tagged "Do not use" and withdrawn from service until repaired.

Workers are instructed to inspect ladders for visible damage (e.g. broken or missing rungs or steps and broken or split rails) before each use. Defective ladders must be tagged "Do not use" and removed from service immediately. Workers shall notify the IT WPRAP Safety & Health Representative whenever a ladder is found to be defective.

IT WRAP workers will be instructed in recognition of hazards associated with ladder use at the WPRAP and procedures to be followed to minimize these hazards. This training shall be provided by IT WPRAP personnel who are competent in the following areas as applicable:

- The nature of fall hazards in the work area.

- The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used.

- The proper use, placement, and care of ladders.

- The maximum intended load-carrying capacities of ladders used at the WPRAP.

- The OSHA standards found in 29CFR1926, Subpart X.

Foundations for portable ladders will be on solid, compacted soils or other solid surface.

Ladders will not be placed in front of doors that open toward the ladder unless the door has been blocked, locked or guarded.

Ladders will not be used in the horizontal position as platforms, runways or scaffolds.

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The top of a step ladder will not be used as a step. The bracing on the back legs of step ladders shall not be used for climbing.

No ladder will be used to gain access to a roof unless the top of the ladder extends at least three feet above the point of support at the eave, gutter, or roof line.

Portable metal or wooden ladders will not be used at the WPRAP.

The minimum extension for two-section ladders shall be as follows:

Size of Ladder (Feet)	Overlap (Feet)
Up to and including 36	3
Over 36 up to and including 48	4
Over 48 up to and including 60	5

Portable ladders shall not be used within ten (10) feet of energized overhead lines.

10.3.1.14 Excavation Hazards

A primary remedial action activity is to remove waste debris from the pits. This involves excavation of soils from the pit areas. Excavation areas present fall to lower level hazards, confined space hazards, dangers of entombment, drowning hazards, slip trip and fall to same level hazards, use of heavy equipment, noise hazards and the potential for hazardous atmospheres.

10.3.1.15 Excavation Hazard Control

IT will perform excavation for removal of waste debris from the waste pits in accordance with the Excavation Plan and in conformance with OSHA 29 CFR Subpart P. Field slope stability determinations will be performed by an OSHA Trenching & Excavation Safety Competent Person as necessary within the OSHA requirements.

Workers will be oriented on recognizing the signs of ground subsidence and soil conditions which indicate soil is collapsing.

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When mobile equipment is operated adjacent to an excavation or when such equipment is required to approach the edge of an excavation and the operator does not have a clear and direct view of the edge of the excavation, a warning system such as barricades, hand and mechanical signals, or stop logs will be utilized. If possible the grade should be away from the excavation.

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Unless otherwise determined by the IT WPRAP OSHA Competent Person, all soils at the WRAP will be assumed to be type "C". Soil within the Fernald Environmental Management Project (FEMP) shall be assumed to be disturbed.

Excavations greater than 4 feet in depth will be considered a confined space. Entry into these excavations shall be in accordance with the

WPRAP Confined Space Entry Program which is available for review in the on-site IT WPRAP Health & Safety office.

Prior to excavation, IT will submit to FDF the names and qualifications of Competent Persons who will oversee excavations.

The IT Competent Person shall:

- Determine protection systems for excavations up to 20 feet deep to protect employees from cave-ins. An IT registered professional engineer shall make all determinations at depths greater than 20 feet.

- Complete the initial inspection.

- Perform soil classification as defined in 29 CFR 1926, Subpart P, Appendix A. A minimum of one visual and one manual classification test is required to determine soil type. The manual test shall be done with a pentrometer or shearvane.

- Inspect the excavation and protection systems using written documentation at the following frequencies:

  - Daily, prior to work beginning and as conditions change.

  - After every measurable rain or other hazard-increasing occurrence (e.g. freezing and thawing conditions).

  - After any other event that may affect the stability of the excavation or protective system.

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All inspections shall be documented. At the end of the project, all inspection forms shall be submitted to FDF.

Unattended excavations shall be physically barricaded.

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10.3.1.16 Flammable Material Hazards

Flammable materials , such as the diesel fuel used for heavy equipment, paints used for protective coatings, solvents and thinners, are in use throughout the WPRAP. A 5,000 gallon diesel fuel storage tank is located onsite. A fuel truck is used to carry diesel fuel to excavation areas for the purpose of refueling equipment.

10.3.1.17 Flammable Material Hazard Control

Sources of ignition are prohibited in areas where flammable materials are present.

Fuels are used and stored in accordance with the National Fire Protection Agency (NFPA) Code 30 "The Flammable & Combustible Liquids" code and with OSHA 29CFR1910.106 "Flammable and Combustible Liquids regulations. Storage locations will be posted with warning signs "Flammable Liquid" and "No Smoking".

Equipment on-site is bonded and grounded, spark proof and explosion resistant as appropriate . Particular attention to bonding and grounding is given to the transfer of flammable/combustible liquids.

With the exception of FDF designated smoking areas, smoking shall be prohibited on-site.

Portable fire extinguishers are provided in sufficient numbers to allow on-site personnel to extinguish fires. Personnel are trained in the proper use of these fire extinguishers.

10.3.1.18 Compressed Gas Hazards

Compressed gases are in use at the WRAP. These include the natural gas that is used to fuel the dryers, oxygen and acetylene cylinders used for hot work activities, and propane cylinders used to power fork trucks.

10.3.1.19 Compressed Gas Hazard Control

Handling, storage and utilization of compressed gases in cylinders are performed in accordance with OSHA Standard 29 CFR 1910, Subpart H - Hazardous Materials, OSHA Standard 29 CFR 1926, Subpart J - Welding

& Cutting and Compressed Gas Association Pamphlets P-1(handling), C-6 & C-8 (inspection), and S-1.1 & S-1.2 (safety relief devices). These documents are available for review in the on-site IT WPRAP Health & Safety office.

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Prior to handling or using compressed gases, the handler or user must review the appropriate Material Safety Data Sheet (MSDS) to ensure that the handler or user has knowledge of the hazardous properties associated with the compressed gas in order to maintain a safe, controlled operation.

Unless otherwise labeled, compressed gas cylinders shall be considered as being full and shall be handled accordingly.

Cylinders may be moved by tilting and rolling them on their bottom edges.

Valve protectors shall not be used to lift cylinders from one vertical position to another.

When work is finished, when cylinders are empty, or when cylinders are moved at any time, the cylinder valve shall be closed

Compressed gas cylinders, whether full or empty, shall not be used as rollers, supports, or for any purpose other than the purpose for which they were designed.

Suitable cylinder truck, chain, or other steadying device shall be used to prevent cylinders from falling while in use or in storage.

Cylinder markings, such as labels and serial numbers, shall not be removed or altered in any way.

Precautions must be taken to prevent sparks, molten metal, electrical currents, excessive heat or flames from coming in contact with compressed gas cylinders.

Compressed gas cylinders are stored only in those areas approved for this purpose. Storage areas must be well ventilated and protected from extreme weather conditions so as to minimize rusting, freezing, continuous exposure to direct rays from the sun, and contact with the ground. This does not preclude exterior storage.

Oxygen cylinders must be stored a minimum distance of 20 feet from any other fuel gas cylinders or combustible materials (especially oil and grease), or be separated by a non-combustible barrier at least 5 feet high and having a fire resistance rating of at least 30 minutes.

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Compressed gas cylinders shall be secured and stored in an upright position.

All empty cylinders must be labeled "Empty". 1730

The following additional precautions are taken with compressed gas cylinders:

- Never use oil and grease as lubricating agent on valves or attachments to oxygen cylinders.
- Never locate compressed gas cylinders in an unventilated area.
- Never attempt to mix gases in a cylinder or to use the cylinder for any purpose other than that for which it was intended.
- Never use oxygen for a substitute for compressed air.
- Never use an open flame or any other source of ignition to test for cylinder leaks.
- Cylinders containing oxygen or acetylene or other fuel gases shall not be taken into confined spaces.

Natural gas lines are labeled.

10.3.1.20 Hoisting and Rigging Hazards

Hoists and rigging may be necessary to repair or replace system components, and make repairs on vehicles and equipment.

10.3.1.21 Hoisting and Rigging Hazard Control

The rated capacity shall be permanently marked on the hoist or load block.

Hoists shall have labels affixed that display the word "Warning" or other legend to bring the label to the attention of the operator. The label shall contain the cautionary language specified in the FDF Hoisting & Rigging Manual, Chapter 15a.

Manual-lever-operated hoists shall be equipped with a load controlling mechanism capable of functioning under normal conditions with test loads up to 125% of the rated capacity.

Hand chains shall be capable of withstanding, without permanent distortion, a force of three times the pull required to lift the rated load.

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Web straps shall be made of nylon, polyester or similar synthetic material.

Nylon and polyester web straps shall not be exposed to an ambient temperature >200° F.

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Electric-powered hoists shall be marked with voltage of AC or DC power supply and circuit ampacity.

Air-powered hoists shall be marked with the rated air pressure.

Positive type safety latches that prevent the hook from opening shall be used.

The lift shall be barricaded in such a manner as to prevent a worker from being struck by falling objects.

Operator shall inspect hoists and rigging at the beginning of each shift or prior to first use. The inspection shall be in accordance with the FDF Hoisting & Rigging Manual, Chapter 15a.

All loads shall be centered.

Softeners shall be used to prevent cutting nylon and polyester web straps.

If more than 1,000 pounds is supported from a structural steel beam, calculations shall be performed to verify the structural adequacy of the beam.

If any load is supported from a concrete beam, calculations shall be performed to verify the structural adequacy of the beam.

10.3.1.22 Confined Space Hazards

At the WRAP, waste pit excavations greater than 4 feet in depth, accessing internal components of the dryers, and railcars present confined space

10.3.1.23 Confined Space Hazard Control

The IT WRAP Safety & Health Representative will evaluate the workplace to determine if spaces are permit-required. If permit-required spaces exist, personnel will be informed as to the existence, location, and danger posed by the spaces. Warning signs will be posted as follows:

DANGER - PERMIT REQUIRED CONFINED SPACE AUTHORIZED ENTRANTS ONLY

All confined space entry shall be performed in accordance with the IT Corporation WPRAP Confined Space Entry Program which is available for review at the on-site Health & Safety office..

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All workers who enter confined spaces will receive training on confined space entry procedures before performing work.

The space will be evaluated by a person who meets the criteria for designation as "Qualified Person". The qualified person will have classroom training in confined space entry procedures, supervised field training in the evaluation of confined spaces, , and experience in conducting confined space evaluations.

An initial hazard assessment will be conducted that includes atmospheric testing for oxygen deficiency, flammable gas concentrations, and toxic gases. No entry will be made if the flammable gas concentration exceeds 10% of the Lower Explosive Limit (LEL).

A confined space entry permit will be completed by the Qualified Person and posted at the entrance to the space. Required personal protective equipment and safety equipment will be specified on this permit.

Communication procedures will be established and reviewed between persons entering the space and the outside standby personnel before entry.

Prior to entering the space, a safety meeting will be conducted with all personnel involved with the entry. All of the hazards and precautions associated with entry will be reviewed at this meeting.

The IT WPRAP Safety & Health Representative shall determine the level of respiratory protection required for entry.

A hoisting device or other equivalent mechanism will be immediately available to retrieve any person who enters the space if an emergency situation arises. Ladders or other approved devices will be used for access or egress of personnel. This device shall not be used for routine access/egress of personnel, materials, or equipment.

No personnel entry will be permitted into a tank, vessel or other confined space that has been inerted.

Any person who is to enter a confined space will wear a harness and lifeline that is manned by a standby person provided with equivalent protection and training for entry if needed in any emergency situation.

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10.3.1.24 Traffic Hazards

Articulating dump trucks are used to transport waste materials from the excavation areas to the material handling building. Frontend loaders are used in the material handling building for blending and sorting wastes and in the railcar loadout facility to direct load waste into the railcars. This vehicle activity presents the potential for accidents involving pedestrians as well as to the equipment operators.

10.3.1.25 Traffic Hazard Control

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Vehicle and/or equipment operators will adhere to WPRAP Site requirements regarding the operation of their motor vehicle or equipment. The number of passengers in or on a vehicle or piece of equipment shall not exceed the seating capacity. When equipped with seat belts, the seat belts will be used at all times. Personnel are not permitted to ride in or on vehicles or equipment in a manner not designated for conveyance of people (e.g. riding on the running boards or fenders of trucks.

Ground personnel must always make eye contact or radio contact with the equipment operator and must wait for a signal from the operator to proceed before passing close to or in front of operating equipment or moving vehicles. Where possible, heavy equipment in stationary operation should be barricaded (with hazard tape) at a sufficient distance for ground personnel to avoid swinging cabs, counterweights, and booms.

Personnel must wear traffic safety vests when working in the vicinity of vehicles and equipment.

10.3.1.26 Housekeeping Hazards

Failure to maintain personnel access ways free of obstructions and failure to maintain the work area free of such items as scrap lumber with protruding nails and combustible scrap and debris are examples of potential housekeeping hazards at the WPRAP.

10.3.1.27 Housekeeping Hazard Control

All IT WPRAP personnel, including subcontracted personnel, visitors and FDF personnel, are required to maintain high housekeeping standards at the WPRAP at all times. High housekeeping standards include but are not limited to the following:

- Maintain clean sanitary facilities.
- Daily jobsite cleanup.

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- Remove all nails from scrap lumber.
- Keeping stairways, passageways, access ways free of materials, supplies, and obstructions at all times.

10.3.1.28 Hand and Power Tool Hazards

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The use of hand and portable power tools present such hazards as cuts and abrasions from unguarded points of operation, eye hazard from flying debris, ergonomic hazard from poor design or improper use, and electrical shock from defective components.

10.3.1.29 Hand and Power Tool Hazard Control

Prior to placing hand and power tools into service at the WRAP, the IT WPRAP Safety & Health Representative performs an inspection to assure that the tool is not defective and is in safe working condition in accordance with the manufacturer's specifications.

All hand and power tools shall be maintained in a safe condition.

When power operated tools are designed to accommodate guards, they shall be quipped with such guards. Manufacturer installed guards shall not be removed while working with the tool.

Rotating or moving parts of equipment, that are exposed to contact by workers or otherwise create a hazard, shall be guarded.

Workers shall inspect tools prior to use. Defective tools shall be removed from service and shall not be reused until repaired and confirmed to be in safe working condition via inspection by the IT WPRAP Safety & Health Representative. Some examples of defective tools are as follows:

- Wrenches with sprung jaws that will permit slippage.
- Mushroomed heads on impact tools such as hammers and chisels.
- Wooden handles that are loose, cracked or splintered.
- Electrical cords that are frayed, cut, or have the ground pin removed.
- Tools with guards removed.
- Hydraulic tools with leaking cylinders.

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Workers shall not wear loose fitting clothing, neckties, or jewelry when working with power tools.

Power tools shall be stored at assigned locations. These locations must be selected, such that, tools cannot be inadvertently activated and cannot fall on unsuspecting workers.

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When not in use, power tools shall be disconnected from the power source.

Electric cords shall be kept off of the floor and away from possible snagging hazards.

10.3.1.30 Slip, Trip and Fall Hazards

Uneven terrain, adverse weather conditions and poor housekeeping techniques may present slip, trip and fall hazards at the WPRAP.

10.3.1.31 Slip, Trip and Fall Hazard Control

The floor or ground surface of work areas shall be kept free of ice, snow, debris and, so far as possible, in a dry condition.

Aisles and passageways shall be kept free of debris.

Electric cords shall be kept off of the floor to prevent creating a tripping hazard.

Openings to trenches or other excavations shall be barricaded and posted with signs to alert personnel to the fall hazard.

10.3.1.32 Railcar Hazards

The use of railcars for loading and transporting waste materials presents special hazards such as the potential for being caught between or run over by a railcar and for derailing a railcar.

10.3.1.33 Railcar Hazard Control

Only trained/qualified personnel will be permitted to move and relocate railcars. These personnel will receive specialized training designed to instruct them in safe operation of the Trackmobile-type shifter and to make them aware of the hazards associated with railcar activities.

Personnel who do not have railcar responsibilities but have occasion to work within the railcar facility shall be given training on general safety

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rules relative to the hazards associated with railcar movement (e.g., safe working distances, not crossing between cars, etc.).

Only personnel assigned to work in the railcar area will be permitted access to the area. Persons needing access on a limited basis (e.g., auditors, maintenance, etc.) shall schedule access through the IT WPRAP Operations Manager.

Trackmobile operators shall establish radio communication support personnel at all times when moving railcars.

10.3.1.34 Hazardous Energy

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Sources of hazardous energy are present throughout the WPRAP. These energy sources consist of the following:

- Electrical - Found throughout the site.
- Hydraulic - Such as the hydraulic systems used on heavy equipment (Front-end loaders, Trackhoes, etc.).
- Chemical - Such as the pressurized natural gas line used to fuel the dryers and the chemical feed lines for the wastewater treatment system.
- Thermal - Such as the dryers and their off-gas treatment system.
- Stored - Such as batteries.
- Mechanical - Such as the conveyor belt feed systems.

10.3.1.35 Hazardous Energy Control

Whenever it is necessary to perform maintenance or emergency repairs on hazardous energy systems such as those described in Section 10.3.1.34 above, the hazardous energy system shall be isolated in accordance with the FDF Lockout/Tagout (Hazardous Energy and Material Control) Procedure. Personnel who perform hazardous energy isolation shall be trained in accordance with the referenced procedure.

10.4 Biological Hazards

IT uses the following controls to protect on-site personnel from the biological hazards associated with WPRAP remedial action activities:

10.4.1 Wild Animals

Wild animals (e.g. stray dogs, cats, racoons, snakes and mice) may be encountered at the WPRAP. On-site personnel are instructed to use discretion and avoid all contact with wild animals. Should these animals present a problem, efforts will be made to trap them and remove them from the site.

10.4.2 Insects

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Insects (e.g. mosquitoes, bees, and wasps) may be found at the site during the warmer months of the year. Workers are trained to recognize and to minimize contact with these insects. If insects present a problem, insect sprays will be used to remove them.

10.4.3 Poisonous Plants

Poisonous plants (e.g. poison ivy and poison oak) may be encountered at the WPRAP. Workers are trained to recognize these plants and to avoid contact with them. When found, these hazards will be removed.

10.5 Adverse Weather

Adverse weather conditions such as high winds, heavy rains, extreme heat or cold, poor visibility, and hail/ice/snow storms may be encountered at the WPRAP.

In the event of adverse weather conditions, the IT WPRAP Safety & Health Representative will determine if operations may continue without the potential for injury to personnel.

Weather affected work (e.g. work in open locations) will be stopped if lightning, heavy persistent rain, limited visibility, heavy snow, or other adverse weather conditions are in the area of the WPRAP.

Any operation involving the use of cranes, man lifts, or personnel working at heights will be suspended if any wind velocity reaches 25 mph.

11.0 TASK-SPECIFIC HAZARDS AND CONTROLS

IT recognizes that there are significant safety hazards inherent with performing the tasks described in Section 8.0 of this RAHASP. To clearly define these hazards and to convey hazard information to the workforce, Job Safety Analyses (JSAs) and relevant Activity Hazard Analyses (AHAs) are prepared for each Safe Work Plan (e.g., Operations Safe Work Plan). The JSA and AHA provide an effective mechanism for conveying important safety information to all personnel performing IT WPRAP Remedial Action activities. Therefore, prior to performing a Remedial Action activity, the applicable JSA and relevant AHAs are reviewed with IT WPRAP personnel. Typically, these reviews are conducted at the morning, post lunch, or change in work

scope safety briefings.

A summary of task-specific hazards and controls is provided in the Health & Safety Requirements Matrix provided as Attachment A.

12.0 SAFE WORK PRACTICES

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12.1 Application of the ALARA Concept to WPRAP Operational Activities

At the WPRAP, IT applies the As Low As Reasonably Achievable (ALARA) concept by following ALARA principles when developing Safe Work Plans, Standard Operating Procedures, and other documents that are used to provide instruction to personnel who are conducting operational activities. Although the ALARA concept was originally developed as the preferred methodology for controlling radiological exposure, ALARA principles can and should be applied to the control of industrial/construction hazards as well. Accordingly, the ALARA concept is implemented at the WPRAP as follows:

12.1.1 Engineering Controls

To the extent feasible engineering controls are used to prevent or otherwise control personnel exposure to the radiological and industrial hazards associated with WPRAP remedial action activities. These engineering controls include, but are not limited to, the following:

- Installing flame scanners on the dryer. These scanners monitor the flame and automatically shut off the natural gas supply should an abnormality be detected.

- Use of high and low pressure gauges to alert personnel should undesired pressures occur within the dryer system.

- Use of cyclone separators, a wet electrostatic precipitator, a single stage HEPA filter with emergency backup, a constant air monitor, and a thermal oxidizer on the dryer off-gas system.

- Use of ventilated hooded enclosures with High Efficiency Particulate Air (HEPA) filtration and/or a scrubbing system in the laboratory to protect personnel and the environment from radiological and chemical hazards.

- Use of prefilters and HEPA filters and scrubbing systems for cleaning gaseous and liquid effluents prior to release to the environment (gaseous)or to FDF (liquids).

- Use of catalytic converters on equipment to reduce carbon monoxide emissions.

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- Use of light stands and/or equivalent portable lighting systems to ensure that lighting equivalent to at least five (5) foot candles per square foot is provided in areas where personnel are working.

12.1.2 Administrative Controls

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The following administrative controls are used to control the radiological and industrial hazards associated with WPRAP remedial action activities:

- A copy of this RAHASP will be maintained at the job site at all times. Personnel requiring access to the WPRAP Construction Zone as defined by orange fencing and signs, shall be oriented on the contents of this RAHASP and shall acknowledge orientation by signing the Acknowledgment Form (Attachment B) prior to access. In addition to orientation on the RAHASP, visitors will be orientated on current site conditions and activities.

- Personnel requiring access to the WPRAP shall be protected from the hazards by complying with the following requirements:

  - All personnel are required to wear a thermoluminescent dosimeter.

  - FDF will generate a Radiological Work Permit (RWP) for each IT Safe Work Plan and for each Work Permit. Work may not begin until the appropriate RWP is in place.

  - All personnel are required to wear head protection (hard hat) when inside the Operations Zone as defined by postings/signs and orange, yellow, or a combination of orange and yellow fencing.. Hard hats must meet the requirements of American National Standards Institute (ANSI) Z89.1- "Safety Requirements for Industrial Head Protection". IT provides hard hats for IT personnel and visitors. FDF provides hard hats for FDF WPRAP oversight personnel and for Fernald Atomic Trades & Labor Council (FAT&LC) personnel.

  - All personnel are required to wear eye protection. Eye protection must comply with ANSI Z87.1- "Practice for Occupational and educational Eye and Face Protection". IT provides safety glasses for IT personnel and visitors. FDF provides safety glasses for FDF WPRAP oversight personnel and for FAT&LC personnel.

    Note: If full-face respiratory protection is required to perform an operations activity, the respirator shall serve as the required eye protection.

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- All personnel shall wear personal protective equipment (PPE) as specified in Radiological Work Permits, Safe Work Plans, or other documents that are used to perform operations activities.

- All personnel shall wear ANSI Z41.1- "American National Standard for Mens Safety-Toe Footwear" boots when working in all areas associated with the WPRAP. IT provides safety- toe boots for IT personnel and visitors. FDF provides safety-toe boots for FDF WPRAP oversight personnel and for FAT&LC personnel.

  Where chemical resistant boots are required, they will be ANSI Z41.1 listed or worn over ANSI Z41.1 listed boots.

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- IT uses FDF approved Safe Work Plans, FDF Radiological Work Permits, IT WPRAP Hot Work Permits, IT WPRAP Confined Space Entry Permits, and other appropriate and applicable documentation to ensure that work is performed safely.

  IT and FDF conduct oversight audits and inspections to ensure compliance with this RAHASP, regulatory, and site-specific, procedural, and FDF Subcontract 98SC000001 requirements.

- IT ensures that only qualified/competent personnel perform WPRAP Pre-Operational activities by providing approved safety training programs, verification and documentation of training, and through field observation of personnel.

- IT ensures that personnel are physically fit to perform pre-operational work activities at the WPRAP by: (1) conducting a medical surveillance program in accordance with 29 CFR 1910.120, 29 CFR 1926.65, and other applicable regulatory or FDF site-specific requirements.; (2) through a written Hearing Conservation Program prepared in accordance with 29 CFR 1910.95 and 29 CFR 1926.52; and (3) through a written Respiratory Protection Program prepared in accordance with 29 CFR 1910.134 and 29 CFR 1926.103.

- Eating, drinking, smoking, chewing tobacco or gum, dipping tobacco and applying makeup are permitted only in areas designated by FDF Radiological Engineering. Not withstanding the following medical exceptions, at no time are these activities permitted within Contaminated Areas, High Contamination Areas or Airborne Radioactivity Areas:

  Medical exceptions:

  1. Non-prescription medicine may not be taken into Controlled Areas with the single exception of Glucose

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Tablets which may be taken by diabetics. Candy is not recognized by FDF as a medicine and shall not be taken into a Controlled Area.

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2. Prescription medicine will only be recognized by FDF after the worker, to whom the medicine is prescribed, registers the medicine with the FDF Medical Department. Workers who need Glucose Tablets must also register with the FDF Medical Department.

3. Workers who must take prescription medicine on a schedule should first try to coordinate their schedule so that they may take their medicine on the administrative (a.k.a, "clean" or "uncontrolled") side of the WPRAP. If this is not possible, prescription medicine shall only be taken in a designated drinking water area or designated break room.

4. In the event of an emergency, when prescription medication is needed right away, a worker may take the medicine on the spot, regardless of the area in which he or she is standing. The concern for human life comes before that of a possible contamination. It is stressed, however, that if medicine must be taken under these conditions, that the worker should contact a Radiological Control Technician (RCT) to determine what action, if any, will be required of the worker in regards to dosimetry (e.g., leaving a urine sample). There will be no administrative consequences for workers that become contaminated during emergency self-administration of registered prescription medicine or Glucose Tablets. The calling of a RCT is a safety precaution and is in the best interest of the worker.

- IT WPRAP personnel receiving medical treatment with radiopharmaceuticals will be restricted from entering Controlled Areas until such time as the radiopharmaceutical has cleared sufficiently from his or her system to the point where frisking through a Personal Contamination Monitor (PCM) at the control point does not trigger the alarms. IT WPRAP personnel who have received treatment with radiopharmaceuticals must report to FDF Medical immediately upon returning to work.

- IT WPRAP personnel, who are pregnant, may "Declare Pregnancy" in accordance with 10 CFR 835 - "Occupational Radiation Protection". The pregnant person should report to FDF Medical, where she will be informed of the risks related to her pregnancy as a result of working at the WPRAP. If declared, FDF will ensure that the person's thermoluminescent

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dosimeter is read monthly as opposed to quarterly. The FDF administration control limit is 50 millirem/month or 400 millirem/gestation period.

13.0 EMERGENCY CONTINGENCY AND RESPONSE PLAN

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This Emergency Contingency and Response Plan has been developed to cover extraordinary conditions that might occur at the WPRAP.

13.1 Reporting

The following emergency numbers shall be used to report emergencies at the WPRAP:

13.1.1 Emergency Numbers

NAME	FEMP TELEPHONE EXTENSION	RADIO
Ambulance	6511	Control
Hospital	6511	Control
Fire	6511	Control
Security	6511	Control
Emergency Response	6511	Control
Assistant Emergency Duty Manager (AEDO)	4749 4444	202/Control

13.1.2 Site Notification Procedures

All emergencies shall be reported to the FDF "Communications Center" to ensure rapid response. Whenever personnel are working, a means to report emergencies shall be available at all work locations. This may be accomplished by one or more of the following methods:

- Phone 6511
- Activate a local site fire alarm station
- Radio to "Control"

Any injury, no matter how minor, shall be reported to FEMP Medical for

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evaluation or treatment. The injured party shall be accompanied by the supervisor in charge or his designee. The FDF WPRAP Health & Safety Officer shall be notified as soon as possible after the injury/accident has occurred.

Personnel will be notified of emergency or abnormal conditions by the plant wide alarm system and radio announcements. This announcement follows the sounding of the site alarm horn signal.

13.1.3 What to Report

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The following are examples of emergencies that would justify calling and reporting:

- Serious Injury
- Injury Complicated by Contamination
- Hazardous Waste or Hazardous Substance Emergency
- Radiation/Contamination Release
- Chemical Splash (Eye and Skin)
- Any Fire
- Property Damage
- Adverse Weather Conditions
- Unusual Occurrences
- Loss of Containment
- Loss of Utilities

When an emergency or abnormal condition is observed, personnel shall contact the Communications Center at extension 6511 or via radio (Control). Stay on the phone line until the dispatcher hangs up.

The following information must be given to the Communications Center Operator:

- Name
- Badge Number

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- Location where emergency has occurred
- Nature of emergency
- Number of personnel with injuries
- Unusual conditions (odors, symptoms, vapors, smoke)
- Current status of the emergency

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13.2 Evacuation Routes

Should a situation require an emergency evacuation of the work areas, all equipment should be shut off (if possible) and left in place. Personnel should immediately proceed to the appropriate Rally Point as noted below. Rally Point locations are shown in Figure 1.

Note: Personnel in the Radiologically Controlled area will go to Rally Point 6. Personnel in the Non-Radiological area will go to Rally Point 4.

13.3 Emergency Equipment

The FEMP Medical Facility is staffed and equipped to handle most types of medical emergencies. The medical facility is staffed with Emergency Medical technicians (EMT) and is equipped with an ambulance to transport injured personnel to the nearest off-site hospital should extended or specialized medical treatment be necessary.

The Medical Facility is located at the east end of the Occupational Safety & Health Building (Building 53). The location of the Medical Facility is shown in Figure 1.

13.4 Emergency Response

The FEMP Emergency Services will handle all emergencies. Any request for emergency help should be requested by telephone (6511) or on any FEMP radio frequency by calling "Control".

13.5 Medical Emergencies

The FEMP Medical Department shall serve as the first-aid person.

13.6 Fire Emergencies

All work sites shall maintain effective communication to summon fire fighting assistance. Access to work areas shall be maintained at all times to permit fire trucks and fire fighting crews to safely approach the fire emergency.

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Only trained personnel shall attempt to operate any fire fighting equipment and only when the fire is clearly within the capability of the fire fighting equipment.

The FEMP Emergency Response Team (ERT) will also respond to all on-site fire emergencies. For any fire at the FEMP call 6511.

Any discharge of a fire extinguisher shall be reported as soon as practical to the on duty Fire Fighter/Emergency Response Specialist by radio (Call number 303) or by phone at 4298.

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13.7 Explosion Emergency

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When an explosion has occurred, the following actions are to be taken:

- Activate the closest fire alarm if possible. Notify other employees by an alternate method if a fire alarm is not available.
- Evacuate the work area
- Proceed to the appointed rally point.

  Note: Personnel in the Radiologically Controlled area will go to Rally Point 6. Personnel in the Non-Radiological area will go to Rally Point 4.
- If qualified, render first-aid to any injured personnel.
- Instruct all persons in transit to avoid the work area and surrounding area.
- Contact Control by radio or by phone (6511)
- Call for medical assistance if necessary.
- Report to your supervisor for accountability.

13.8 Chemical Emergencies

13.8.1 Splashes

Flush the affected area for 15 minutes and report to FDF Medical Services.

13.8.2 Personal Contamination (Chemical)

When contaminated with a corrosive or caustic material, flush the affected area with clean water for 15 minutes. Report to FDF Medical Services. The injured

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party shall be accompanied by the supervisor in charge or his designee. The FDF WPRAP Health & Safety Officer shall be notified as soon as possible after the injury/accident has occurred.

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When contaminated with other materials, contact FDF Industrial Hygiene and remain at the work location until a representative of Industrial Hygiene arrives and provides further instructions.

All instances of personal chemical contamination shall be reported to FDF Industrial Hygiene, FDF WPRAP Safety Officer, IT WPRAP Safety Representative, and the FDF Assistant Emergency Duty Officer.

Any situation which could have resulted in the inhalation, ingestion, or absorption of a hazardous material shall immediately be reported to IT Supervision and Safety and to the FDF Assistant Emergency Duty Officer (AEDO), who will report the circumstances to FEMP Medical Services and Industrial Hygiene. The involved personnel shall be directed by the AEDO or IT Supervision as to when and where to report for medical evaluation, completion of an Incident Investigation Report, and submission of bioassay samples (e.g. blood, urine).

13.9 Radiological Emergencies

13.9.1 Releases

The release area shall be evacuated. The supervisor in charge, AEDO, Radiological Control Technicians, and the FDF WPRAP Safety Officer shall be notified of the release.

13.9.2 Personal Contamination (Radiological)

Contamination should be avoided where possible by making minimum contact with the contaminant. All instances of personal radiological contamination must be reported to FDF Radiological Control, the FDF WPRAP Safety Officer, the IT Safety Representative, and the FDF AEDO.

Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion, absorption, or injection shall be immediately reported to a supervisor. The supervisor shall immediately report the circumstance of possible radioactive materials intake to FDF ES&H Radiological Control Department for evaluation. When the suspect isotope is uranium, the involved person shall report to the Urine Sampling Station at the end of their respective shift to complete an Investigation Report (IRR Form FMPC-ES&H-1458), which is available at the urine sampling station, and submit an incident urine sample. The involved person shall also report to the Urine Sampling Station at the start of their next shift to submit a follow up urine sample. When the suspect isotope is other than uranium, the involved person shall report to the Radiological Control

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Department for further determination of actions. Personnel are responsible for complying with additional requirements as specified by the Radiological Control Department.

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Personnel decontamination will be performed in accordance with FDF Radiological Control requirements.

13.10 Uncontrolled Hazardous Waste or Hazardous Substance Release

Under the Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120), an "emergency" exists when a site experiences an occurrence that results in, or is likely to result in, an uncontrolled hazardous waste or hazardous substance release, causing a potential health or safety hazard that cannot be mitigated by personnel in the immediate work area where the release occurs. In the case of an "emergency", trained responders from Fluor Daniel Fernald's Emergency Response Organization will be relied upon for response.

IT will support FDF emergency response by providing detailed information, such as the information specified in Section 13.1.3, regarding the emergency and technical input as needed to ensure the safety of the responders, the public and the environment.

13.11 Incidental Release of Hazardous Substances

Under 29 CFR 1910.120 (a) (3), Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel, are not considered to be emergency responses within the scope of HAZWOPER. Responses to releases of hazardous substances where there is no potential health or safety hazard (e.g., fire, explosion, or chemical exposure) are not considered to be emergency responses.

IT will ensure that only qualified personnel, who are trained to cleanup such incidental releases under the Hazard Communication Standard, respond to incidental releases. These personnel are not considered emergency responders.

13.12 Post-Emergency Response

Post-emergency response is defined under HAZWOPER as "that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and cleanup of the site has begun". Making this distinction is critical because, among other things, different training requirements and different exposure levels may apply depending on the phase of response. If post-emergency response is performed by personnel who were part of initial emergency response, it is considered to be part of the initial response and not post-emergency response.

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13.13 Weather Limitations/Adverse Conditions

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Any outside work will be suspended if warnings for high winds, lightning or tornados are sounded. Any operations utilizing cranes, or personnel working on elevated steel type work will be suspended if wind velocity reaches 25 mph.

Work on elevated steel (walking) will be suspended during rain, lightning, high winds or when icy conditions exist.

13.14 Accident Investigations

Any injury or accident shall require the supervisor to complete an accident report. For injuries and illnesses a "Supervisor's Report of Injury" shall be submitted within 24 hours of the event and forwarded to FDF Medical Services and the FDF WPRAP Contract Administrator. Should a serious accident or injury occur, the involved area should not be disturbed until approved by the FDF WPRAP Safety Officer.

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FIGURE 1

WPRAP
REMEDIAL ACTION HEALTH & SAFETY PLAN

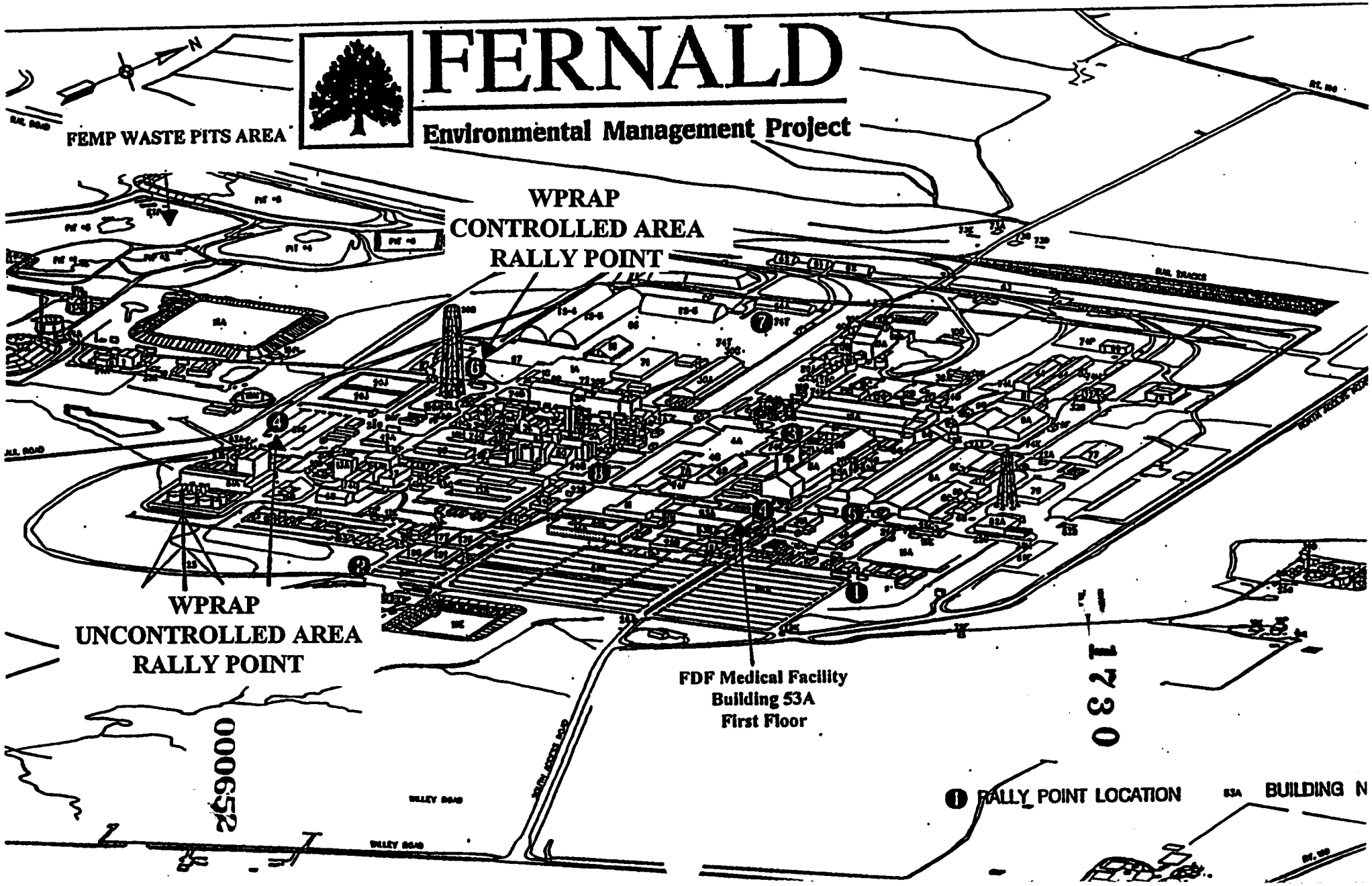

FIGURE 2

WPRAP
REMEDIAL ACTION HEALTH & SAFETY PLAN

DEFECTIVE EQUIPMENT
WARNING TAG

WARNING

DO NOT USE! THIS PIECE OF EQUIPMENT IS IN UNSAFE OR INOPERABLE CONDITION.

EXPLAIN:_____

_____

SIGNED BY_____DATE_____

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ATTA[illegible]IENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit & Plans	Decontamination & Disposal Procedures
Section 1.0 **General Site Access** **Note: These requirements apply to all sections of this matrix**	**Physical Hazards:** Slip & trip hazards due to uneven surfaces and/or adverse weather conditions. Fall to same level resulting from a trip or slip hazard. Excavation at the waste pits. Fall to lower level hazard at excavation sites. Motor vehicle and mechanized equipment operating areas at the waste pits, material handling building, warehouse building, railcar loadout facility and on haul roads. Confined spaces as identified by barricades and postings. Noise hazard areas as posted. Heat stress hazards may be encountered during the hotter months (e.g., July, August, September, etc.). Cold stress hazards may be encountered during the colder months (e.g., December, January, February, etc.).	Personnel exiting Controlled, Contamination, High Contamination, and Airborne Radioactivty Areas (accept when short lived Radon/Thoron is the source of airborne activity) into uncontaminated areas shall perform a whole body survey. Personnel exiting Radiological Buffer Areas that contain Contamination, High Contamination, and Airborne Radioactivty Areas (accept when short lived Radon/Thoron is the source of airborne activity), at a minimum, shall perform a hand and foot survey. Personnel who enter any areas controlled for radiation or have the potential to be exposed to radiological hazards shall wear a FDF Thermoluminescent dosimeter (TLD). Personnel who enter any areas controlled for radiation or have the potential to be exposed to radiological hazards and shall participate in the FDF bioassay program as specified by FDF Radiological Control (See Medical Monitoring & Surveillance Requirements). FDF Radiological Control will perform Breathing Zone (BZ) Sampling on personnel who are working in Contamination, High Contamination, or Airborne Radioactivity Areas. The frequency of this sampling shall be determined by FDF Radiological Control. IT Safety & Health may perform Breathing Zone (BZ) Sampling on personnel who have the potential for exposure to airborne Hazardous Chemical Contamination. The frequency of this sampling shall be determined by IT Safety & Health.	The minimum PPE requirements for access to the Controlled Area of the WPRAP where the atmosphere contains no known hazard and work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals, including radioactive material are as follows: • Steel toed leather safety shoes. • Hard hat. • Safety glasses with side shields. Hearing protection in areas where noise levels exceed 85 decibels averaged over eight hours Clothing for protection against heat and cold stress conditions. A traffic safety vest is required when working around heavy equipment.	**Site Worker:** FDF General Employee Training (GET) 40 hr HAZWOPER or the FDF Site Worker Training. FDF Rad Worker II training is required to work in a contaminated area. Respirator Safety Training. FDF Construction Rules and Regulations. OSHA Supervised Field Experience(24 hrs of Hazardous Waste Site Supervised Experience per 29CFR1910.120). Morning, post lunch, and change in work scope safety briefings Orientation on the IT WPRAP Remedial Action Health & Safety Plan (RAHASP). Briefing on applicable FDF Radiological Work permits and Excavation Permits. Briefing on applicable IT Safe Work Plans, Hazardous Chemical Permits, Hot Work Permits, and Confined Space Entry Permits. Workers who are required to work in fall hazard areas shall be trained in the recognition of fall hazards in accordance with the IT WPRAP Fall Protection Program.	**Site Worker:** Prior to performing work, all workers must pass a drug and alcohol screen in accordance with the IT WPRAP Substance Abuse Program. All workers must pass a baseline physical prior to performing work. In addition to the baseline physical, workers will receive follow up annual, incident and termination physicals All worker are required to participate in the FDF Bioassay Sampling Program which includes the following: • Urine sampling: Baseline, routine (every 60 calendar days), incident and at termination. • Lung count: Baseline, annual, incident and at termination. • Fecal sampling as required by the FDF Dosimetry Program. All injuries/illnesses, no matter how minor, resulting from work performed at the WPRAP must be reported to FDF Medical, IT WPRAP Safety & Health and IT WPRAP Supervision. The IT Superintendent shall report all accidents and injuries to the FDF Technical Representative when they occur. The IT Safety & Health Representative shall report all accidents and injuries to the FDF Health and Safety Officer when they occur. In the event of a serious accident or injury, the involved area shall not be disturbed until approved by FDF. IT will provide reports and support investigations into accidents, illnesses, and injuries as required by FDF.	**Administrative Controls:** Administrative controls that are used at the WPRAP to eliminate or control worker exposure to site hazards include, but are not limited to the following: • Preparation of the site for remedial action activities. • Creating work zones (e.g., Radiation Areas, Contamination Areas, Airborne Contamination Areas, Soil Contamination Areas), and identifying Confined Spaces, etc.). • Using the "Buddy System" to ensure worker safety. • Using barriers and postings to communicate hazardous conditions to the workforce and visitors. • Using telephones and two-way radios for communication. • Developing and implementing Safe Work Plans, Work Permits, Standard Operating Procedures, and Training Programs. • Daily specific task review of relevant Sections of the IT WPRAP RAHASP Health & Safety Requirements Matrix. • Worker participation in morning, post lunch, and change in work scope safety briefings. Outdoor activities will be suspended when one or more of the following conditions occur: ▪ Lightning ▪ Heavy persistent rain ▪ Wind gusts of 25 mph or greater will stop elevated work and crane work. Verification of all operator qualifications.	FDF Radiological Work Permit for work in a contaminated area. FDF Excavation/ Penetration Permit. An IT Confined Space Entry Permit may be required as determined by IT Safety & Health in accordance with the IT WPRAP Permit-Required Confined Space Entry Program. IT Hot Work Permits will be required as necessary to ensure compliance with IT Safety Instruction #2, ""Hot Work Activities". IT Hazardous Chemical Permits may be required as determined by IT Safety & Health. IT WPRAP Operations Safe Work Plan IT WPRAP Standard Operating Procedures	Prior to removal from Controlled, Contamination, High Contamination, and Airborne Contamination Areas, all equipment and materials, including trash and debris, must be monitored for radioactive contamination by FDF Radiological Control. Respirators and launderable clothing are collected in designated containers at the exit points from Controlled, Contamination, High Contamination, and Airborne Radioactivity Areas and taken to the onsite Laundry for decontamination. Nonprocessable wastes are delivered to FDF for disposition. Processable wastes are treated and packaged as necessary to meet the waste acceptance criteria for the disposal facility(ies).

The requirements of this document are based upon current conditions and/or operations in areas near remedial action activities. This document is to be used as an aid in conjunction with the IT WPRAP Remedial Action Health and Safety Plan (RAHASP) to assist the workers in understanding the safety requirements of the project.

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ATTA[illegible]MENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permits & Plans	Decontamination & Disposal Procedures
Section 1.0 **General Site Access cont.** **Note: These requirements apply to all sections of this matrix**	**Radiological Hazards:** Thorium Oxide or Thorium Metal/ Powder as contamination in soil and in or on miscellaneous materials such as drums and wood. Radioactive source materials such as those found in the Analytical Laboratory. **Biological Hazards:** Insects, such as bees, wasps, hornets, spiders and mosquitoes may be encountered anywhere on the site. Wild animals, such as stray cats & dogs, racoons, snakes, mice, may be encountered anywhere on the site. Poisonous plants, such as poison ivy and poison oak may be encountered in vegetated areas on the site. **Adverse weather:** Heavy rain, lightning, snow, sleet, ice, etc.	Wet Bulb Globe Temperature (WBGT) measurements will be performed routinely during hot weather. Physiological monitoring (pulse & temperature) will begin when WBGT exceeds 78°F. The IT WPRAP Safety & Health Representative will perform testing for hazardous environments prior to confined space entry. The IT WPRAP Safety & Health Representative will use a sound level meter to determine noise levels in the work area(s).	The minimum PPE requirements for access to the Radiological Areas of the WPRAP are as follows: • Steel toed leather safety shoes. • Hard hat. • Powered air purifying respirator (PAPR). • Anti-contamination clothing as specified by Radiological Work Permits, Hazardous Chemical Permits, Material Safety Data Sheets and Safe Work Plans. Personnel will be provided with sun screen, shaded safety glasses, long sleeved PPE as necessary to protect them from ultra- violet radiation. Appropriate rain gear will be used to protect personnel from heavy rains. Insect repellents will be used to protect personnel from insects.	**Site Worker cont.:** If entry into a permit-required confined space is necessary, workers shall be trained in the duties of permit-required confined space entry participants in accordance with the IT WPRAP Permit-Required Confined Space Entry Program prior to entering the confined space. conditions. Safety training on the signs and symptoms of heat stress **Visitors:** Visitors must meet all of the training requirements specified for Site Worker before they will be permitted unescorted access to the WPRAP: Visitors must meet the following training requirements before they will be permitted escorted access to the WPRAP: • Radiological training commensurate with the area(s) they are to enter, as determined by FDF Radiological Control. • Orientation on the Remedial Action Health & Safety Plan (RAHASP). • Orientation on current site conditions and activities.	**Visitors:** Visitors must meet all of the medical monitoring requirements specified for Site Worker before they will be permitted unescorted access to the WPRAP: Escorted visitors requiring access to Contamination, High Contamination, or Airborne Radioactivity Areas must meet all of the medical monitoring requirements specified for Site Worker before they will be permitted to access these areas. There are no medical monitoring requirements for visitors who are escorted and do not require access to Contamination, High Contamination, or Airborne Radioactivity Areas.	**Engineering Controls:** Engineering controls that are used at the WPRAP to preclude worker exposure by removing or isolating site hazards include, but are not limited to the following: • Designing the dryer system to operate under negative pressure for the purpose of preventing release of airborne radioactive contamination. Using long-reach excavators to provide a safe distance between operators and the source(s) of contamination. Using negative pressure hooded enclosures in the laboratory for sample preparation. Configuring the site such that personnel exposure to the hazards is minimized. Application of Best Available Technology (BAT) in designing and reengineering the process (e.g., off-gas scrubbing, HEPA filtration, etc.). Dust control measures, such as watering roadways, will be implemented as necessary. Use of relevant operational and/or maintenance procedures to perform remedial action activities.	IT WPRAP Operations & Maintenance Plan. IT WPRAP Environmental Control Plan. IT WPRAP Remedial Action Health & Safety Plan (RAHASP)	

The requirements of this document are based upon current conditions and/or operations in areas near remedial action activities. This document is to be used as an aid in conjunction with the IT WPRAP Remedial Action Health and Safety Plan (RAHASP) to assist the workers in understanding the safety requirements of the project.

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 2.0 **Site Surveillance** **Task 1** **Inspection & Maintenance of Existing Facilities** **This Task Includes:** **Inspection and maintenance of Waste Pits 4,5, and 6.** **Inspection and maintenance of the Clearwell, Storm Management System, and Roads**	All hazards identified in Section 1.0 •Drowning •Hazardous chemical spills and leaks. •Electrical shock •Flammable materials	All monitoring identified in Section 1.0	All PPE identified in Section 1.0 Personal flotation devices when working near water hazards. Hazardous chemical spill kits staged at or near potential spill locations. Ground Fault Circuit Interrupters. Portable fire extinguishers	All training identified in Section 1.0 Workers are instructed to wear personal floatation devices when working at or near water hazards. Workers are trained in spill response in accordance with MSDS guidance and IT training modules for inspection & maintenance of existing facilities. Workers are trained on the use of portable fire extinguishers.	All requirements identified in Section 1.0	All measures identified in Section 1.0	Plans & permits identified in Section 1.0	All procedures identified in Section 1.0

The requirements of this document are based upon current conditions and/or operations in areas near remedial action activities. This document is to be used as an aid in conjunction with the IT WPRAP Remedial Action Health and Safety Plan (RAHASP) to assist the workers in understanding the safety requirements of the project.

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedure
Section 3.0 **Material Handling** **Task 2** **Waste Pits Excavation** **This task includes removal of the waste pit caps, removal of the waste in the pits, removing the waste pit liners, and removal of contaminated soil below the liners to a point where the Final Release Levels are met.**	All hazards identified in Section 1.0 •Inhalation of hazardous chemicals (Includes radiological and chemical) •Struck/crushed by object •Fire/explosion •Burns (thermal and chemical) •Drowning •Excavation of nontypical wastes (e.g., gas cylinders, intact drums, transforms, pyrophoric materials, etc.) •Radon (ponding) in open excavations •Hand & power tools hazards •Refueling	All monitoring identified in Section 1.0 FDF Radiological Control technicians conduct surveys for radioactive contamination during excavation. The survey data is used to ensure that the appropriate radiological control measures are in place to protect personnel from the hazards. .	All PPE identified in Section 1.0 Hearing protection where noise levels exceed an 8 hr TWA of 85 decibels. Leather gloves when working with sharp tools. Chemical resistant gloves when working with hazardous chemicals. Full face shields when exposed to splash hazards Clothing suitable for ambient conditions. Personal flotation devices when working near water hazards. Portable fire extinguishers Operators will carry a five minute escape bottle in the cab of their vehicles for use in the event of an emergency that would require them to evacuate their vehicle while in an area where respirator protection is required	All training identified in Section 1.0 Review of Material Safety Data Sheet (MSDS) prior to using hazardous chemicals. Portable fire extinguisher training. If entry into a permit-required confined space is necessary, confined space entry training is required and shall be given in accordance with the IT WPRAP Confined Space Entry Program. Workers are instructed in safe drum handling techniques in accordance with IT Safety Instruction #11 "Drum Handling Procedure". Workers are instructed in safe cylinder handling techniques in accordance with IT Safety Instruction #13 "Handling, Use and Storage of Compressed Gas Cylinders". Workers are instructed on the precautions to be taken when pyrophoric materials are encountered, including response to fires involving pyrophoric materials. Workers are instructed on the precautions to be taken when buried compressed gas cylinders are encountered.	All requirements identified in Section 1.0	All measures identified in Section 1.0 . The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Prior to excavation, utilities shall be located, identified and protected from damage. Existing structures shall be protected from damage or displacement. Ladders will not be used within 10 feet of electrical lines. Open excavations shall be marked with a physical barrier and signs. All ladders shall be inspected in accordance with the IT WPRAP Portable Ladder Safety Program. Outdoor activities will be suspended when one or more of the following conditions occur: ▪ Lightning ▪ Heavy persistent rain ▪ Wind gusts of 25 mph or greater will stop elevated work and crane work.	All permits specified in Section 1.0	All procedures identified in Section 1.0

The requirements of this document are based upon current conditions and/or operations in areas near remedial action activities. This document is to be used as an aid in conjunction with the IT WPRAP Remedial Action Health and Safety Plan (RAHASP) to assist the workers in understanding the safety requirements of the project.

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 4.0 **Material Handling** **Task 3** **Waste Blending** **This task includes:** **Mixing of contaminated soil with frontend loaders or other mechanical devices to create a homogeneous blend that will satisfy the WAC for the PCDF.**	All hazards identified in Section 1.0 •Hand & power tool hazards •Motorized vehicles and mechanized equipment. •Hot work hazards •Fire hazard •Refueling •Dust	Applicable monitoring as identified in Section 1.0	Applicable PPE as identified in Section 1.0 UL listed and FM approved flame retardant gloves when performing hot work. UL listed and FM approved flame retardant clothing. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents.	Applicable training as identified in Section 1.0 Review of Material Safety Data Sheet (MSDS) prior to using hazardous chemicals. Portable fire extinguisher training.	Applicable requirements as identified in Section 1.0	Applicable measures as identified in Section 1.0 Compliance with FDF Radiological Work Permits. The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Dust control measures, such as watering roadways, will be implemented as necessary.	Applicable Plans and Permits as identified in Section 1.0 IT WPRAP Confined Space Entry Permit is required if entry into a Permit-Required Confined Space is necessary IT Hot Work Permit	Applicable procedures as identified in Section 1.0

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requirements of the project.

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 5.0 **Material Handling** **Task 4:** **Waste Stockpiling** **This task includes:** **Indoor and outdoor waste material staging areas, storage bins within the Material Handling and Railcar Loadout Buildings and surge piles**	All hazards identified in Section 1.0 •Slope stability •Fire •Hazardous chemicals •Refueling •Manual lifting •Miscellaneous hazardous debris •Dust •Maintenance & repair •Vehicle accident •Carbon monoxide poisoning	Applicable monitoring as identified in Section 1.0 The IT Safety & Health Representative performs routine monitoring for carbon monoxide levels in buildings or other confined areas where vehicles are operated.	Applicable PPE as identified in Section 1.0 Chemical resistant gloves when working with hazardous chemicals. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents.	Applicable training as identified in Section 1.0 Review of Material Safety Data Sheet (MSDS) prior to using hazardous chemicals. Portable fire extinguisher training.	Applicable requirements as identified in Section 1.0	Applicable measures as identified in Section 1.0 The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Dust control measures, such as watering roadways, will be implemented as necessary.	Applicable plans and permits as identified in	Applicable procedures as identified in Section 1.0

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 6.0 **Material Handling** **Task 5** **Waste Segregation** **This task includes:** **Any separation of a portion of the waste for specialized handling and or processing.**	All hazards identified in Section 1.0 •Manually lifting •Refueling •Nontypical waste (e.g., intact drums, transformers, pyrophoric materials, etc.) •Hoisting & rigging •Pinch points •Fire •Cuts •Maintenance and repair •Slope stability	Applicable monitoring as identified in Section 1.0	Applicable PPE as identified in Section 1.0 Leather gloves when working with sharp objects. Chemical resistant gloves when working with hazardous chemicals. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents.	Applicable training as identified in Section 1.0 Review of Material Safety Data Sheet (MSDS) prior to using hazardous chemicals. Portable fire extinguisher training.	Applicable requirements as identified in Section 1.0	Applicable measures as identified in Section 1.0 Compliance with FDF Radiological Work Permits. (If used) The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Open excavations shall be marked with a physical barrier and signs.	Applicable plans and permits as described in Section 1.0	Applicable procedures as identified in Section 1.0

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 7.0 **Material Handling** **Task 6** **Waste Screening** **This task includes:** **Processing waste material through a screener to properly size waste material for processing through the dryer.**	All hazards identified in Section 1.0 •Moving mechanical parts (pinch points) •Manual lifting •Maintenance and repair •Hot work •Refueling •Falling and flying objects •Electrical shock •Falls •Ladders •Carbon monoxide poisoning •Energized systems	Applicable monitoring as identified in Section 1.0 The IT Safety & Health Representative performs routine monitoring for carbon monoxide levels in buildings or other confined areas where vehicles are operated.	Applicable PPE as identified in Section 1.0 UL listed and FM approved flame retardant gloves when performing hot work. UL listed and FM approved flame retardant clothing. Leather gloves when working with sharp tools. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents.	Applicable training as identified in Section 1.0 Workers are trained in safe lifting techniques in accordance with IT Safety Instruction #14.	Applicable requirements as identified in Section 1.0	Applicable measures as identified in Section 1.0 Compliance with FDF Radiological Work Permits. The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Dust control measures, such as watering sprays, are implemented as necessary. Ladders will not be used within 10 feet of electrical lines. Ladders extended more than 6 feet shall be secured prior to use: All ladders shall be inspected in accordance with the IT WPRAP Portable Ladder Safety Program. Outdoor activities will be suspended when one or more of the following conditions occur: ▪ Lightning ▪ Heavy persistent rain ▪ Wind gusts of 25 mph or greater will stop elevated work and crane work.	Applicable Plans and permits as identified in Section 1.0	Applicable procedures as identified in Section 1.0

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 8.0 **Material Handling** **Task 7** **Size Reduction** **This task includes:** **Physical seperation and mechanical cutting or shredding of waste materials to meet the WAC.**	All hazards identified in Section 1.0 •Manual lifting •Sharp edges •Chemical hazards •Dust •Moving mechanical parts •Hot work •Pinch points	Applicable monitoring as identified in Section 1.0	Applicable PPE as identified in Section 1.0 Leather gloves when working with sharp edges. Chemical resistant gloves when working with hazardous chemicals. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents. UL listed and FM approved flame retardant gloves when performing hot work. UL listed and FM approved flame retardant clothing.	Applicable training as identified in Section 1.0 Review of Material Safety Data Sheet (MSDS) prior to using hazardous chemicals. Portable fire extinguisher training.	Applicable requirements as identified in Section 1.0	All measures identified in Section 1.0 Compliance with FDF Radiological Work Permits. (If used) The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Existing structures shall be protected from damage or displacement. Dust control measures, such as watering roadways, will be implemented as necessary. Ladders will not be used within 10 feet of electrical lines. Open excavations shall be marked with a physical barrier and signs. Ladders extended more than 6 feet shall be secured prior to use: All ladders shall be inspected in accordance with the IT WPRAP Portable Ladder Safety Program. Outdoor activities will be suspended when one or more of the following conditions occur: ▪ Lightning ▪ Heavy persistent rain ▪ Wind gusts of 25 mph or greater will stop elevated work and crane work.	Applicable Plans and Permits as identified in Section 1.0t IT WPRAP Hot Work	Applicable procedures identified in Section 1.0

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 9.0 **Material Handling** **Task 8** **Waste Transferring & Handling** **This task includes:** **Transferring waste materials from one piece of process equipment or process area to another**	All hazards identified in Section 1.0 •Dust •Carbon monoxide poisoning •Refueling •Pyrophoric material •Falling objects •Vehicle accident •Struck by object/equipment •Entrapment •Hazardous chemicals	Applicable monitoring as identified in Section 1.0 The IT Safety & Health Representative performs routine monitoring for carbon monoxide levels in buildings or other confined areas where vehicles are operated.	Applicable PPE as identified in Section 1.0 Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents.	Applicable training as identified in Section 1.0 Portable fire extinguisher training.	Applicable requirements as identified in Section 1.0	Applicable measures as identified in Section 1.0 Compliance with FDF Radiological Work Permits. The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Dust control measures, such as watering roadways, will be implemented as necessary. Open excavations shall be marked with a physical barrier and signs.	Applicable Plans and Permits as identified in Section 1.0	Applicable procedures as identified in Section 1.0

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 10.0 **Material Handling** **Tasks 9,15,16** **Waste Drying** **These tasks include:** **Thermal drying, air drying, and free drainage; operating the thermal dryer and Treating dryer off-gas.**	All hazards identified in Section 1.0 •Wet/slippery surfaces •Dust •Hazardous chemicals •Electrical shock •Moving mechanical parts •Confined space •Hoisting & rigging •Refueling •Lighting •Pressurized lines •Fire •Hot work •Leaks and spills •Compressed gas •Thermal and chemical burns •Falls •Ladders	Applicable monitoring as identified in Section 1.0 The IT Safety & Health Representative will performed testing for hazardous environments prior to confined space entry.	Applicable PPE as identified in Section 1.0 UL listed and FM approved gloves when performing hot work UL listed and FM approved flame retardant clothing. Chemical resistant gloves when working with hazardous chemicals. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents. Fall protection (full body harness and lanyard) required when exposed to fall hazards.	Applicable training as identified in Section 1.0 Review of Material Safety Data Sheet (MSDS) prior to using hazardous chemicals. Portable fire extinguisher training. Safety training on the signs and symptoms of heat and cold stress Personnel who are exposed to fall hazards shall be trained in accordance with the IT WPRAP Fall Protection Program. Dryer operators will be trained to recognize and control potential fire/explosion conditions in the dryer and of-gas treatment system in accordance with the Standard Operating Procedures.	Applicable requirements as identified in Section 1.0	Applicable measures as identified in Section 1.0 Compliance with FDF Radiological Work Permits. The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Ladders will not be used within 10 feet of electrical lines. Ladders extended more than 6 feet shall be secured prior to use: All ladders shall be inspected in accordance with the IT WPRAP Portable Ladder Safety Program. The oxygen level in the dryer will be maintained between 2 and 3 percent. This will be monitored using redundant oxygen meters. An inert gas (nitrogen) will be used to suppress volatile constituents.	FDF Site Work Permit IT WPRAP Hot Work Permit IT WPRAP Hazardous Chemical Permit	All procedures identified in Section 1.0

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WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 11.0 **Material Handling** **Tasks 10 & 11** **Railcar Loading and Alternative Waste Production Strategy** **These activities include:** **Lining, loading and lidding railcars**	All hazards identified in Section 1.0 •Confined space •Falls •Ladders •Manual lifting •Sharp edges •Pinch points •Hoisting & rigging •Carbon monoxide poisoning •Derailment •Spills	Applicable monitoring as identified in Section 1.0 Radiological monitoring will be performed by FDF Radiological Control in order to confirm that railcars meet the Final Release Level for removal from the WPRAP. The IT Safety & Health Representative will performed testing for hazardous environments prior to confined space entry. The IT Safety & Health Representative performs routine monitoring for carbon monoxide levels in buildings or other confined areas where vehicles are operated.	Applicable PPE as identified in Section 1.0 Leather gloves when working with sharp tools. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents. A full body harness and lanyard are required when exposed to fall hazards.	Applicable training as identified in Section 1.0 Personnel who are exposed to fall hazards shall be trained in accordance with the IT Fall Protection Program. Workers are trained in safe lifting techniques in accordance with IT Safety Instruction #14. If entry into a permit-required confined space is necessary, confined space entry training is required and shall be given in accordance with the IT WPRAP Confined Space Entry Program.	Applicable requirements as identified in Section 1.0	Applicable measures as identified in Section 1.0 Compliance with FDF Radiological Work Permits. The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Ladders will not be used within 10 feet of electrical lines. Ladders extended more than 6 feet shall be secured prior to use: All ladders shall be inspected in accordance with the IT WPRAP Portable Ladder Safety Program.	Applicable Plans and Permits as identified in Section 1.0 IT WPRAP Confined Space Entry Permit. IT/FDF approved Safe Lift Plan.	Applicable procedures as identified in Section 1.0

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 12.0 **Material Handling** **Tasks 12** **Inspection and Maintenance of Waste Carrying Systems.** **This activity includes:** **Routine inspection and maintenance to ensure integrity of waste carrying systems (e.g., dump trucks, dryer conveyors, etc.)**	All hazards identified in Section 1.0 •Moving mechanical parts •Pinch points •Hazardous chemicals •Hoisting & rigging •Sharp edges •Confined spaces •Hot work •Electrical shock •Fall hazards •Fire hazard •Manual lifting •Spills •Fire •Overhead work	Applicable monitoring as identified in Section 1.0 The IT Safety & Health Representative will performed testing for hazardous environments prior to confined space entry.	Applicable PPE as identified in Section 1.0 Leather gloves when working with sharp edges. Chemical resistant gloves when working with hazardous chemicals. UL listed and FM approved gloves when performing hot work UL listed and FM approved flame retardant clothing. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents. A full body harness and lanyard is required when exposed to fall hazards.	Applicable training as identified in Section 1.0 Review of Material Safety Data Sheet (MSDS) prior to using hazardous chemicals. Portable fire extinguisher training. Personnel who are exposed to fall hazards shall be trained in accordance with the IT WPRAP Fall Protection Program. If entry into a permit-required confined space is necessary, confined space entry training is required and shall be given in accordance with the IT WPRAP Confined Space Entry Program.	All requirements identified in Section 1.0	All measures identified in Section 1.0 Compliance with FDF Radiological Work Permits. The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Ladders will not be used within 10 feet of electrical lines. Ladders extended more than 6 feet shall be secured prior to use: All ladders shall be inspected in accordance with the IT WPRAP Portable Ladder Safety Program.	Applicable Plans and Permits as identified in Section 1.0 IT WPRAP Confined Space Entry Permit. IT WPRAP Hot Work Permit IT/FDF approved Safe Lift Plan.	Applicable procedures as identified in Section 1.0

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Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 13.0 **Material Handling** **Tasks 13** **Dust and Fugitive Emissions** **This activity includes:** **Controlling dust hazards and fugitive emissions from embankments, haul roads, service roads, waste stockpiles, etc.**	All hazards identified in Section 1.0 •Dust •Refueling •Flying debris •Fire	Applicable monitoring as identified in Section 1.0	Applicable PPE as identified in Section 1.0 Hearing protection where noise levels exceed an 8 hr TWA of 85 decibels. Leather gloves when working with sharp tools. Chemical resistant gloves when working with hazardous chemicals. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents. Anti-contamination clothing, if required by FDF Radiological Control. Orange safety vest is required when working around heavy equipment. Full body harness and lanyard are required when exposed to fall hazards. Clothing suitable for ambient conditions.	Applicable training as identified in Section 1.0 Portable fire extinguisher training.	Applicable requirements identified in Section 1.0	Applicable measures as identified in Section 1.0 Compliance with FDF Radiological Work Permits. The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels. Dust control measures, such using a water truck to keep roadways wet.	Applicable Plans and Permits as identified in Section 1.0	Applicable procedures as identified in Section 1.0

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 14.0 **Material Handling** **Tasks 14** **Water Management** **This activity includes:** **Routine inspection and maintenance to ensure integrity of waste carrying systems (e.g., dump trucks, dryer conveyors, etc.)**	All hazards identified in Section 1.0 •Spills and leaks •Hazardous chemicals •Drowning •Slope stability •Electrical shock •Falls •Fire •Manual lifting •Refueling •Manual lifting	Applicable monitoring as identified in Section 1.0	Applicable PPE as identified in Section 1.0 Chemical resistant gloves when working with hazardous chemicals. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents.	Applicable training as identified in Section 1.0 Review of Material Safety Data Sheet (MSDS) prior to using hazardous chemicals. Portable fire extinguisher training. Personnel who are exposed to fall hazards shall be trained in accordance with the IT WPRAP Fall Protection Program. FDF Lockout/Tagout training Workers are trained in safe lifting techniques in accordance with IT Safety Instruction #14.	All requirements identified in Section 1.0	All measures identified in Section 1.0 Compliance with FDF Radiological Work Permits. The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels.	Applicable Plans and Permits as identified in Section 1.0	Applicable procedures as identified in Section 1.0

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ATTACHMENT A
WPRAP REMEDIAL ACTION HEALTH & SAFETY PLAN

Health & Safety Requirements Matrix

Activity (Tasks)	Hazard Identification	Frequency & Type of Air and Personnel Monitoring Required	Personal Protective Equipment	Training Requirements	Medical Monitoring & Surveillance Requirements	Administrative & Engineering Control Measures	Permit(s)	Decontamination & Disposal Procedures
Section 15.0 **Material Handling** **Task 17** **Laundry Operations** **This activity includes:** **Washing, drying**	All hazards identified in Section 1.0 •Spills and leaks •Hazardous chemical •Drowning •Electrical shock •Slope stability •Falls •Fire •Manual lifting •Refueling •Manual lifting •Heat stress	Applicable monitoring as identified in Section 1.0	Applicable PPE as identified in Section 1.0 Chemical resistant gloves when working with hazardous chemicals. Other PPE as specified in Material Safety Data Sheets, Safe Work Plans, Radiological Work Permits, or other work documents.	Applicable training as identified in Section 1.0 Review of Material Safety Data Sheet (MSDS) prior to using hazardous chemicals. Portable fire extinguisher training. FDF Lockout/Tagout training. Workers are trained in safe lifting techniques in accordance with IT Safety Instruction #14.	Applicable requirements as identified in Section 1.0	Applicable measures as identified in Section 1.0 Compliance with FDF Radiological Work Permits. The IT WPRAP Heat Stress Program will be implemented when the WBGT temperature inside the laundry facility exceeds 78°F. The IT WPRAP Hearing Conservation Program will be implemented when the noise level exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels.	Applicable Plans and Permits as identified in Section 1.0	Applicable procedures as identified in Section 1.0

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ATTACHMENT B

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REMEDIAL ACTION HEALTH & SAFETY PLAN ACKNOWLEDGEMENT FORM For The WASTE PITS REMEDIAL ACTION PROGRAM

The undesigned individuals have been oriented on the requirements of the Remedial Action Health & Safety Plan (RAHASP) for the Waste Pits Remedial Action Project and understand and agree to comply with all RAHASP requirements.

NAME(Print)	SIGNATURE	DATE	SSN or BADGE N0.

DRAWING NUMBER 773481-M71

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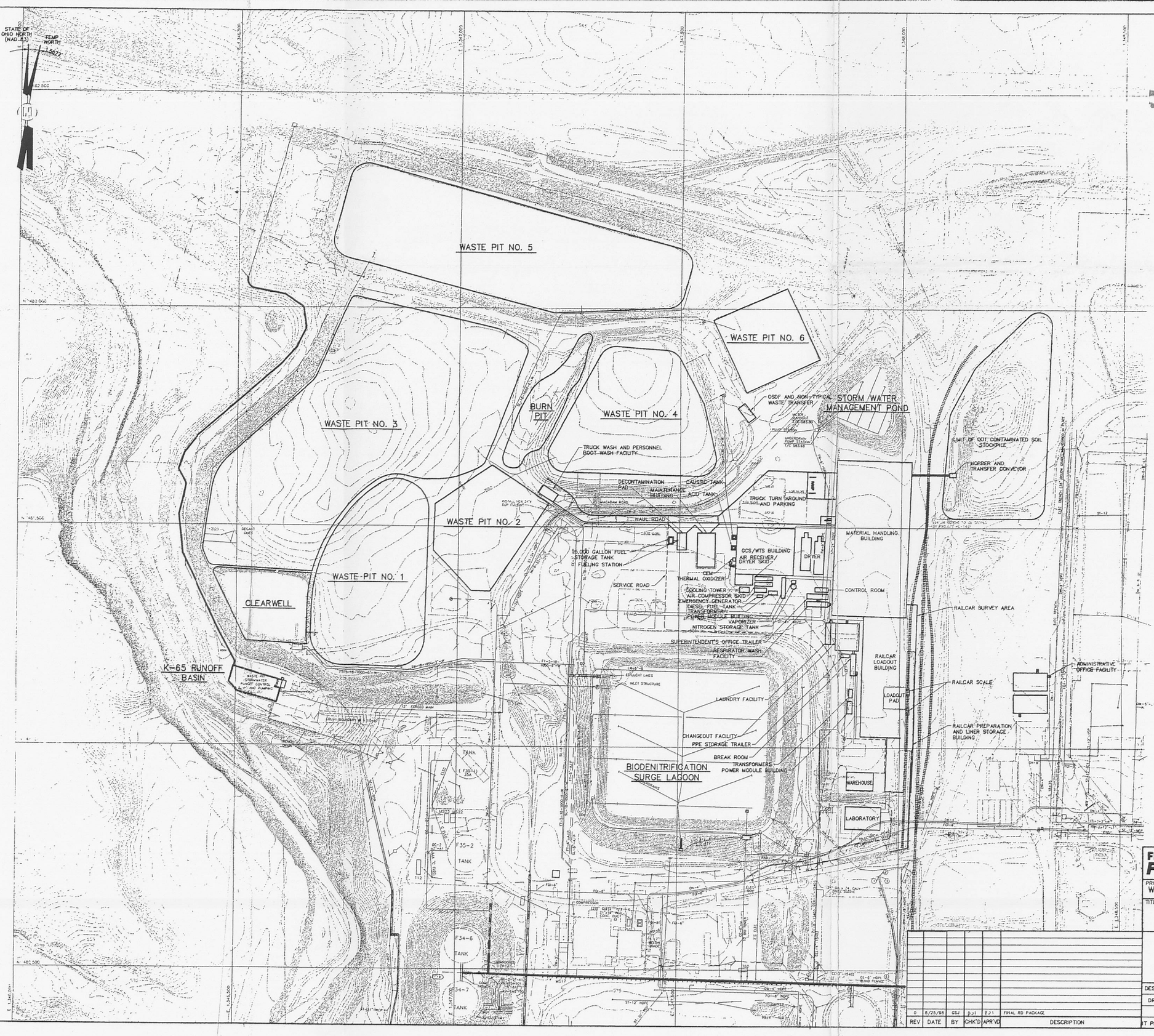

FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

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FIGURE 1-1

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	5/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

FLUOR DANIEL FERNALD — WASTE PITS REMEDIAL ACTION PROJECT (WPRAP), FERNALD, OHIO, FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

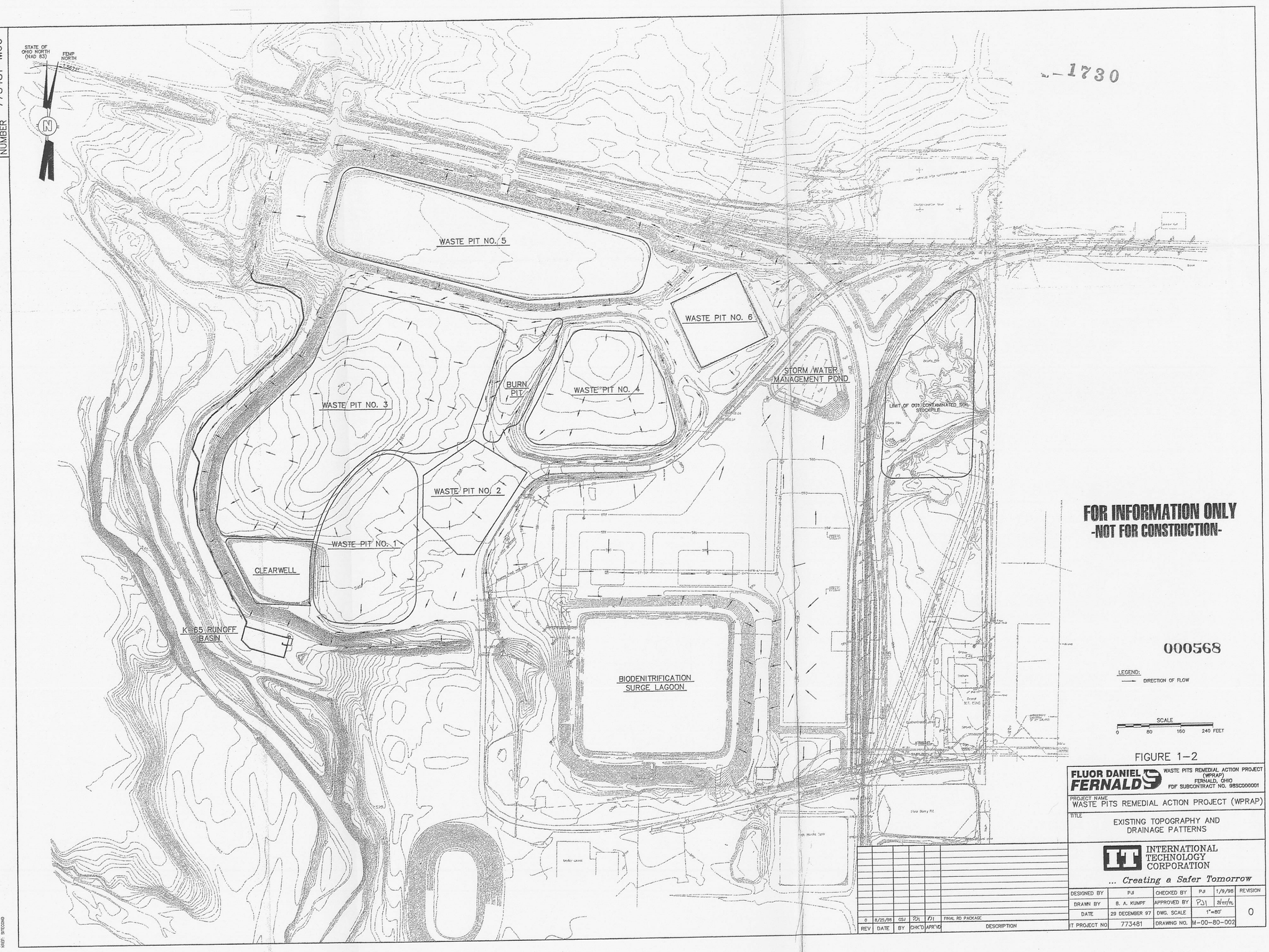
TITLE: OVERALL SITE FACILITIES MAP

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	9/Dec/98	0
DATE	29 DECEMBER 97	DWG. SCALE	1"=80'		
IT PROJECT NO	773481	DRAWING NO.	M-00-02-001		

28 MAY 98 10:21 9903 SITE COND

DRAWING NUMBER 773481-M60



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LEGEND:
—— DIRECTION OF FLOW

SCALE
0 80 160 240 FEET

FIGURE 1-2

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

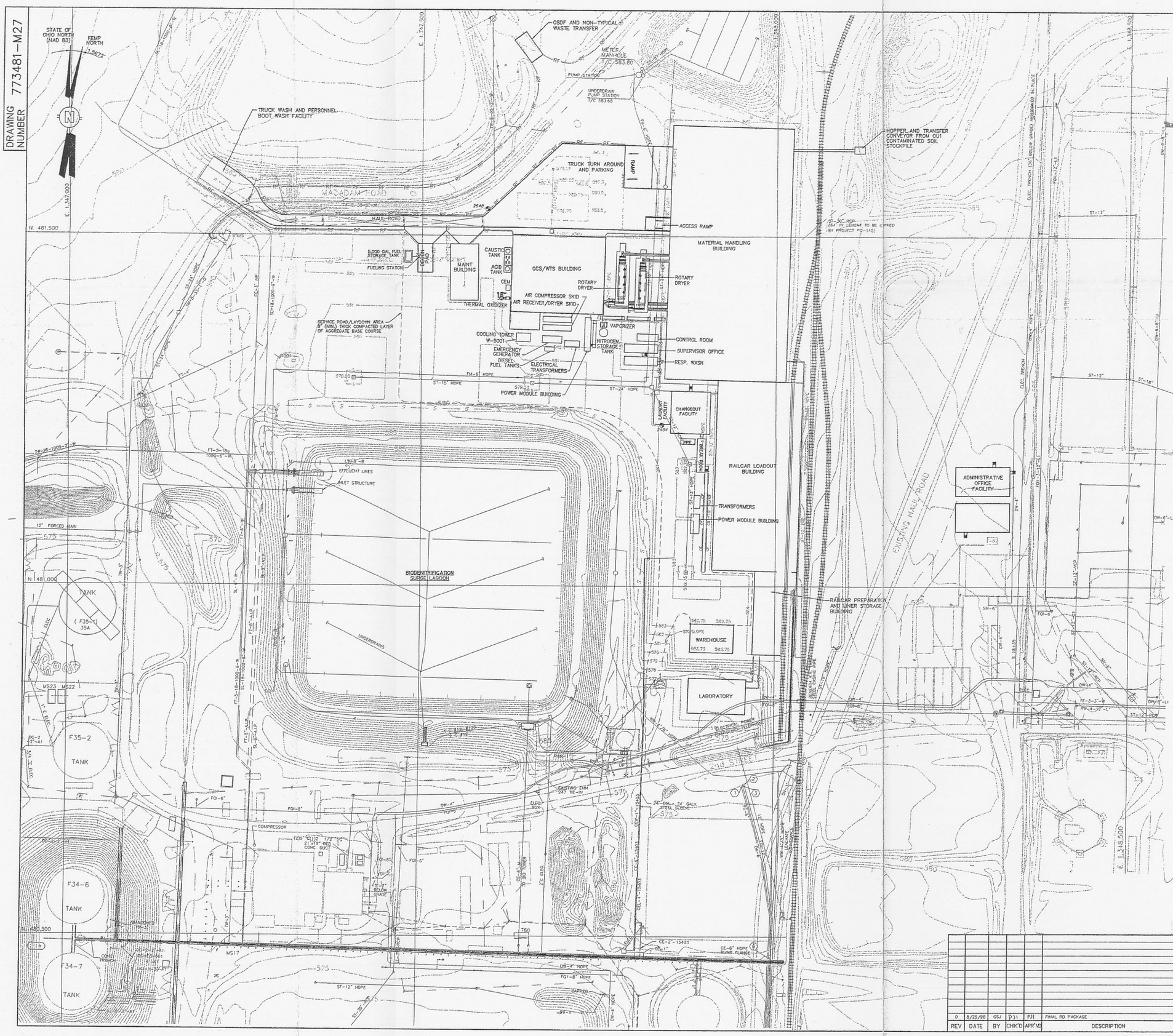
TITLE
EXISTING TOPOGRAPHY AND DRAINAGE PATTERNS

INTERNATIONAL TECHNOLOGY CORPORATION
... *Creating a Safer Tomorrow*

DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	2/27/98	0
DATE	29 DECEMBER 97	DWG. SCALE	1"=80'		
IT PROJECT NO	773481	DRAWING NO.	M-00-80-002		

29 MAR 98
23:30
WEST SECOND

DRAWING NUMBER 773481-M27



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-NOT FOR CONSTRUCTION-

LEGEND:
— CF — CONSTRUCTION FENCE
— RF — RADIOLOGICAL FENCE

000567

FIGURE 1-3

FLUOR DANIEL FERNALD — WASTE PITS REMEDIAL ACTION PROJECT (WPRAP) FERNALD, OHIO FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: SITE FACILITIES LAYOUT

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

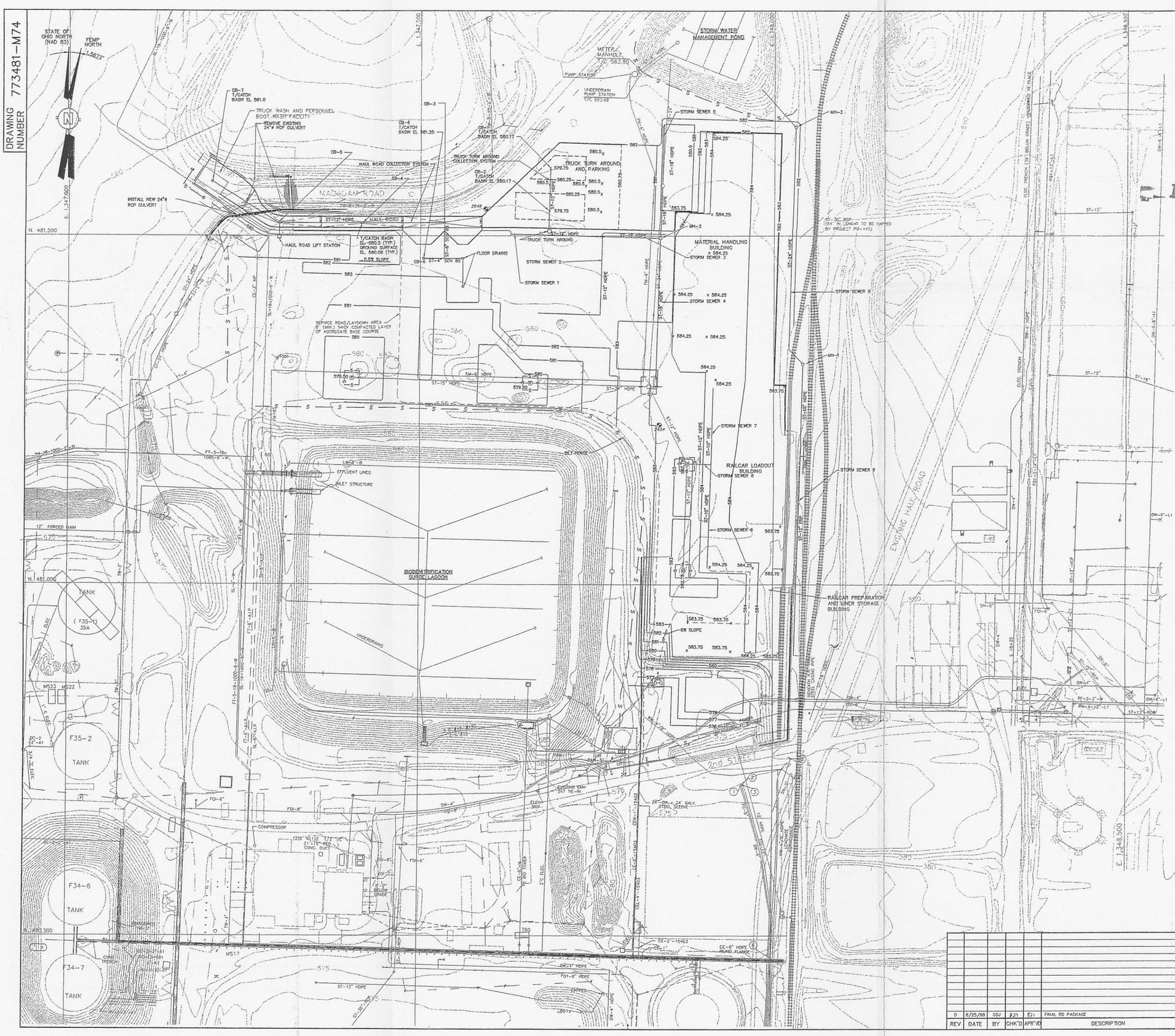
REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

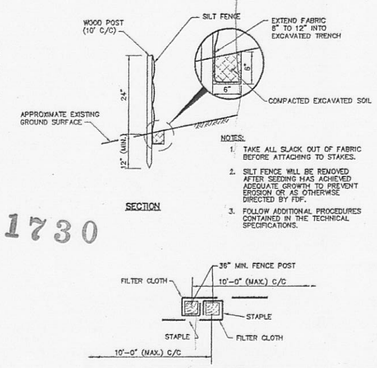
DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	8/25/98
DATE	19 DECEMBER 97	DWG. SCALE	1"=50'	
IT PROJECT NO.	773481	DRAWING NO.	M-00-02-002	

REVISION: 0

4/30/98 0500 WBET EXISTING

DRAWING NUMBER 773481-M74





NOTES:

1. TAKE ALL SLACK OUT OF FABRIC BEFORE ATTACHING TO STAKES.
2. SILT FENCE WILL BE REMOVED AFTER SEEDING HAS ACHIEVED ADEQUATE GROWTH TO PREVENT EROSION OR AS OTHERWISE DIRECTED BY FDF.
3. FOLLOW ADDITIONAL PROCEDURES CONTAINED IN THE TECHNICAL SPECIFICATIONS.

TYPICAL SILT FENCE INSTALLATION

NOT TO SCALE

FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

000566

LEGEND:

- NEW CULVERT
- CB-3 PROPOSED CATCH BASIN
- EXISTING CATCH BASIN
- ST-12" HDPE PROPOSED STORM WATER LINE
- ST-24" HDPE EXISTING STORM WATER LINE
- S SILTFENCE
- EXISTING MANHOLE
- PROPOSED MANHOLE

FIGURE 4-1

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

FLUOR DANIEL FERNALD — WASTE PITS REMEDIAL ACTION PROJECT (WPRAP), FERNALD, OHIO, FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: SITE GRADING PLAN

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PJI	CHECKED BY	PJI	6/19/98	REVISION
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	8/25/98	0
DATE	19 DECEMBER 97	DWG. SCALE	1"=50'		
IT PROJECT NO.	773481	DRAWING NO.	M-00-80-001		

8/13/98 GSJ EXISTING XREF

1730

FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

LEGEND:

- K-65 STORMWATER BASIN (150,973 GALLONS)
- STORMWATER MANAGEMENT POND (645,305 GALLONS)
- PADDY'S RUN (171,518 GALLONS)
- CLEARWELL (125,571 GALLONS)
- DIRECTION OF FLOW
- CF — CONSTRUCTION FENCE
- RF — RADIOLOGICAL FENCE

000307

NOTE:

RUNOFF VOLUMES ARE BASED ON 25-YEAR, 24-HOUR STORM EVENT OF 4.8 INCHES.

4/30/98
0500
XREF: EXISTING

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

FIGURE 3-2

FLUOR DANIEL FERNALD — WASTE PITS REMEDIAL ACTION PROJECT (WPRAP) FERNALD, OHIO FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

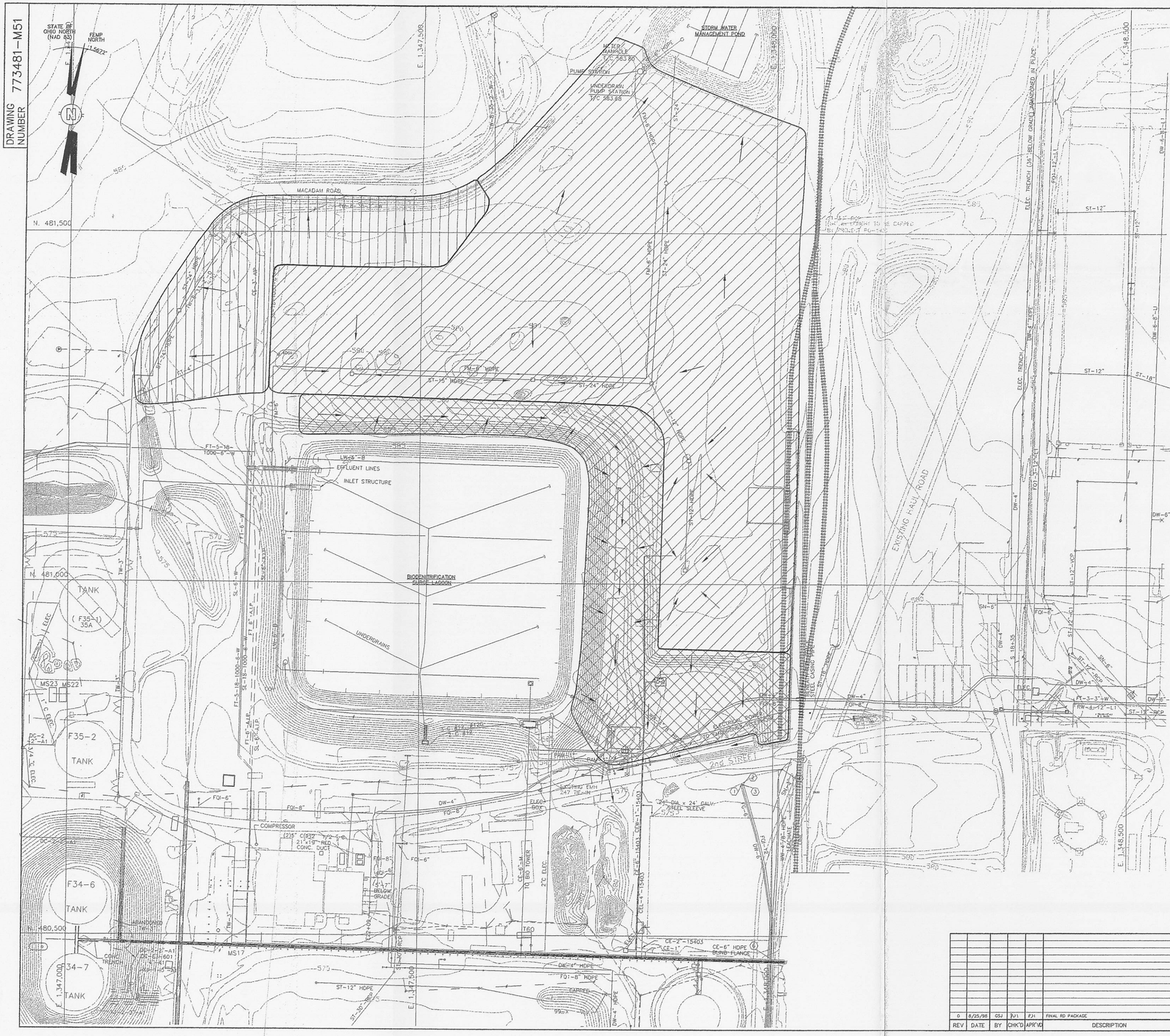
TITLE
POSTCONSTRUCTION
STORM WATER MANAGEMENT

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	8/26/98	0
DATE	19 DECEMBER 97	DWG. SCALE	1"=50'		
IT PROJECT NO.	773481	DRAWING NO.	M-00-80-011		

DRAWING NUMBER 773481-M51

1730



FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

LEGEND:

- K-65 STORMWATER BASIN (120,920 GALLONS)
- STORMWATER MANAGEMENT POND (544,630 GALLONS)
- PADDY'S RUN (170,370 GALLONS)
- DIRECTION OF FLOW

NOTE:

RUNOFF VOLUMES ARE BASED ON 25-YEAR, 24-HOUR STORM EVENT OF 4.8 INCHES.

000306

SCALE
50 0 50 100 FEET

FIGURE 3-1

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE
PRECONSTRUCTION
STORM WATER MANAGEMENT

INTERNATIONAL TECHNOLOGY CORPORATION

... Creating a Safer Tomorrow

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

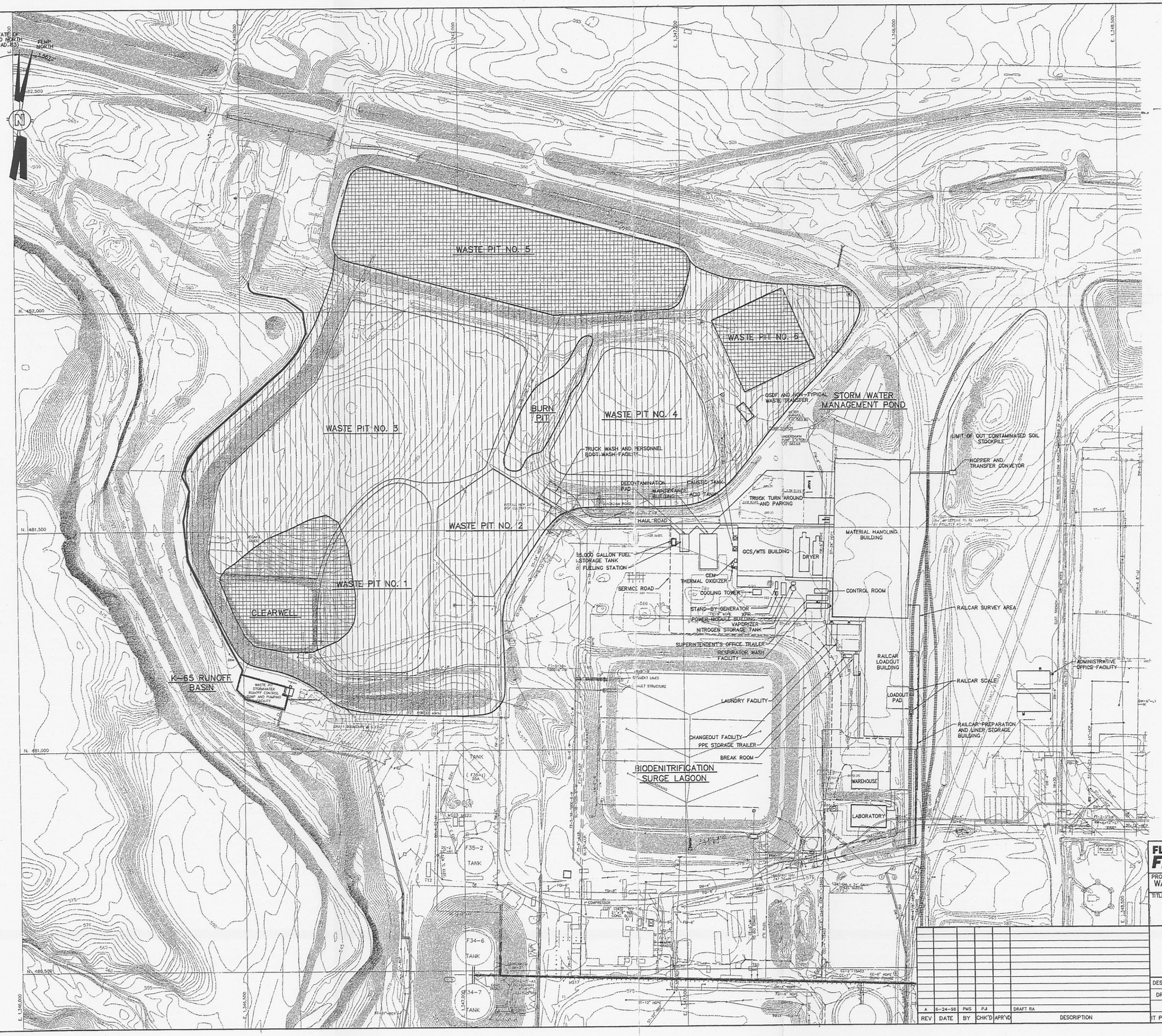
DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	8/25/98
DATE	23 DECEMBER 97	DWG. SCALE	1"=50'	
IT PROJECT NO	773481	DRAWING NO.	M-00-80-010	

REVISION 0

5-29-98
L:\A\A\A\A\
XREF: EXISTING

DRAWING NUMBER 773481-M111

1730



LEGEND:

- K-65 STORMWATER BASIN (1,938,296 GALLONS)
- CLEARWELL (768,074 GALLONS)

000305

SCALE

0 80 160 240 FEET

FIGURE 3-3

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
A	6-24-98	PMS	PJI		DRAFT RA

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: WASTE PIT AREA PRE-EXCAVATION STORM WATER MANAGEMENT

INTERNATIONAL TECHNOLOGY CORPORATION

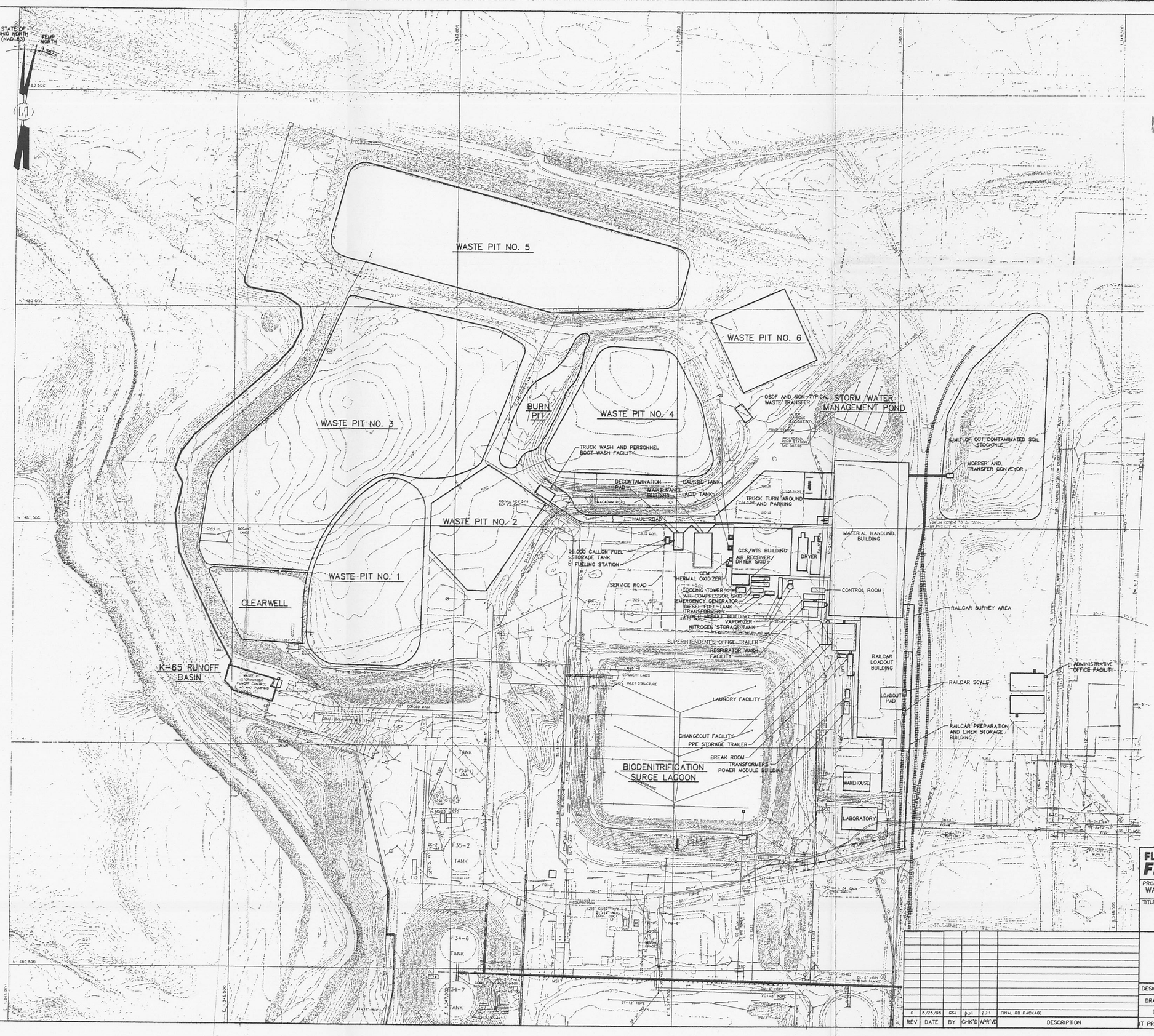
... Creating a Safer Tomorrow

DESIGNED BY	PMS	CHECKED BY	PJI	1/9/98
DRAWN BY	R. WEIBLE	APPROVED BY		
DATE	19 JUNE 98	DWG. SCALE	1"=80'	
IT PROJECT NO.	773481	DRAWING NO.	M-90-80-012	

REVISION: A

6-10-98
2:45 PM
WEST SYECOND

DRAWING NUMBER 773481-M71



E-1730

FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

000304

FIGURE 1-1

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

FLUOR DANIEL FERNALD
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: OVERALL SITE FACILITIES MAP

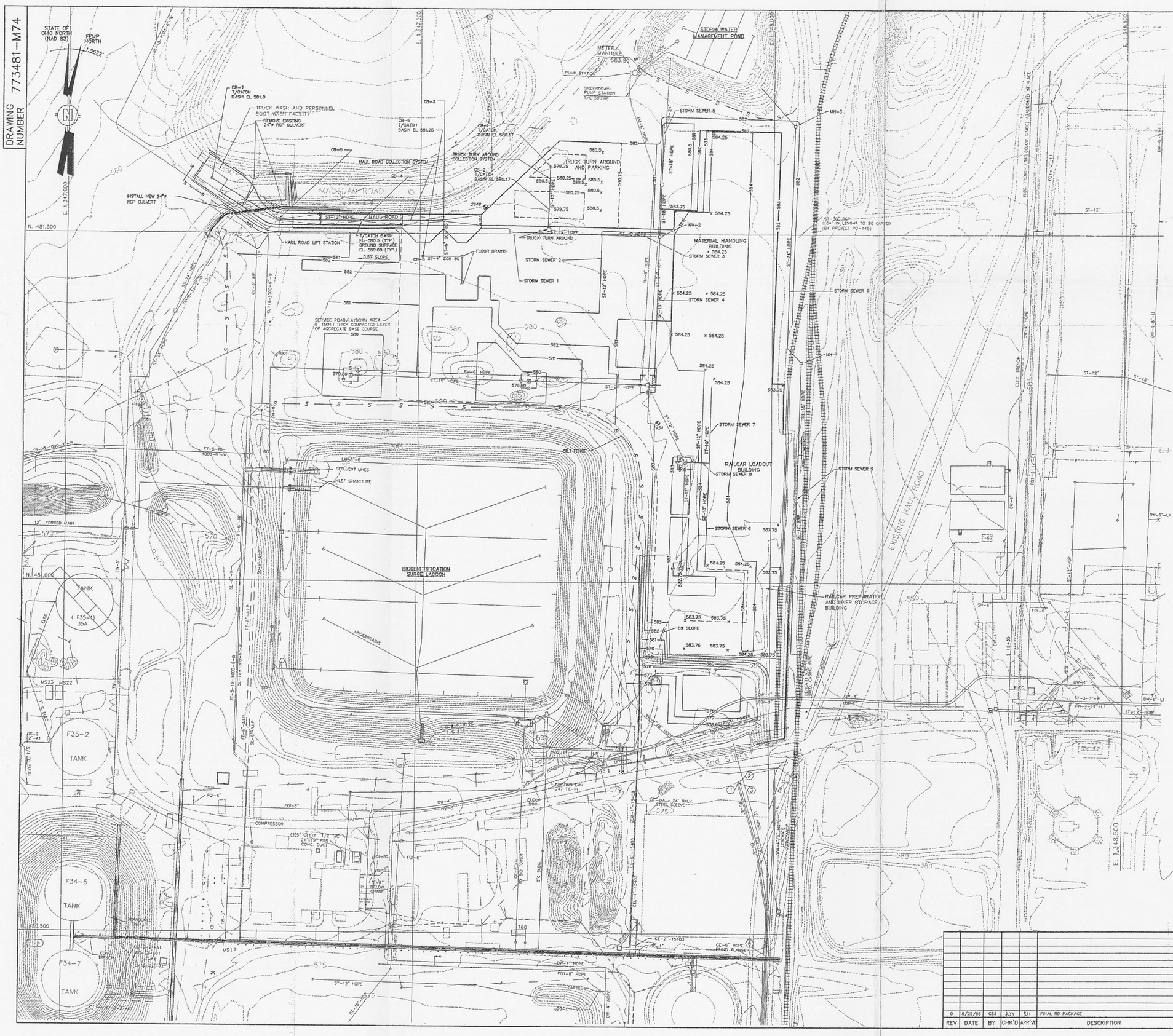
INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

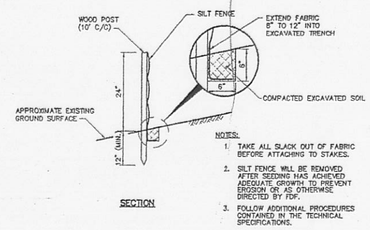
DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	9/25/98
DATE	29 DECEMBER 97	DWG. SCALE	1"=80'	
IT PROJECT NO	773481	DRAWING NO.	M-00-02-001	

REVISION 0

28 MAY 98 10:37 AM XREF SITECOND

DRAWING NUMBER 773481-M74



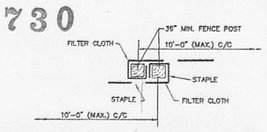


SECTION

NOTES:

1. TAKE ALL SLACK OUT OF FABRIC BEFORE ATTACHING TO STAKES.
2. SILT FENCE WILL BE REMOVED AFTER SEEDING HAS ACHIEVED ADEQUATE GROWTH TO PREVENT EROSION OR AS OTHERWISE DIRECTED BY FDF.
3. FOLLOW ADDITIONAL PROCEDURES CONTAINED IN THE TECHNICAL SPECIFICATIONS.

1730



JOINING TWO ADJACENT SILT FENCE SECTIONS

TYPICAL SILT FENCE INSTALLATION

NOT TO SCALE

FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

000303

LEGEND:

- NEW CULVERT
- CB-3 PROPOSED CATCH BASIN
- EXISTING CATCH BASIN
- ST-12" HDPE PROPOSED STORM WATER LINE
- ST-24" HDPE EXISTING STORM WATER LINE
- S SILTFENCE
- EXISTING MANHOLE
- PROPOSED MANHOLE

FIGURE 4-1

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: SITE GRADING PLAN

INTERNATIONAL TECHNOLOGY CORPORATION

... Creating a Safer Tomorrow

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

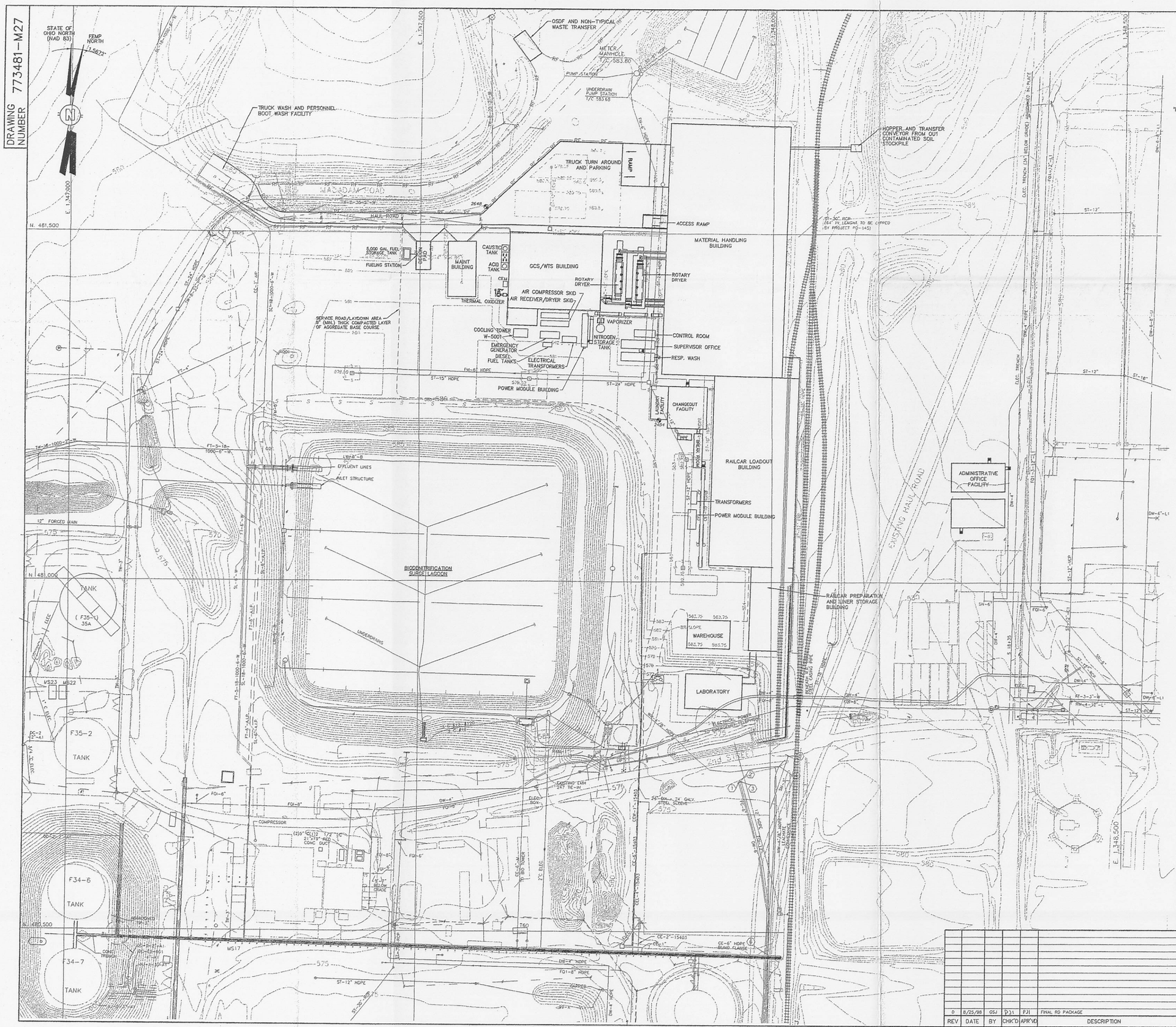
DESIGNED BY	PJI	CHECKED BY	PJI	6/19/98
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	8/25/98
DATE	19 DECEMBER 97	DWG. SCALE	1"=50'	
IT PROJECT NO	773481	DRAWING NO.	M-00-80-001	

REVISION: 0

8/25/98
8:53:00
XREF: EXISTING

DRAWING NUMBER 773481-M27

1730



FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

LEGEND:
— CF — CONSTRUCTION FENCE
— RF — RADIOLOGICAL FENCE

000302

FIGURE 1-3

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: SITE FACILITIES LAYOUT

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	OSJ	PJI	PJI	FINAL RD PACKAGE

DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	8/25/98	0
DATE	19 DECEMBER 97	DWG. SCALE	1"=50'		
IT PROJECT NO	773481	DRAWING NO.	M-00-02-002		

6/30/98
XREF: EXISTING

DRAWING NUMBER 773481-M60

FIGURE 1-2

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE
EXISTING TOPOGRAPHY AND DRAINAGE PATTERNS

INTERNATIONAL TECHNOLOGY CORPORATION
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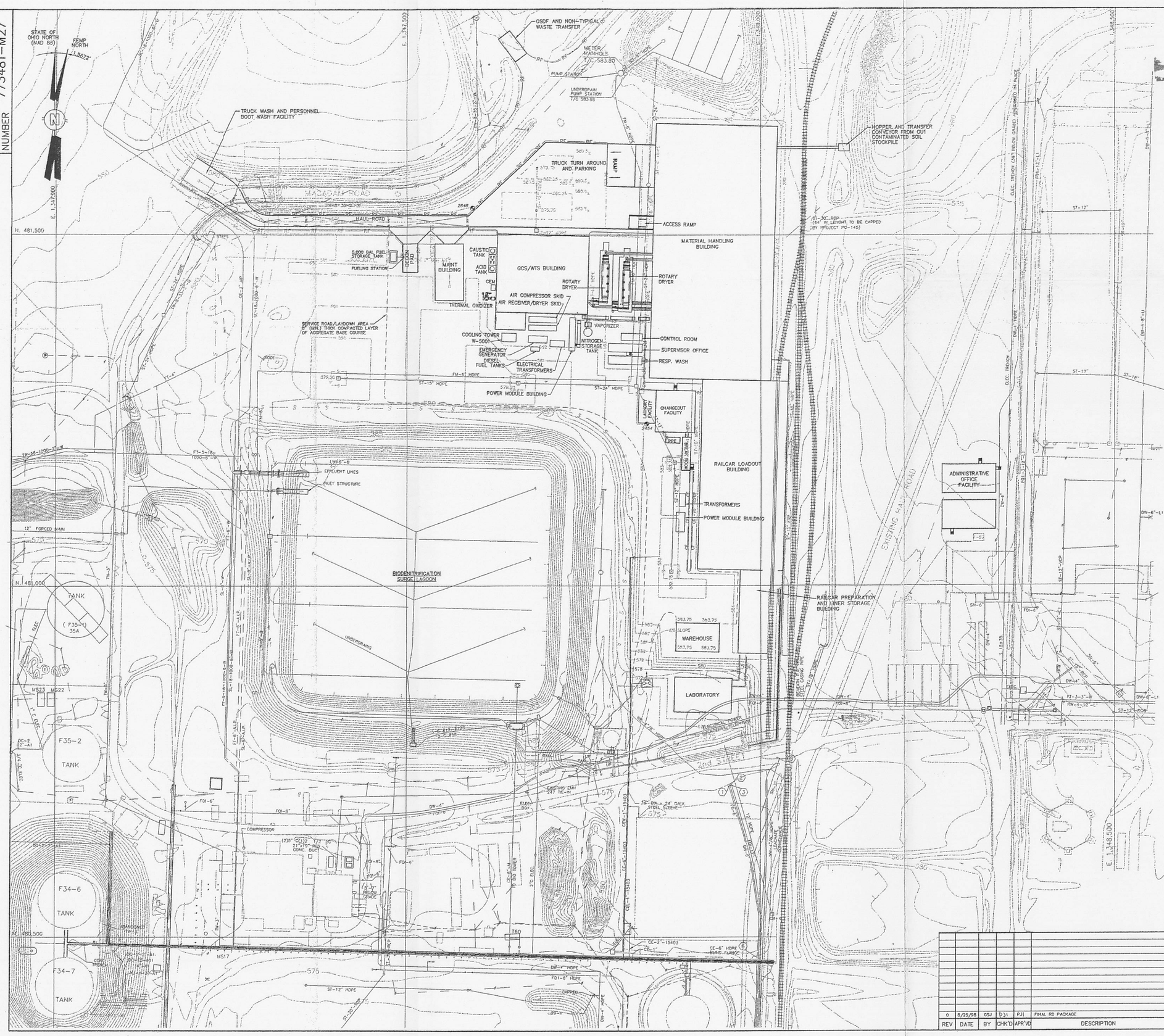
REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	2/25/98	0
DATE	29 DECEMBER 97	DWG. SCALE	1"=80'		
IT PROJECT NO	773481	DRAWING NO.	M-00-80-002		

28 MAR 98
08:00
XREF: SITECOND

DRAWING NUMBER 773481-M27

1730



FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

LEGEND:
— CF — CONSTRUCTION FENCE
—RF— RADIOLOGICAL FENCE

000116

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

FLUOR DANIEL FERNALD — WASTE PITS REMEDIAL ACTION PROJECT (WPRAP), FERNALD, OHIO, FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: SITE FACILITIES LAYOUT

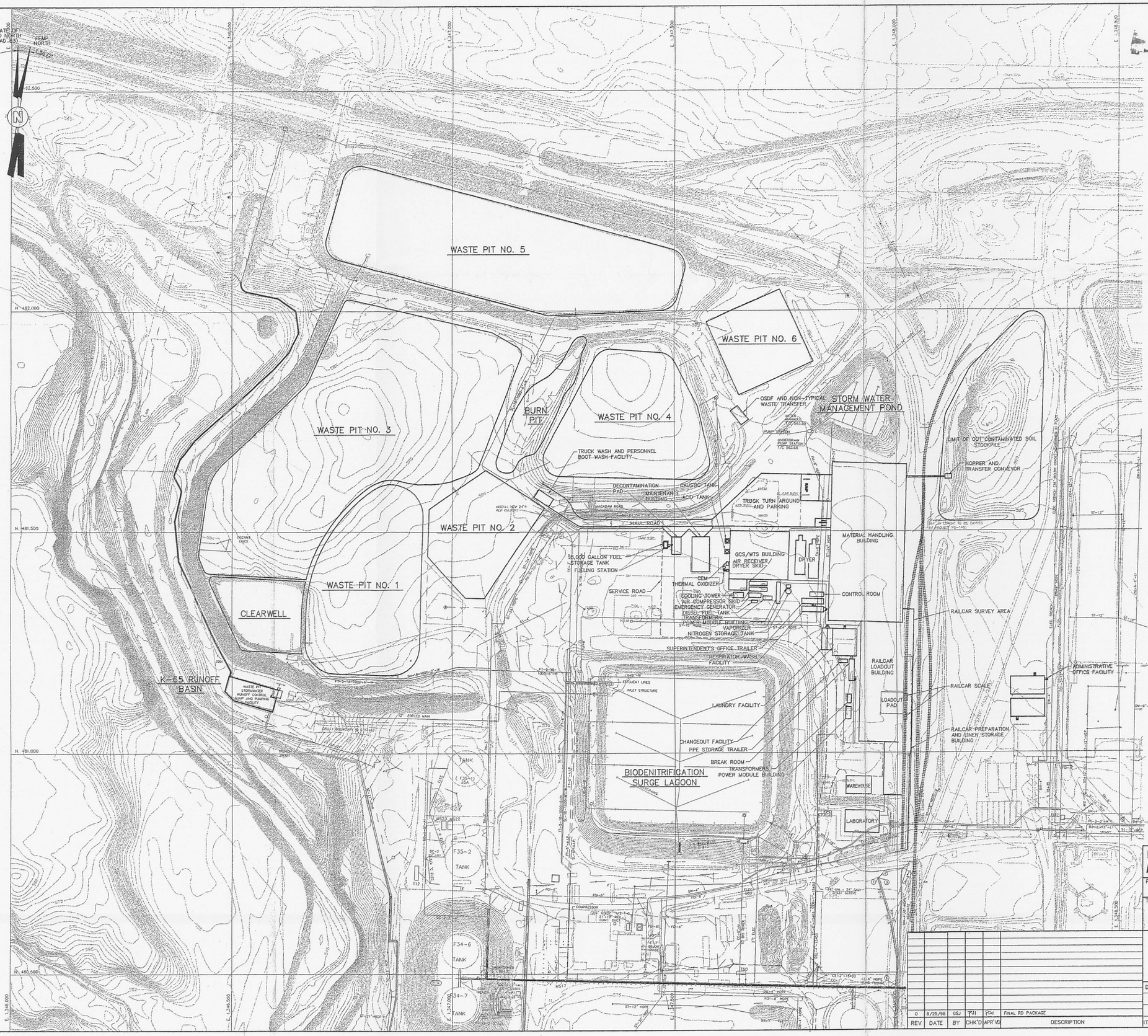
INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	8/25/98	0
DATE	19 DECEMBER 97	DWG. SCALE	1"=50'		
IT PROJECT NO	773481	DRAWING NO.	M-00-02-002		

4/30/98 GSJ XREF: EXISTING

DRAWING NUMBER 773481-M53

1730



FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

000115

SCALE
0 80 160 240 FEET

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE
OVERALL SITE FACILITIES MAP

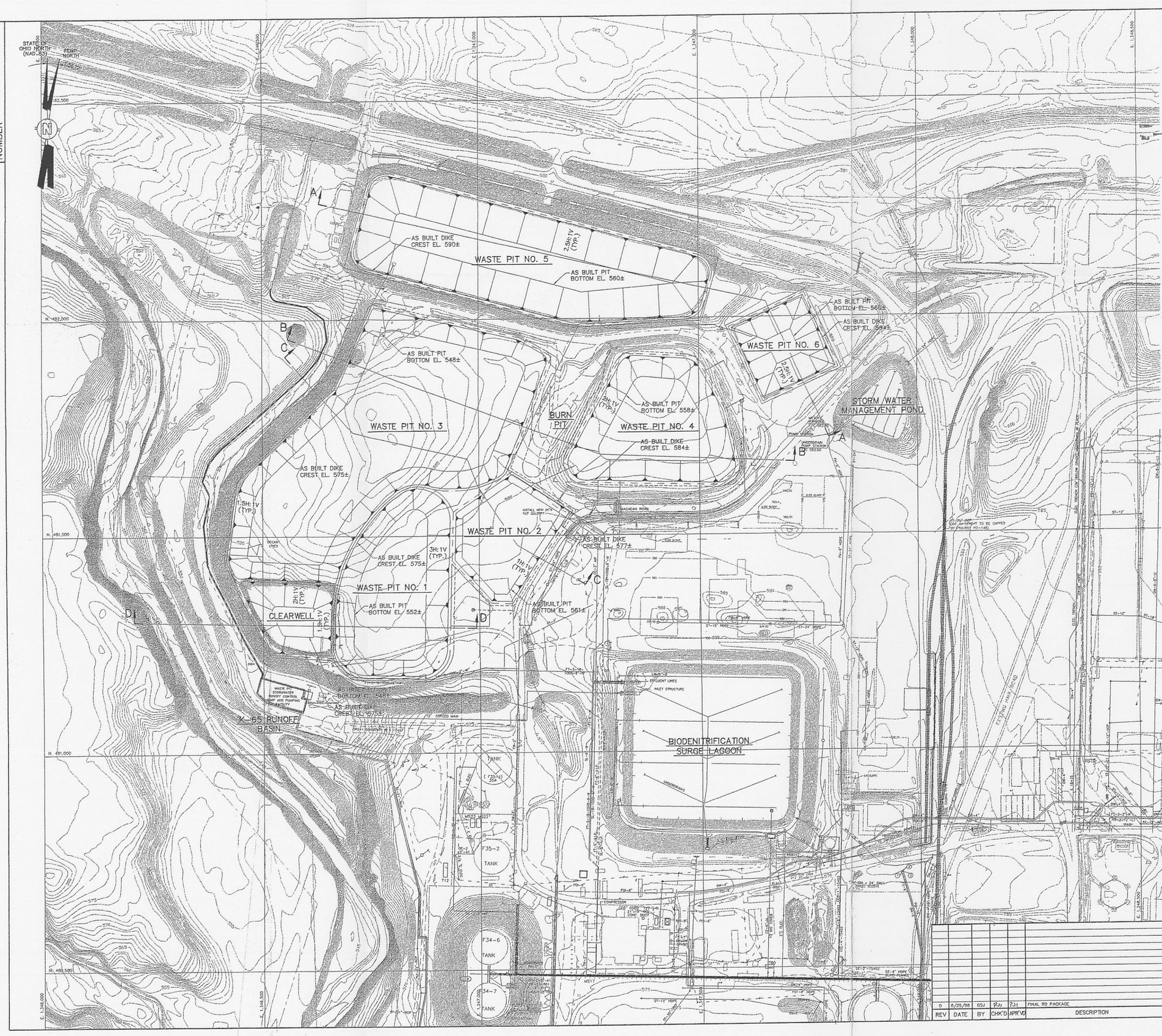
INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	8/25/98	0
DATE	29 DECEMBER 97	DWG. SCALE	1"=80'		
IT PROJECT NO	773481	DRAWING NO.	M-00-02-001		

29 MAY 98
12:35
XREF: SITECOND

DRAWING NUMBER 773481-M16

1730



FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

NOTES:

1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM FEMP SITE PROVIDED DATA FROM THE DOCUMENTS LISTED BELOW.
   AERIAL TOPOGRAPHY, 1992
   FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS
2. THE GEOMETRIC CONFIGURATIONS, THE LINER THICKNESSES, AND THE BOTTOM ELEVATIONS OF THE WASTE PITS WERE DETERMINED FROM THE BEST AVAILABLE DATA AT THIS TIME. THIS DATA WAS GATHERED FROM CONSTRUCTION, AS-BUILT, SURVEY, AND FEASIBILITY STUDY DRAWINGS (1/31/92, REV. 1), AND FROM THE EXISTING PLANT ENGINEERING FILES. THE DIKE CREST SHOWN AROUND THE WASTE PITS REPRESENTS THOSE BUILT AT THE TIME OF CONSTRUCTION. MOST OF THE DIKES HAVE BEEN BURIED WITH COVER MATERIAL OF DIFFERENT THICKNESSES.
3. THE GEOMETRIC CONFIGURATION OF THE BURN PIT HAS BEEN DETERMINED FROM THE SITE AS-BUILT SURVEY OF THE BURN PIT. DIKE DEPTH AND SLOPES OF THE BURN PIT ARE NOT KNOWN.
4. FOR SECTIONS A-A THROUGH D-D, SEE DRAWING NO. M-05-82-002.

SCALE
0 80 160 240 FEET

000066

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

FLUOR DANIEL FERNALD

WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)
FERNALD, OHIO
FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME
WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE
WASTE PIT AREA
EXISTING CONDITIONS
PLAN VIEW

IT INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	PJI	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	B. A. KUMPF	APPROVED BY	PJI	8/25/98	0
DATE	29 DECEMBER 97	DWG. SCALE	1"=80'		
IT PROJECT NO.	773481	DRAWING NO.	M-05-82-001		

05-27-98
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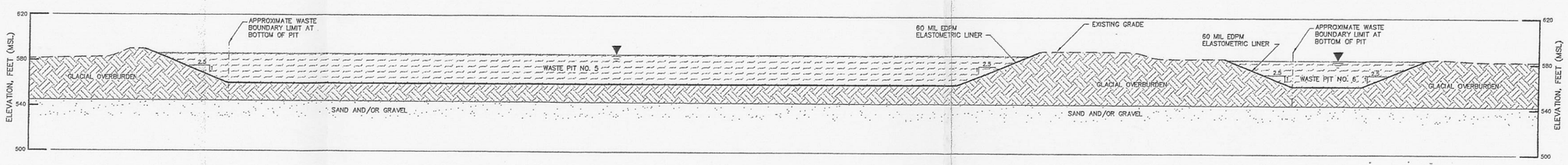
XREF: TBTCOND

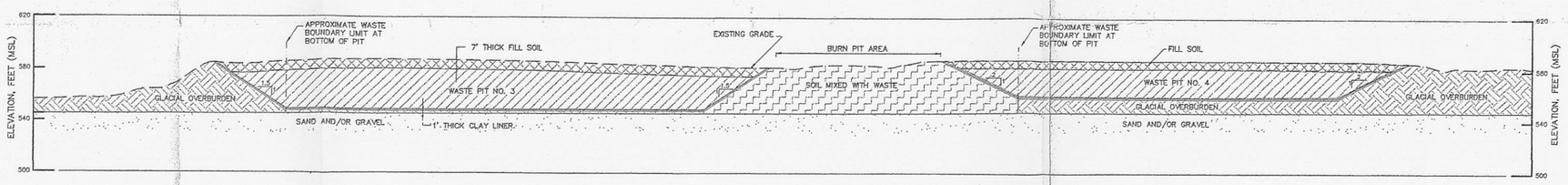
DRAWING NUMBER 773481-M15



CROSS SECTION A–A

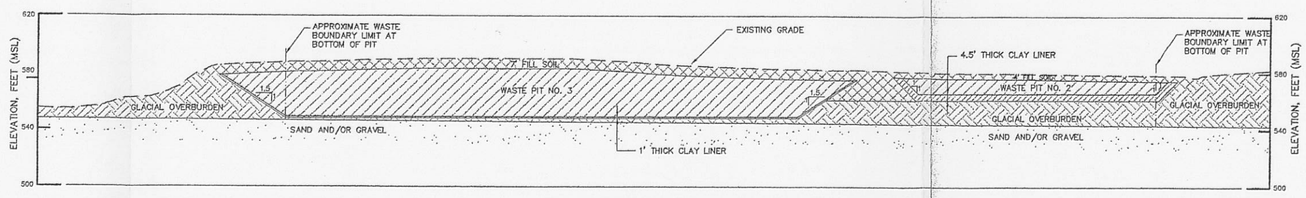
SCALE
0 40 80 120 FEET

1730



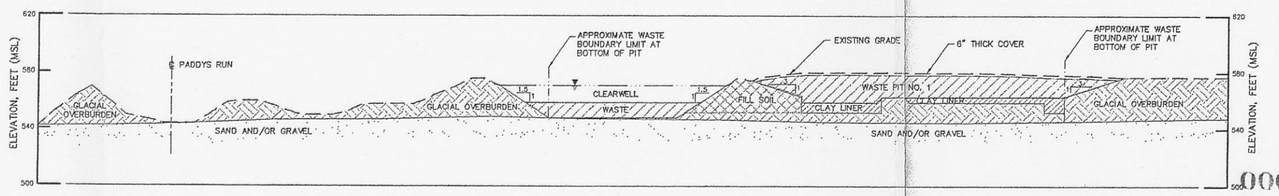
CROSS SECTION B–B

SCALE
0 40 80 120 FEET



CROSS SECTION C–C

SCALE
0 40 80 120 FEET



CROSS SECTION D–D

SCALE
0 40 80 120 FEET

000065

NOTES:

1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM FEMP SITE PROVIDED DATA FROM THESE DOCUMENTS:
   - –EXISTING SITE DATA SOURCE (IN PLANT FILES)
   - –AERIAL PHOTOGRAPHY, 1992
   - –FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS
2. 2H : 1V IS MINIMUM SLOPE PERMISSIBLE FOR SAFE EXCAVATION OVER AN EXTENDED TIME PERIOD. ACTUAL SLOPE WILL VARY DEPENDENT ON SLOPE CONDITIONS ENCOUNTERED. (TYPICAL TO ALL PITS).
3. THE GEOMETRIC CONFIGURATIONS, THE LINER THICKNESS, AND THE BOTTOM ELEVATIONS OF THE WASTE PITS WERE DETERMINED FROM THE BEST AVAILABLE DATA AT THIS TIME. THIS DATA WAS GATHERED FROM CONSTRUCTION, AS–BUILT, SURVEY, AND FEASIBILITY STUDY DRAWINGS (REV. 1), ALONG WITH ENGINEERING FILES AND THE 1992 AERIAL TOPOGRAPHY.
4. THE BORING LOGS SHOWN ON PARSONS SKETCH SK–G–01221 PROVIDED THE SUBSURFACE PROFILES.
5. BECAUSE OF INADEQUATE INFORMATION, THE BURN PIT AREA LOCATED BETWEEN WASTE PITS 3 AND 4 IS SHOWN AS SOIL MIXED WITH WASTE.
6. FOR PLAN LOCATION OF SECTIONS, SEE DRAWING NO. M–05–82–001.

FOR INFORMATION ONLY
-NOT FOR CONSTRUCTION-

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	8/25/98	GSJ	PJI	PJI	FINAL RD PACKAGE

FLUOR DANIEL FERNALD — WASTE PITS REMEDIAL ACTION PROJECT (WPRAP), FERNALD, OHIO, FDF SUBCONTRACT NO. 98SC000001

PROJECT NAME: WASTE PITS REMEDIAL ACTION PROJECT (WPRAP)

TITLE: WASTE PIT AREA EXISTING CONDITIONS CROSS SECTIONS A–A THROUGH D–D

INTERNATIONAL TECHNOLOGY CORPORATION
... Creating a Safer Tomorrow

DESIGNED BY	LIU LIN	CHECKED BY	PJI	1/9/98	REVISION
DRAWN BY	RAW	APPROVED BY	PJI	8/25/98	
DATE	11-18-97	DWG. SCALE	1" = 40'		0
IT PROJECT NO.	773481	DRAWING NO.	M–05–82–002		

06/27/98 2:02 PM