5981

Department of Energy

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SEP 9 2005

Mr. James A. Saric, Remedial Project Manager
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Region V-SRF-5J
77 West Jackson Boulevard
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DOE-0325-05

Mr. Thomas Schneider, Project Manager
Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

SILOS 1 AND 2 PROJECT TRANSPORTATION AND DISPOSAL PLAN 40750-PL-0018, REV.2; SILOS 3 PROJECT TRANSPORTATION AND DISPOSAL PLAN 40430PL-0008, REV.5

The intent of this correspondence is to provide for additional staging of Silos waste as a contingency for unforeseen events such as funding impacts. As a result of competing priorities, the site has limited funding to continue shipping silos waste this fiscal year. This request will allow Fluor Fernald to stage additional Silos shipping containers until October 1, 2005. It is expected that all of the container backlog will be eliminated by November 30, 2005.

Attached for your review and approval are revisions to the above referenced documents. Also attached is a revision to the NHASP for the Silos 1&2 Projects. These revisions have been made to provide for additional safe staging of Silos material for transportation if shipments to Waste Control Specialists or Envirocare are temporarily interrupted because of unforeseen circumstances. The documents provide for an additional area for Silos 1&2 container staging and an increase in staging from 180 containers to 440 containers. Assuming 20 containers produced per day and a 13 – 15 day turn around time on the trailers, it will take 30 – 60 days to eliminate the backlog of containers from the Silos 1&2 project. For Silo 3, the Transportation and Disposal Plan has been changed to allow staging for more than 14 days because of unforeseen circumstances including funding. The Silo 3 backlog is expected to take between 15 – 30 days to eliminate. For Silo 3, most of the production will be completed in September. No change in the NHASP is required for Silo 3 staging. Silos 3 staging areas will not change.

Curtailing or stopping production of Silos 1&2 containers has been considered. This action is not desirable for a number of reasons. It has taken Fluor Fernald four months to bring the project to a consistent close to "steady state" level of production. Any stoppage of the Silos 1&2 and for that matter Silos 3 production would take months to overcome and re-establish the current production rates. The current momentum would be lost. Silo 1&2 production is directly teid to the Project Completion critical path.

Fluor Fernald schedules work to maximize the use of funding received. Every year more work is scheduled than funding provides. This management concept results in innovations and efficiencies. Throughout the year actual costs of work performed are carefully examined when determining the work to be performed over the remainder of the year. Bi-weekly meetings are held to review the work completed on every project and to estimate the cost of completion. Work efforts are adjusted to maximize the work to be completed. The baseline has been increased to include increases in waste pit material and wastes to be shipped off site. Costs of managing the Silos Projects have increased for many reasons including the complexity of the operations, the additional time needed to complete the startup, and changes in grout mix required to calibrate waste loading.

Based on actual expenditures at the end of July, reductions in work were made that were believed to be adequate to manage the project within the funding provided. These changes included: delaying the shipment of 12 unit trains (these 12 include unit trains that had already been eliminated beginning in June with early work reductions.) of waste to Envirocare; reducing soils excavation and waste placement support, resulting in the delayed closure of the On-Site Disposal Facility (OSDF) until June 2006; additional reductions in workforce and other smaller reductions. It was believed that these reductions would reduce costs to be commensurate with the Fluor Fernald funding level.

Actual costs in August indicated that the reductions implemented were not adequate. Higher costs than projected were realized in soils and silos projects. Further reductions have been made and include: 1) Overtime expenditures have been reduced more than 50 percent across all programs including Silos and Soils; 2) Excavation, placement , restoration and decon will be working a mandated 4-10s schedule effective August 15, 2005 and reduced Building Trades Labor by more than 55; 3) Decontamination and Demolition reduced Building Trades Labor by 7; 4) Eliminated Wise Construction support of fencing removal and area turnover (7 additional Building Trades); and 5) all waste shipments other than silos have been put on hold.

The problem continues to be a serious one. As a result, a number of actions are being evaluated to reduce the impact of this shortfall of funding. We are prepared to specifically explain and illustrate the fiscal constraints and impacts that we are currently experiencing. The delay in shipping silo waste will defer into Fiscal year 2006 approximately $2,000,000 and can be accomplished without any impact on safety and public health protection.

The October shipping campaign will be a top site priority ahead of other site work. It is not expected that Silos shipping will be impacted in the next fiscal year even if the site funding appropriation is subject to a Continuing Resolution.

Even if production rates hit their maximum expected rate of 20 cans per day we expect to be back under 180 cans on site within 30-60 days into the new Fiscal year. This could be accelerated if the production rates stay at the current rate of 16 cans per day and further reduced if trailer turn around time is reduced from the current 15 days to 13 days as planned. We have considered the use of additional trailers to increase shipping rates in October; however, they cannot be fabricated in this short of a time frame.

Please find attached the various documents we discussed in our September 2, 2005 conference call related to actions required in order to submit the request to the agencies. As time is of the essence, your expedited review of the material will be greatly appreciated. We are prepared to respond to any and all inquiries related to this request.

If you have any questions or require additional information, please contact Johnny Reising at (513) 648-3139.

Sincerely,

Johnny Reising

for William J. Taylor
Director

FCP:Reising

Enclosures

cc w/enclosures:
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D. Carr, Fluor Fernald, Inc./MS1
D. Edwards, Fluor Fernald, Inc./MS84
AR Coordinator, Fluor Fernald, Inc./MS78
ECDC, Fluor Fernald, Inc./MS52-7

6

5981

SILO 3 PROJECT
TRANSPORTATION AND DISPOSAL PLAN

40430-PL-0008, REV. *6*

***September* 2005**

APPROVED BY:

Dennis J. Carr, Senior Project Director

Robert F. Schulten, Shipping and Receiving

Date

FERNALD CLOSURE PROJECT
FERNALD, OHIO

U.S. DEPARTMENT OF ENERGY

TABLE OF CONTENTS

1.0 INTRODUCTION **1**

1.1 PURPOSE AND SCOPE 1
1.2 PROJECT APPROACH 1

2.0 OFF-SITE TRANSPORTATION **2**

2.1 INTRODUCTION 2
2.2 DEPARTMENT OF TRANSPORTATION REQUIREMENTS 2
2.3 MATERIAL TRANSPORT 2
2.3.1 Routes *3*
2.3.2 Risk and Safety Requirements *3*
2.3.3 Shipping Requirements *4*

3.0 ON-SITE WASTE MANAGEMENT **4**

3.1 INTRODUCTION 4
3.2 WASTE CHARACTERIZATION 5
3.3 PACKAGING 5
3.4 STAGING AND INSPECTIONS 5
3.4 STAGING AND INSPECTIONS 6
3.5 CONTAINER MOVEMENTS 7
4.1 INTRODUCTION 7
4.2 NUCLEAR AND SYSTEMS SAFETY 7
4.3 OCCUPATIONAL SAFETY AND HEALTH 7
4.4 SAFETY PRECAUTIONS 8
4.5 RADIOLOGICAL PROTECTION 8
4.5.1 Access of Personnel *8*
4.6 SECURITY 9

5.0 EMERGENCY RESPONSE **9**

5.1 INTRODUCTION 9
5.1.1 Department of Energy Requirements *9*
5.2 FCP EMERGENCY RESPONSE PREPAREDNESS PLANS 9
5.3 EMERGENCY RESPONSE FOR THE FCP OFF-SITE SHIPMENTS 10
5.3.1 Motor Carriers *12*

6.0 WASTE DISPOSAL **12**

6.1 INTRODUCTION 12
6.2 SILO 3 MATERIAL QUANTITIES/CHARACTERISTICS 12
6.3.1 Shipment Receipt and Acceptance *13*
6.3.2 Disposal Operations *14*

FIGURES

FIGURE 3-1 SILO 3 PROJECT AREA LAYOUT **8**

APPENDICES

APPENDIX A SILO 3 MATERIAL LSA DETERMINATION (HM-230, EFFECTIVE OCTOBER 1, 2004 ..... **A**

RECORD OF ISSUE/REVISIONS

EFFECTIVE DATE	REV. NO.	DESCRIPTION
05/20/2004	0	New plan issued to describe transportation and disposal operations for Silo 3 material, comments by USEPA and OEPA incorporated.
07/07/2004	1	Section 2.3, 3rd paragraph, 2nd sentence, revised to add "actions to take in the event of severe weather." Third sentence of same section revised to indicate FCP access to the satellite tracking system. Section 4.2, deleted reference to IHASP. Section 5.3, 2nd paragraph revised to indicate notifications to state and tribal emergency response organizations and add reason for not providing individual shipment information.
2/15/2005	2	Revised plan issued to reflect disposal at Envirocare
2/23/2005	3	Revised to incorporate minor editorial revisions prior to USEPA / OEPA Review
3/4/05	4	Revision to Section 3 in response to comments from USEPA review
3/31/05	5	Revision to Section 2.3.1 to correct shipping route and to section 3.3 to reflect revised packaging configuration
9/15/05	*6*	*Revision to Section 3.4 to clarify limits for onsite staging*

ACRONYMS

ACEM	Activity Concentration for Exempt Material
AEA	Atomic Energy Act
AEDO	Assistant Emergency Duty Officer
ALEC	Activity Limit for Exempt Consignment
ASME	American Society of Mechanical Engineers
Bq	Becquerels
Bq/g	Becquerels per gram
CFR	Code of Federal Regulations
DOE	Department of Energy
DOT	Department of Transportation
EDO	Emergency Duty Officer
EMS	Emergency Management System
EOC	Emergency Operations Center
ERP	Emergency Response Plan
FCP	Fernald Closure Project
Fluor Fernald	Fluor Fernald, Inc.
HMR	Hazardous Material Regulations
IAEA	International Atomic Energy Agency
ILCR	Incremental Lifetime Cancer Risk
IP-2	Industrial Packaging-Type 2
ISMS	Integrated Safety Management System
ISO	International Standards Organization
LCF	Latent Cancer Fatalities
LSA	Low Specific Activity
MCEP	Motor Carrier Evaluation Program
MEF	Material Evaluation Form
NCP	National Contingency Plan
NHASP	Nuclear Health and Safety Plan
NRC	Nuclear Regulatory Commission
OU	Operable Unit
Ra-226	Radium 226
Ra-228	Radium 228
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RD/RA	Remedial Design/Remedial Action
RDP	Remedial Design Package
RI	Remedial Investigation

ROD	Record of Decision
RPP	Radiological Protection Program
RSPA	Research and Special Programs Administration
RWP	Radiological Work Permit
SPR	Safety Performance Requirement
SR	State Route
SRC	Safety Review Committee
TBq	Terabecquerels
TBq/g	Terabecquerels per gram
TEP	Transportation Emergency Plan
Th-230	Thorium 230
TSA	Trailer Staging Area
TSR	Transportation Safety Standards
US	United States
WAC	Waste Acceptance Criteria
WC	Waste Characterization

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

This plan describes transportation and disposal operations that will ensure safe and successful staging and transportation of Operable Unit 4 (OU4) Silo 3 material from the Fernald Closure Project (FCP) to Envirocare of Utah (Envirocare), as well as operations for receipt and disposal of the Silo 3 material at Envirocare. The mode of transportation for this material will be motor carrier.

This plan serves to: (1) describe the transportation logistics associated with Silo 3 material; and (2) generally describe operational aspects of transportation plans to demonstrate that Silo 3 material can be transported to the designated disposal site safely, and in accordance with applicable regulations.

Submittal of this Transportation and Disposal Plan complies with the requirements put forth in the Silo 3 Project Remedial Design/Remedial Action (RD/RA) Package (40430-RDP-0001, Revision 2, December 2003), which requires an operational description of the transportation and disposal of Silo 3 material, including on-site staging, logistics, packaging configuration, and selected mode of transportation to the selected disposal facility.

The Record of Decision (ROD) Amendment for Operable Unit (OU) 4 Silo 3 Remedial Actions (40430-RP-0026, August 2003), requires treatment to the extent practical, by addition of a chemical stabilization reagent and a reagent to reduce dispersability.

As documented in this Transportation and Disposal Plan, shipments of Silo 3 material to Envirocare will be performed exclusively by truck. The current transportation and disposal approach assumes the Silo 3 material will be conditioned and packaged in 96 ft3, soft-sided containers, loaded into International Standards Organization (ISO) containers, and transported by truck to Envirocare for disposal.

Since this plan is specific to transportation and disposal of Silo 3 material at Envirocare, disposal at any other government or commercial site will require a revision of this Transportation and Disposal Plan to reflect the receiving facility's license and permits.

1.2 PROJECT APPROACH

Fluor Fernald is responsible for material retrieval, conditioning, and packaging; selection of the disposal facility and mode of transportation; analysis of the Silo 3 material for compliance with the disposal facility's Waste Acceptance Criteria (WAC); loading Silo 3 material for shipment; and transporting the Silo 3 material to the disposal facility. Plans and requirements for completing this scope are described in the Silo 3 Project Remedial Design/Remedial Action Package (40430-RDP-0001, Rev. 2, December 2003).

2.0 OFF-SITE TRANSPORTATION

2.1 INTRODUCTION

The FCP will conduct its operations in compliance with applicable federal, state, local, and tribal requirements governing materials transportation, unless exemptions or alternatives are approved in accordance with Department of Transportation (DOT) regulations.

2.2 DEPARTMENT OF TRANSPORTATION REQUIREMENTS

DOT regulations, under 49 Code of Federal Regulations (CFR) Part 173.403, categorize low specific activity (LSA) material into three classifications: LSA-I, LSA-II, and LSA-III. To be considered LSA material, the material need only meet criterion under one of the classifications. Evaluation of the radiological content of the Silo 3 material indicates this material meets one criterion for LSA-II material. Specifically, Silo 3 material is considered "other material in which the radioactive material is distributed throughout and the estimated average specific activity does not exceed 10-4 A2/g for solids..."

The results of the LSA-II determination on Silo 3 material are presented in Appendix A-1.

The LSA determination drives the container requirements for packaging the Silo 3 material for off-site shipment. Based on the evaluation performed, the minimum packaging requirement for the Silo 3 material is an Industrial Packaging – Type 2 (IP-2) container. Soft-sided IP-2 containers will be used to containerize the Silo 3 material for staging and subsequent shipment. The soft-sided containers will be placed on pallets to facilitate handling and loading into ISO containers and then loading onto flatbed trailers.

2.3 MATERIAL TRANSPORT

The carrier will be selected to meet the requirements of each shipment and provide safe, expeditious, and economical delivery to the final destination.

Only motor carriers with satisfactory ratings under the Department of Energy (DOE) Motor Carrier Evaluation Program (MCEP) will be considered.

The FCP provides a detailed briefing to every driver of radioactive material before the shipment departs the FCP. That briefing stresses emergency response actions to take in the unlikely event of an accident, actions to take in the event of severe weather, instructions for maintenance of exclusive use shipment controls, and the importance of remaining on the routes assigned by FCP. The FCP also requires motor carriers to utilize a satellite tracking system (e.g., Qualcomm and/or cell phone) for each shipment and has made arrangements with the motor carriers to access that data as necessary to randomly verify that the motor carrier is adhering to the assigned routes. Motor carrier drivers that fail to adhere to the assigned routes are prohibited from hauling future shipments of material for the FCP.

2.3.1 Routes

The transportation risk evaluation conducted in support of the Revised Proposed Plan for Operable Unit 4 Silo 3 Remedial Action (April 2003) assumed the following route for direct truck shipments to Envirocare:

The proposed truck route to Envirocare of Utah consists of:

• South on Route 128 to West on I-74 to Indianapolis, IN.	95 miles
• Take I-70 Southwest to St. Louis, MO.	242 miles
• Continue on I-70 through Kansas into Colorado.	
• Follow I-70 to I-270 around Denver to I-25.	
• I-25 North to I-80 West (Cheyenne)	950 miles
• Take I-80 West to Exit 49 and proceed to Envirocare, Clive, UT.	512 miles
Total:	1799 miles

Loops around cities will be utilized when available This route would pass through or around the following major cities: Indianapolis, Indiana; St. Louis Missouri; Kansas City, Missouri; St. Joseph, Missouri;; Cheyenne, Wyoming; and Salt Lake City, Utah. Truck routes will use interstate bypasses, where such bypasses exist.

2.3.2 Risk and Safety Requirements

A transportation risk assessment was conducted in support of the Revised Proposed Plan for Operable Unit 4 Silo 3 Remedial Action (April 2003) comparing the risks associated with potential alternatives for transportation of unconditioned Silo 3 material to disposal facilities, including direct truck transportation to Envirocare. The assessment was based on unconditioned material, and took no credit for the reduction in dispersability due to the additive, for the soft-sided disposal container nor for the ISO container as a conservative approach. The assessment evaluated both potential risks associated with accident-free waste transportation (direct radiation) and the risks associated with an accident scenario. The evaluation demonstrated that the calculated excess cancer risk to members of the general public for both scenarios meets the criteria specified by the Silo 3 ROD Amendment.

Per 49 CFR 397 Subpart D, Routing of Class 7 (Radioactive) Materials, the truck route selected for shipment of radioactive material to Envirocare shall ensure that the radiological risk is minimized. Accident rates, transit time, population density and activities, and the time of day and week in which transportation will occur are included in the radiological risk determination.

2.3.3 Shipping Requirements

2.3.3.1 Department of Transportation Requirements

The FCP shall comply with applicable federal, tribal, state, and local regulations. Each package and shipment of hazardous materials for off-site shipment shall be prepared in compliance with 49 CFR 171-180, Hazardous Materials Regulations and the applicable tribal, state, and local regulations.

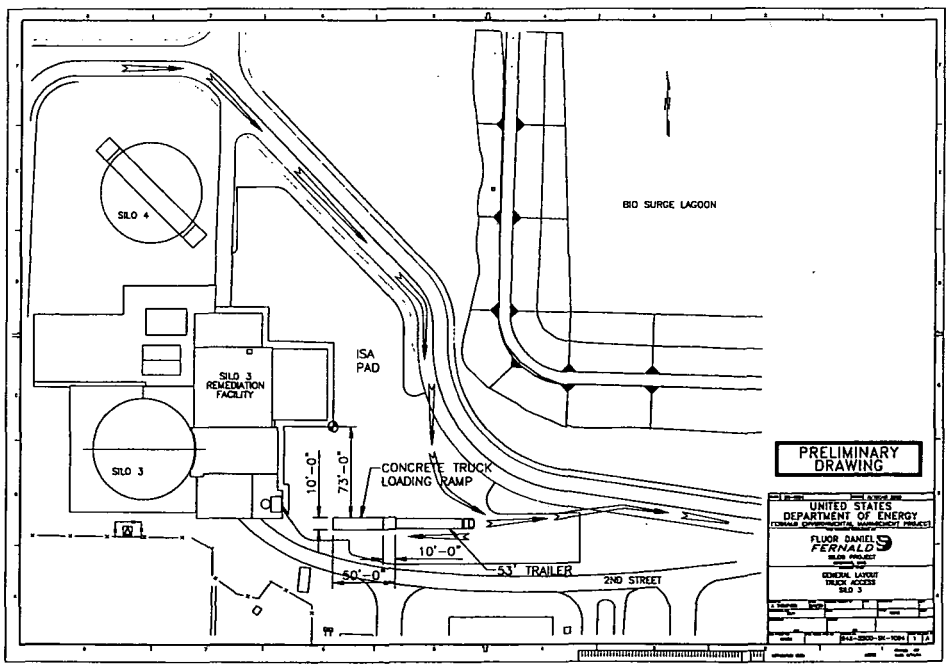
2.3.3.2 Motor Carrier Selection

Carrier selection will be performed consistent with DOE MCEP, DOE Orders, 41 CFR 101-40 and Transportation and Traffic Management. Shipments will be planned in order to maximize the quantity to the extent practicable whenever such arrangements will result in transportation or administrative economies but only within the limits of the transportation risk analysis.

3.0 ON-SITE WASTE MANAGEMENT

3.1 INTRODUCTION

This section addresses the on-site management of the Silo 3 material, including the characterization, packaging, staging, inspections, and Silo 3 material container movements. The following diagram is a representation of the layout of the Silo 3 Area:



3.2 WASTE CHARACTERIZATION

The Silos Project is responsible for characterizing the conditioned Silo 3 material to coordinate the appropriate waste disposal/storage, packaging and transportation options for this waste. As documented in the OU4 Remedial Investigation/Feasibility Study (RI/FS), the OU4 Record of Decision (ROD) and its subsequent modifications, and Material Evaluation File (MEF) 3851, the Silo 3 material is characterized as byproduct material in accordance with Section 11e.(2) of the Atomic Energy Act as amended. Additional characterization of the conditioned Silo 3, based upon process knowledge, process control data and/or sampling and analysis, will be documented to confirm that the packaged waste attains Envirocare's Waste Acceptance Criteria (WAC).

3.3 PACKAGING

The current Silo 3 packaging approach assumes conditioned Silo 3 material is packaged in 96 ft3 Industrial Packaging- Type 2 (IP-2) soft-sided containers with 30-mil PVC liners, placed on pallets, loaded into ISOs (4 to 8 soft-sided containers per ISO), placed on flat bed trailers and staged for shipment to the Envirocare. Either one or two ISOs will be loaded on each trailer and anchored in accordance with DOT requirements. The ISOs are approximately 8 feet wide by 8.5 feet high by 20 feet long (exterior) and are all-steel construction, end-opening containers. The tare weight of an ISO varies between 5000 and 5,200 pounds. Although, they are rated to an approximate gross of 68,000 pounds, the maximum anticipated gross is 40,000 pounds.

The containers will be filled with Silo 3 material, weighed, labeled, and surveyed before being prepared for shipment to Envirocare. When ready for shipment, the containers will be loaded into the ISO in accordance with procedure 11-C-344, "Loading of Silo 3 Soft-sided Shipping Containers for Offsite Shipment", and will be braced as required (e.g. with lumber), before closing the ISO. The Package Loading Stand is equipped with a scale to allow weighing of the filled soft-sided container prior to being placed on pallets.

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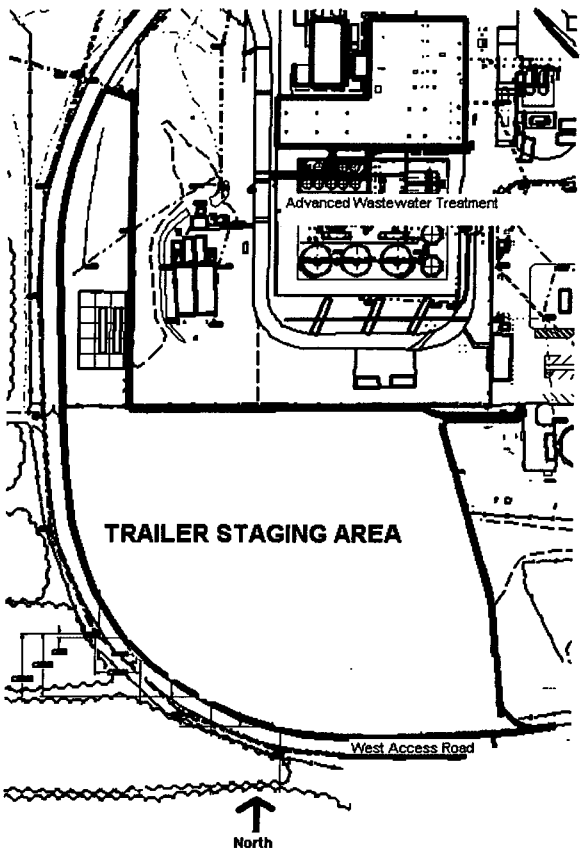
3.4 STAGING AND INSPECTIONS

Inbound trailers will be inspected and surveyed before being moved to the Trailer Staging Area (TSA), using a yard tractor. The TSA will serve as a place for staging of empty and loaded trailers (as long as dose is within limits), as well as repair of unfit trailers. Following is a diagram of the TSA:



Filled packages will be staged onsite as required to allow inspection, final characterization and preparation of individual ISO's meeting the Envirocare WAC. Once a group of packages has been approved for disposal, it will be loaded into an ISO and prepared for shipment as described in Section 3.3. Staging of filled ISO's that have been certified for shipment will be limited to the period of time necessary to facilitate ongoing, continuous shipments to Envirocare. Once an ISO has been filled, inspected, and certified for shipment, it will remain on-site for only the length of time required to facilitate logistics between FCP, transportation contractors, and Envirocare. Barring outside circumstances (e.g., weather, *funding unavailability,* etc) temporarily interrupting the ability to continue shipments, this period of time will not exceed 14 days.

At time of shipment, the ISO's will be placed onto a flatbed trailer. After the trailers are surveyed and released from the Silos area for shipment, the Shipping organization will prepare the remaining paperwork. Individual containers of Silo 3 material will be tracked using the existing on-site waste tracking databases.

3.5 CONTAINER MOVEMENTS

Once an inventory of material is approved for shipment, the final shipping certification will occur prior to loading. Containers will be loaded onto ISOs/flat bed trailers using fork trucks or other necessary heavy equipment.

4.0 HEALTH AND SAFETY

4.1 INTRODUCTION

The focus of this section will be the Health and Safety approach for on-site transportation operations-related activities. The overall on-site project Health and Safety responsibility lies directly with the DOE, Fluor Fernald, and its contractors and is implemented according to PL-3081, Safety Management System Description, which incorporates the core functions of the Integrated Safety Management System (ISMS). The specific functional areas of safety addressed in this section are Nuclear and Systems Safety, Occupational Safety and Health, Radiological Protection, and Security.

4.2 NUCLEAR AND SYSTEMS SAFETY

The FCP Nuclear and System Safety Program is identified in RM-2116, System Safety Requirements and is implemented by Fluor Fernald through site procedures. Safety analyses are performed to help ensure the health and safety of the public, the workers, and the environment. A Nuclear Health and Safety Plan (NHASP) has been developed for operation of the Silo 3 Project and has been approved by DOE.

Safety analysis documentation includes staging of material and motor vehicle shipping activities for Silos projects. All shipments and containers (including Silo 3 shipping containers) will comply with DOT regulations, which will help to ensure the health and safety of the public, the workers, and the environment.

4.3 OCCUPATIONAL SAFETY AND HEALTH

The FCP Occupational Safety and Health Program requirements are defined in the RM-0021, Safety Performance Requirements (SPR) Manual. The SPRs apply to activities at the FCP. SPRs identify requirements established by federal, state, and local regulations, in addition to requirements from DOE Orders and Best Management Practices established by Fluor Fernald through experience, lessons learned, and employee input. SPRs identify safety and health standards for assessing and planning work at the FCP. SPRs contain guidelines on what must be done to safely execute work and are not intended to specify how to execute work. The Fluor Fernald Silo 3 Project team will implement the SPRs by incorporating their requirements into any project-specific procedures and contracts that will be developed to guide the performance of transportation activities. Silo 3 material shipments will be performed in accordance with existing shipping procedures, which incorporate the required SPRs.

Project-specific safety and health requirements will be developed as the details of the project unfold. For planning purposes, however, existing SPRs are being used as the basis for health and safety on this project. The SPRs and additional project-specific safety requirements are incorporated into planning documents and implementing procedures.

4.4 SAFETY PRECAUTIONS

Staging of packaged Silo 3 material will be in designated and approved area(s).

4.5 RADIOLOGICAL PROTECTION

Equipment and material, including containers of Silo 3 material, will be released from the Silo 3 facility when the exterior of the item meets DOT surface contamination limits. Therefore, it is planned that shipping activities will take place in a Controlled Area. FCP Radiological Control Technicians (RCTs) will conduct routine radiological surveys to ensure contamination levels are maintained below Contamination Area limits. The exterior of each container, (soft-sided containers), will be surveyed by FCP Radiological Control for compliance with DOT regulations and Fluor Fernald Radiological Protection Program (RPP) requirements. Exterior non-fixed contamination levels will be determined per 49 CFR 173.443, Contamination Control for shipments and 10 CFR 835, Occupational Radiation Protection for staging. Once the containers have been surveyed and are ready for release, they will be loaded into ISOs and placed on flatbed trailers. After the trailers have been surveyed and released, they will be transported to the TSA or other on-site staging location.

If the equipment or material in the Controlled Area exceeds Contamination Area levels, a Contamination Area will be established and a new Radiation Work Permit (RWP) will be issued. The RWP will define the level of anti-contamination clothing and RCT coverage required. If decontamination is feasible, decontaminating the work surface to a level below Contamination Area limits will eliminate the need for routine wearing of anti-contaminating clothing and reduce the RCT coverage requirements. If/when Contamination Areas are established, whole body monitoring will be required for exiting the area. Immediately following the completion of work, the area will be decontaminated, as necessary, and surveyed for the purpose of down-posting.

Detailed project-specific radiological control requirements will be developed and incorporated into procedures and work permits.

4.5.1 Access of Personnel

Only necessary personnel with the appropriate training will be given access to the radiologically-controlled areas. The crew will ingress/egress through a radiological control point(s) and will be subject to personal contamination monitoring upon exit. Incidents of personal contamination will be addressed per existing, approved site procedures.

4.6 SECURITY

Areas where Silo 3 material will be loaded and staged pending the completion of shipment will be within the site fence and provided with the appropriate levels of security and lighting. FCP Security monitors site access by using stationary posts, conducting walking, driving, and perimeter patrols on a 24-hour basis.

5.0 EMERGENCY RESPONSE

5.1 INTRODUCTION

This section documents the emergency response procedures that are in place to respond to transportation accidents involving shipments of Silo 3 material. The scope of this discussion focuses on off-site occurrences and references procedures for on-site occurrences.

DOE Order 151.1B, Comprehensive Emergency Management System, provides for a DOE Emergency Management System (EMS). This order requires sites and facilities to have emergency plans and procedures in place and to address transportation emergencies for onsite and offsite. The FCP has established plans and procedures. Also, pursuant to DOE O 151.1, EM has authority to maintain the Transportation Emergency Preparedness Program, which assists Department of Energy (DOE) and other federal, state, tribal and local authorities to prepare for response to a transportation incident involving DOE shipments of radioactive material. DOE O 151.1 also addresses DOE's responsibilities under the National Contingency Plan (NCP) and the Nuclear Rad Annex of the National Response Plan.

5.1.1 Department of Energy Requirements

DOE Order 435.1, Radioactive Waste Management and associated manual DOE M 435. 1-1, Chapter IV, Section L.2, Transportation, also state that the volume of waste and number of waste shipments shall be minimized to the extent practical. This requirement was considered in development of the Silo 3 waste form and associated transportation planning.

5.2 FCP EMERGENCY RESPONSE PREPAREDNESS PLANS

The FCP Transportation Emergency Plan (TEP), PL-3043, is part of the DOE-FCP Transportation Emergency Preparedness Program. The FCP TEP provides a centralized program approach to off-site transportation emergency response including products, samples, waste, and rail shipments.

The FCP TEP describes the overall DOE/FCP process developed for the coordination of response efforts to off-site transportation incidents. This assistance planning is

accomplished by adherence to applicable federal, state, and local transportation-related emergency response requirements, plus utilizing existing DOE programs designed to protect the well-being of citizens and the environment from accidental release of transported materials.

Procedures for on-site emergencies are addressed in PL-3020, FCP Emergency Plan, which details the procedures to be followed at the FCP in the event of an accident or emergency, highlights FCP safety features, and governs the spill response actions. The FCP Emergency Plan is distributed to participating mutual aid organizations, such as local fire departments and hospitals, in the general vicinity of the FCP. Silo-specific emergency procedures are addressed in EM-0030, Silos Area Emergency Procedure. Loading of soft-sided containers, including response to a damaged container is directed by procedure 11-C-344, "Loading of Silo 3 Soft-Sided Shipping Containers for Off-site Shipment." Response to a spill or release is directed by procedure 11-E-006, "Silo 3 Abnormal/Emergency Events Response."

5.3 EMERGENCY RESPONSE FOR THE FCP OFF-SITE SHIPMENTS

A Silo 3 material shipment will become an off-site shipment at the point when the entire shipment crosses the facility boundary. When the shipment is off-site, the motor carrier will be responsible for providing emergency response support to the local authorities in proximity of any incident. The carrier also has contractors available for containment and cleanup as necessary. The FCP will provide technical assistance via the 24-hour emergency response telephone number. DOE will advise and provide support as requested by the local response authority (49 CFR 172.604). Local response personnel including police, firefighters, and emergency responders, typically are the first to arrive on the scene of an incident. They must be provided with the technical information needed by first responders to accurately identify the hazards involved in the incident. Information contained in the shipping papers includes source terms, health and safety concerns, and recommended protective actions. The information is consistent with the DOT, Research and Special Programs Administration publication, North American Emergency Response Guidebook, Guide 162.

Consistent with the procedure for other shipments to Envirocare, advance notification will be provided to state and tribal emergency response organizations prior to the beginning of the Silo 3 shipping campaign. The notification will include information such as the number of shipments, the type of material and packaging configuration, the projected dates for initiation and completion of shipments, and on-site contact information. Primarily for security reasons, current policy for waste shipments does not provide for notification of the date, time, and route of individual Silo 3 waste shipments. A contact list of the organizations notified prior to initiating shipments will be provided to OEPA and USEPA for information.

The following is an overview of the emergency response responsibilities of the motor carriers, DOE, individual states, and the FCP to support local authorities at an accident scene.

1. Carriers
   - Trained in accordance with DOT Emergency Response Guidebook and the carrier's respective Emergency Response Plans
   - Stabilize situation
   - Provide notification of incident to carrier home office
   - Provide notification to FCP/DOE

2. Carrier Emergency Response Organization
   - Make appropriate additional notification (local authorities, DOE, etc.)
   - Dispatch Emergency Response Personnel to the scene to support On-Scene Commander
   - Mobilize strategically positioned emergency response subcontractors, if necessary
   - Responsible for Recovery Actions

3. Local Authorities
   - Typically function as the On-Scene Commander

4. State Emergency Response Organizations
   - Each state possesses an Emergency Response Organization capable of responding to radiological emergencies

5. DOE Regional Radiological Assistance Teams
   - Eight Radiological Assistance Team offices across the United States
   - Provide On-Scene Commanders with support in terms of radiological monitoring, communications, and information coordination during an emergency
   - Consist of DOE and contracted personnel possessing expertise in health physics, public information, and communications

The FCP TEP is activated when the carrier or the local response organizations contacts the FCP to notify DOE that an incident has occurred. The 24-hour emergency phone number provided on the bill of lading, as required by 49 CFR 172.604, Emergency Response Telephone Number, is a direct telephone line to the FCP Communications Center.

The FCP Communications Center provides communication capability for the FCP, monitors conditions, and makes notifications as required. The FCP Communication Center establishes and maintains direct communication with the On-Scene Commander and the FCP Assistant Emergency Duty Officer (AEDO) until the Emergency Operations Center (EOC) is activated.

The FCP EOC is activated at the direction of the AEDO or Emergency Duty Officer (EDO) for events categorized at the emergency level, including transportation events and for non-

emergency events at the discretion of the EDO. The EOC officially becomes operational when the Emergency Director or Deputy Emergency Director arrives at the EOC, determines that sufficient personnel are available to manage the response, and declares the EOC operational. The combined efforts of EOC staff members provide support, guidance, and direction to the On-Scene Commander in the field. The EOC staff assumes responsibilities such as making protective action recommendations, providing notifications, and obtaining necessary resources, as required by the specific circumstances of the event.

5.3.1 Motor Carriers

Motor carriers maintain Emergency Response Plans (ERP), which outline the procedures the carrier's employees must take in the event of an incident. The plan includes notification responsibilities, emergency response procedures for personnel on the scene, environmental considerations, and additional precautions to take in the event of an incident. DOE, as the shipper, will be notified by the carrier immediately should an incident occur. Both the carrier and DOE will initiate emergency procedures upon notification.

6.0 WASTE DISPOSAL

6.1 INTRODUCTION

This section describes procedures for receipt and disposal of Silo 3 material at Envirocare. Envirocare is authorized by its 11e.(2) license to accept 11e.(2) byproduct material with an average concentration in any transport vehicle (truck or railcar) not to exceed 4,000 pCi/g for natural uranium or for any radionuclide in the Radium-226 series, 60,000 pCi/g for thorium-230, or 6,000 pCi/g for any radionuclide in the thorium decay series. The specified concentration limits are for each radionuclide in the corresponding decay series.

The average concentration on receipt will be based upon the total activity and waste mass (including moisture and additives) in each ISO container as opposed to each individual soft-sided container. Consequently, some shipments may contain individual disposal containers with manifested radionuclide concentrations above the specified limits. This will be acceptable as long as the total shipment concentration (i.e., total shipment activity divided by total waste mass) of all disposal containers in the ISO is less than the specified concentration limits.

6.2 SILO 3 MATERIAL QUANTITIES/CHARACTERISTICS

Silo 3 contains approximately 5,100 yd3 of material that was generated at the FCP during uranium extraction operations in the 1950s. Samples collected from Silo 3 indicate the presence of significant activity and concentrations of the radionuclides within the uranium decay series, confirming prior process knowledge. The predominant radionuclide of concern identified within Silo 3 is Th-230, a radionuclide produced from the natural decay of Uranium-238. Approximately 450 curies of Th-230 are distributed within the Silo 3 material. (Note: The 450 curies is a mean inventory value. The 95% upper confidence

limit inventory value is approximately 530 curies. For most determinations, the upper confidence limit values are used for conservatism.)

The Silo 3 material is classified as 11e.(2) by-product material under the Atomic Energy Act (AEA), of 1954, as amended, because the material resulted from the processing of uranium ore concentrate and is specifically exempt, as defined, from regulation as solid waste under the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.4(a)(4), Identification and Listing of Hazardous Waste, Exclusions. Since Silo 3 material is not a solid waste, requirements under RCRA are not applicable.

The current approach is for disposal of conditioned Silo 3 material. The conditioning process, which results in a minimal volume increase, will reduce material dispersability and reduce the mobility of certain RCRA metals contained in the material.

6.3 DISPOSAL OF SILO 3 MATERIAL AT ENVIROCARE

6.3.1 Shipment Receipt and Acceptance

Upon arrival at Envirocare, shipments of Silo 3 material will be inspected to verify compliance with Department of Transportation (DOT) and State of Utah regulations, applicable licenses and permits and with the Radioactive Waste Profile Record. Envirocare Transportation Compliance personnel will perform an initial visual inspection of each shipment to ensure compliance with DOT requirements. The initial DOT inspection will include radiological surveys, inspection of the integrity of disposal containers, inspection for load shifting, and review of shipping documentation. The ISO containers will be opened and inspected outside of Envirocare's restricted area. Individual soft-sided packages will not be opened until the ISO container is brought into the restricted area and sampled as described below.

Envirocare Transportation Compliance personnel will sign the Uniform LLRW Manifest once the waste shipment has been inspected, prior to entering the disposal facility. Any discrepancies will be noted on the manifest and formal written notification will be provided to Fluor Fernald. The signed manifest will be returned to Fluor Fernald within seven days of receipt of the shipment. After the initial shipment inspections, ISO containers will be moved into the disposal site and staged for waste receipt inspections and sampling.

The ISO containers will remain closed until health physics and sampling personnel are ready to sample the waste. ISO containers will be selected for WAC verification sampling in accordance with Envirocare's disposal license and as the associated procedures, and analyzed onsite to quantify the activity from the gamma-emitting radionuclides. The measured concentrations (wet weight basis) will be compared against the license limits to verify compliance prior to disposal.

As an alternative approach, WAC verification sampling may be conducted, with oversight of Envirocare personnel, at the FCP prior to shipment.

Waste will be authorized for disposal once the analytical results have been reviewed and approved by the laboratory manager.

6.3.2 Disposal Operations

Envirocare utilizes an above-ground engineered disposal technology. The design of the 11e.(2) disposal embankment includes standard liner and cover requirements. Waste material is placed in the disposal embankments in 12-inch lifts using a continuous cut and cover process. After placement, native clay is blended with the waste in the lift and is compacted to 90 percent of its optimum density based upon results of Standard proctor measurements determined by ASTM-D698. Debris items placed in the disposal lifts are required to be less than 8 feet in any dimension and less than 10 inches in one dimension. Soil is compacted in and around debris to eliminate void space and minimize the effects of settlement of the disposal embankment during and after disposal operations.
After shipment inspection and sampling, the ISO containers will be transferred to the 11e.(2) disposal embankment and remain closed until the disposal operator is prepared to begin waste placement. Each ISO container will be emptied within 14 days after being transferred to the disposal embankment. All disposal operations for the Silo 3 material will be performed under the direct supervision of health physics personnel in accordance with a specific Radiation Work Permit.

Prior to opening an ISO container, the disposal area will be prepared for immediate placement of the inner disposal packages. Each palletized soft-sided package will be removed from the ISO container using a forklift and placed on the disposal embankment. Due to the radionuclide content and physical properties of Silo 3 material, the packages will immediately be covered with native clay to minimize the potential for airborne material during the process of opening and emptying the packages. Disposal operators will then use heavy equipment to break open the bags and blend the contents with native clay. The use of heavy equipment will allow disposal operators to maintain adequate distance from the waste as it is being blended and compacted into the disposal lifts. Disposal operators will wear the appropriate protective clothing and equipment as specified in the Radiation Work Permit. The disposal operator and surrounding area will be closely and continuously monitored using air sampling equipment to ensure proper controls are in place and functioning at all times during disposal operations.

The addition of conditioning solution to the Silo 3 material during packaging will significantly reduce the airborne potential during disposal operations at Envirocare. In addition, Envirocare will employ dust suppression as needed during disposal operations as the blended clay and Silo 3 material is compacted in the 12-inch lifts. Disposal operators will have sufficient clay material available while the Silo 3 material is being blended and compacted to ensure that the waste is covered at all times. Envirocare will ensure that 11e.(2) material from other generators is not blended with the Silo 3 material.

Empty soft-sided packages, debris and other secondary wastes associated with the Silo 3 project will be placed with the Silo 3 material in the disposal embankment. The debris and secondary wastes will be uniformly distributed throughout the disposal lift and blended with native clay to achieve the required compaction criteria in accordance with Envirocare's license and associated procedures.

Once the waste is compacted in the disposal lift, Envirocare's quality control technicians perform compaction testing to ensure the lift is compliant with the applicable design and construction criteria. If necessary, the disposal lift will be further compacted until the compaction criteria are met.

The specific location of each shipment in the disposal embankment is identified using standard survey practices, and is maintained in Envirocare's Waste Information and tracking database.

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7.0 REFERENCES

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Code of Federal Regulations, 10 CFR Chapter 1,"Nuclear Regulatory Commission"

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Code of Federal Regulations, 40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan"

Code of Federal Regulations, 41 CFR 101-40, "Transportation and Traffic Management"

Code of Federal Regulations, 49 CFR 171-180, "Hazardous Materials Regulations"

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U.S. Department of Energy, 2003, "Safety Basis Requirements," 10 CFR 830, Subpart B, January 2003

APPENDIX A
SILO 3 MATERIAL LSA DETERMINATION (HM-230, EFF. OCTOBER 1, 2004)

The table below represents the source term for the Silo 3 material, as well as the LSA classification and packaging determinations. On January 26, 2004 Research and Special Programs Administration (RSPA) issued a final rule [Docket No. RSPA-99-6283 (HM-230)] amending the requirements in the Hazardous Material Regulations (HMR) pertaining to the transportation of radioactive material. The purpose of this rulemaking initiative is to harmonize requirements of the HMR with international standards for radioactive materials as well as to disseminate other Department of Transportation (DOT)-initiated requirements. The mandatory compliance date is October 1, 2004. RSPA is authorizing a voluntary compliance date of February 25, 2004.

Column 1 identifies each radionuclide present in the Silo 3 material.

Columns 2 and 4 identify the activity concentration for each radionuclide in terabecquerels per gram (TBq/g) and becquerels per gram (Bq/g), respectively. Columns 3 and 5 identify the total activity of each radionuclide in terabecquerels (TBq) and becquerels (Bq), respectively. The values in Columns 3 and 5 were arrived at by taking the activity concentration per radionuclide multiplied by the net weight in grams of material.

The radionuclide specific limits shown in Columns 6 and 8 are prescribed by 49 CFR 173.436. 49 CFR 173.436 Footnote (b) specifies the progeny that have been taken into consideration when assigning the activity concentration and consignment limits of the parent. The table provides a list of these parent/progeny relationships included in Silo 3 material.

Column 7 contains the result of the unity calculation per nuclide for the activity concentration limit for exempt material (ACEM) and is derived by the following:
Column 4, "Activity Concentration (Bq/g)" divided by Column 6, "ACEM [Activity Concentration Limit for Exempt Material] (Bq/g)"

Column 9 contains the result of the unity calculation per nuclide for the activity limit for exempt consignment (ALEC) and is derived by the following:
Column 5, "Total Activity (Bq)" divided by Column 8, "ALEC [Activity Limit for Exempt Consignment] (Bq)"

If the sum of either column is less than or equal to 1, then the material is not regulated as Class 7 radioactive material. As demonstrated in the table, the sum of each unity calculation individually exceeds 1; therefore, the Silo 3 material meets the definition of Class 7 radioactive material.

Column 10 identifies the applicable LSA-I limit, which is 30 times the ACEM. Column 11 contains the result of the unity calculation per nuclide for LSA-I and is derived by the following:
Column 4, "Activity Concentration (Bq/g)" divided by Column 10, "LSA-I(1)(iv) 30x Activity Concentration Limit (Bq/g)"

If the sum of Column 11 exceeds 1, then the radioactive material cannot be shipped as LSA-I material. As shown in the table, the LSA-I unity calculation greatly exceeds 1; therefore, it does not meet the definition of LSA-I.

Column 14 identifies the A2 values prescribed by 49 CFR 173.435. 49 CFR 173.435, Footnote (a), indicates that certain A2 values already include the contributions from daughter nuclides with half-lives less than 10 days and considered to be in secular equilibrium with their parent nuclide. The table provides a list of these parent/daughter relationships included in Silo 3 material.

The definition of LSA-II solid material found at 173.403 *LSA material* requires that the activity is distributed throughout and the average specific activity of the material is less than 10^{-4} A_2/g. This limit is identified in Column 12. Column 13 contains the result of the unity calculation per nuclide for LSA-II and is derived by the following:
Column 2, "Activity Concentration (TBq/g)" divided by Column 12, "LSA-II (2)(ii) Limits 10^{-4} A2/g"

If the sum of Column13 exceeds 1, then the radioactive material cannot be shipped as LSA-II material. As shown in the table, the sum of the LSA-II unity calculation does not exceed 1; therefore, it can be classified and shipped as LSA-II material. At this point, it has been determined the Silo 3 material meets the DOT definitions of radioactive and LSA-II material.

Column 15 contains the result of the A2 unity calculation per nuclide and is derived by the following:
Column 3, "Total Activity (TBq)" divided by Column 14, "A2 Limits (TBq)"

If the sum of Column 15 exceeds 1, thereby exceeding an A2 quantity, the material cannot be shipped in an excepted package as permitted by 173.427(b)(4). As shown in the table, the sum of the A2 unity exceeds 1; therefore, the Silo 3 material must and will be packaged in a Type IP-2 packaging, subject to the limitations of Table 6, as required by 49 CFR 173.427 (b)(1). Per Table 5, the activity limit for the conveyance is unlimited for LSA-II Non-combustible Solids.

Project: Silo 3 Transportation & Disposal Plan - Appendix A-2
Container: Non-Bulk IP-2 Bag
Weight/Unit: 4400 Lbs.
Net Weight: 4400.0 Lbs. **Net Wt (Gms):** 1,995,798.0

					49 CFR 173.436 [HM-230]				49 CFR 173.403 [HM-230]				49 CFR 173.435 [HM-230]	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Radionuclide	Activity Concentration (TBq/g)	Total Activity (TBq)	Activity Concentration (Bq/g)	Total Activity (Bq)	ACEM (Activity Concentration Limit for Exempt Material) (Bq/g)	ACEM Unity	ALEC (Activity Limit for Exempt Consignment) (Bq)	ALEC Unity	LSA-I (1)(iv) 30X Activity Concentration Limit (Bq/g)	LSA-I Unity	LSA-II (2)(ii) Limits 10^-6 A2/g	LSA-II Unity	A2 Limits (TBq)	A2 Unity
Ac-227	3.078E-11	6.144E-05	3.078E+01	6.144E+07	1.000E-01	3.078E+02	1.000E+03	6.144E+06	3.000E+00	1.026E+01	9.000E-09	3.420E-03	9.000E-05	6.827E-01
Ac-228	2.808E-11	5.605E-05	2.808E+01	5.605E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Bi-210	1.288E-10	2.570E-04	1.288E+02	2.570E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Bi-211	3.078E-11	6.144E-05	3.078E+01	6.144E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Bi-212	2.808E-11	5.605E-05	2.808E+01	5.605E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Bi-214	1.288E-10	2.570E-04	1.288E+02	2.570E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Fr-223	4.255E-13	8.492E-07	4.255E-01	8.492E+05	1.000E+01	4.255E-02	1.000E+04	8.492E+01	3.000E+02	1.418E-03	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Pa-231	3.078E-11	6.144E-05	3.078E+01	6.144E+07	1.000E+00	3.078E+01	1.000E+03	6.144E+04	3.000E+01	1.026E+00	4.000E-06	7.998E-04	4.000E-04	1.538E-01
Pa-234m	6.216E-11	1.241E-04	6.216E+01	1.241E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Pb-210	1.288E-10	2.570E-04	1.288E+02	2.570E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	5.000E-06	2.576E-05	5.000E-02	5.140E-03
Pb-211	3.078E-11	6.144E-05	3.078E+01	6.144E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Pb-212	2.808E-11	5.605E-05	2.808E+01	5.605E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Pb-214	1.288E-10	2.570E-04	1.288E+02	2.570E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-210	1.288E-10	2.570E-04	1.288E+02	2.570E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	2.000E-06	6.438E-05	2.000E-02	1.285E-02
Po-211	8.399E-14	1.678E-07	8.399E-02	1.678E+05	1.000E-01	8.399E-01	1.000E+03	1.678E+02	3.000E+00	2.800E-02	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-212	1.798E-11	3.589E-05	1.798E+01	3.589E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-214	1.288E-10	2.570E-04	1.288E+02	2.570E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-215	3.078E-11	6.144E-05	3.078E+01	6.144E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-216	2.808E-11	5.605E-05	2.808E+01	5.605E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-218	1.288E-10	2.570E-04	1.288E+02	2.570E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Ra-223	3.078E-11	6.144E-05	3.078E+01	6.144E+07	1.000E+02	3.078E-01	1.000E+05	6.144E+02	3.000E+03	1.026E-02	7.000E-07	4.398E-05	7.000E-03	8.777E-03
Ra-224	2.808E-11	5.605E-05	2.808E+01	5.605E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Ra-226	1.288E-10	2.570E-04	1.288E+02	2.570E+08	1.000E+01	1.288E+01	1.000E+04	2.570E+04	3.000E+02	4.292E-01	3.000E-07	4.292E-04	3.000E-03	6.588E-02
Ra-228	2.808E-11	5.605E-05	2.808E+01	5.605E+07	1.000E+01	2.808E+00	1.000E+05	5.605E+02	3.000E+02	9.361E-02	2.000E-06	1.404E-05	2.000E-02	2.802E-03
Rn-219	3.078E-11	6.144E-05	3.078E+01	6.144E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Rn-220	2.808E-11	5.605E-05	2.808E+01	5.605E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Rn-222	1.288E-10	2.570E-04	1.288E+02	2.570E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Th-227	3.078E-11	6.144E-05	3.078E+01	6.144E+07	1.000E+01	3.078E+00	1.000E+04	6.144E+03	3.000E+02	1.026E-01	5.000E-07	6.157E-05	5.000E-03	1.229E-02
Th-228	2.808E-11	5.605E-05	2.808E+01	5.605E+07	1.000E+00	2.808E+01	1.000E+04	5.605E+03	3.000E+01	9.361E-01	1.000E-07	2.808E-04	1.000E-03	5.605E-02
Th-230	2.005E-09	4.002E-03	2.005E+03	4.002E+09	1.000E+00	2.005E+03	1.000E+04	4.002E+05	3.000E+01	6.685E+01	1.000E-07	2.005E-02	1.000E-03	4.002E+00
Th-231	2.842E-12	5.671E-06	2.842E+00	5.671E+06	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Th-232	2.808E-11	5.605E-05	2.808E+01	5.605E+07	1.000E+01	2.808E+00	1.000E+04	5.605E+03	3.000E+02	9.361E-02	Unlimited	0.000E+00	Unlimited	0.000E+00
Th-234	6.216E-11	1.241E-04	6.216E+01	1.241E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	3.000E-05	2.072E-06	3.000E-01	* 4.135E-04
Tl-207	3.078E-11	6.144E-05	3.078E+01	6.144E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Tl-208	1.010E-11	2.016E-05	1.010E+01	2.016E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
U-234	6.216E-11	1.241E-04	6.216E+01	1.241E+08	1.000E+01	6.216E+00	1.000E+05	1.241E+03	3.000E+02	2.072E-01	6.000E-07	1.036E-04	6.000E-03	2.086E-02
U-235	2.842E-12	5.671E-06	2.842E+00	5.671E+06	1.000E+01	2.842E-01	1.000E+04	5.671E+02	3.000E+02	8.472E-03	Unlimited	0.000E+00	Unlimited	0.000E+00
U-238	6.216E-11	1.241E-04	6.216E+01	1.241E+08	1.000E+01	6.216E+00	1.000E+04	1.241E+04	3.000E+02	2.072E-01	Unlimited	0.000E+00	Unlimited	0.000E+00
TOTALS						2.486E+03		6.818E+06		8.026E+01		2.527E-02		6.043E+00
RESULTS					RADIOACTIVE ? (T/F): TRUE				Not LSA-I		LSA-II		>A2	

173.436, Footnote (b) - Parent nuclides and their progeny included in secular equilibrium are listed in the following:	
Parent	Progeny
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
U-235	Th-231
U238	Th-234, Pa-234m

173.435, Footnote (a) - A_2 values include contributions from daughter nuclides with half-lives less than 10 days.:	
Parent	Daughter
Ac-227	Fr-223
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Po-211, Tl-207
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Bi-210
Ra-228	Ac-228
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Th-234	Pa-234m
U-235	Th-231

5981

FCP-40750-PL-0018
Revision *3*
September 2005

SILOS 1 and 2 PROJECT TRANSPORTATION AND DISPOSAL PLAN

40750-PL-0018, REV. *3*

***September* 2005**

APPROVED BY:

Dennis J. Carr, Project Director, Silos Project	Date
Robert F. Schulten, Shipping and Receiving	Date

FERNALD CLOSURE PROJECT
FERNALD, OHIO

U.S. DEPARTMENT OF ENERGY

TABLE OF CONTENTS

1.0 INTRODUCTION **1**
1.1 PURPOSE AND SCOPE 1
1.2 BACKGROUND 1
2.0 CHARACTERISTICS OF SHIPPED MATERIAL **4**
3.0 PACKAGING **4**
4.0 ON-SITE STAGING AND INSPECTION **6**
4.1 CONTAINER STAGING 6
4.2 CONTINGENCY STAGING 7
4.3 INSPECTIONS 7
5.0 MATERIAL TRANSPORT **9**
5.1 DEPARTMENT OF TRANSPORTATION REQUIREMENTS 9
5.2 MODE OF TRANSPORTATION 9
5.3 MOTOR CARRIER SELECTION 9
5.4 RISK AND SAFETY REQUIREMENTS 9
5.5 ROUTING 10
6.0 EMERGENCY RESPONSE **11**
6.1 INTRODUCTION 11
6.2 FCP EMERGENCY RESPONSE PREPAREDNESS PLANS 12
6.3 EMERGENCY RESPONSE FOR THE FCP OFF-SITE SHIPMENTS 12
7.0 OFFSITE STORAGE / DISPOSAL **15**
7.1 TEMPORARY OFFSITE STORAGE OF SILOS 1 AND 2 MATERIALS 15
7.1.1 Regulatory Information 15
7.1.2 WCS Waste Acceptance 15
7.1.3 Temporary Storage at WCS 15
7.2 FINAL DISPOSAL 15
8.0 FCP HEALTH AND SAFETY REQUIREMENTS **16**
8.1 NUCLEAR AND SYSTEMS SAFETY 16
8.2 OCCUPATIONAL SAFETY AND HEALTH 16
8.3 RADIOLOGICAL PROTECTION 16
8.4 SECURITY 17
9.0 REFERENCES **18**

FIGURES

FIGURE 1-1 SILOS 1 AND 2 PROJECT AREA LAYOUT.....5
FIGURE 3-1 SILOS 1 AND 2 PACKAGING CONFIGURATION.....4
FIGURE 4-1 SILOS 1 AND 2 TRAILER STAGING AREA..... 6
FIGURE 4-2 CONTINGENCY TRAILER STAGING AREA.....8
FIGURE 5-1 TRAGIS TRANSPORTATION ROUTES 9

APPENDIX A SILOS 1 AND 2 MATERIAL LSA DETERMINATION (HM-230, EFFECTIVE OCTOBER 1, 2004)..... ..... A-1

RECORD OF ISSUE/REVISIONS

EFFECTIVE DATE	REV. NO.	DESCRIPTION
August 5, 2004	0	New plan issued to describe transportation and disposal operations for Silos 1 and 2 materials.
August 26, 2004	1	Revised plan issued to incorporate comments from DOE review for submittal to USEPA/OEPA
May 3, 2005	2	Revised plan issued to reflect transportation to WCS for temporary offsite storage
September 12, 2005	*3*	*Revised plan issued to reflect contingency trailer staging*

ACRONYMS

ACEM	Activity Concentration for Exempt Material
AEA	Atomic Energy Act
AEDO	Assistant Emergency Duty Officer
ALEC	Activity Limit for Exempt Consignment
ASME	American Society of Mechanical Engineers
Bq	Becquerels
Bq/g	Becquerels per gram
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRF	Cancer Risk Factor
DOE	Department of Energy
DOT	Department of Transportation
EDO	Emergency Duty Officer
EMS	Emergency Management System
EOC	Emergency Operations Center
ERP	Emergency Response Plan
FCP	Fernald Closure Project
HMR	Hazardous Material Regulations
HRCQ	Highway Route Controlled Quantity
ILCR	Incremental Lifetime Cancer Risk
IP-2	Industrial Packaging-Type 2
ISMS	Integrated Safety Management System
LCF	Latent Cancer Fatalities
LSA	Low Specific Activity
MCEP	Motor Carrier Evaluation Program
MEF	Material Evaluation Form
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NHASP	Nuclear Health and Safety Plan
NTS	Nevada Test Site
NTSWAC	Nevada Test Site Waste Acceptance Criteria
OSDF	*Onsite Disposal Facility*
OU	Operable Unit
PCDF	Permitted Commercial Disposal Facility
Ra-226	Radium 226
Ra-228	Radium 228
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RD/RA	Remedial Design/Remedial Action
RDP	Remedial Design Package
RI	Remedial Investigation
ROD	Record of Decision
RPP	Radiological Protection Program
RSPA	Research and Special Programs Administration

RWP	Radiological Work Permit
SPR	Safety Performance Requirement
SR	State Route
SRC	Safety Review Committee
TBq	Terabecquerels
TBq/g	Terabecquerels per gram
TCLP	Toxicity Characteristic Leaching Procedure
TEP	Transportation Emergency Plan
TEPP	Transportation Emergency Preparedness Program
Th-230	Thorium 230
TRAGIS	Transportation Routing Analysis Geographic Information System
TSA	Trailer Staging Area
WAC	Waste Acceptance Criteria
WC	Waste Characterization
WCS	Waste Control Specialists LLC

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

This plan describes the staging and transportation of Operable Unit (OU) 4 Silos 1 and 2 material from the Fernald Closure Project (FCP) to the Waste Control Specialists (WCS) facility in Andrews Texas. This plan serves to: (1) describe the transportation logistics associated with Silos 1 and 2 material; and (2) generally describe operational aspects of transportation plans to demonstrate that Silos 1 and 2 material can be transported to the designated storage/disposal site safely, and in accordance with applicable regulations.

Submittal of this Transportation and Disposal Plan complies with the requirements of the Silos 1 and 2 Remediation Facility Remedial Design Package (40750-RP-0028, Rev. 0, April 2003) which requires an operational description of the transportation and offsite management of Silos 1 and 2 material, including on-site staging pending shipment, logistics, packaging configuration, and selected mode of transportation to the selected offsite facility.

1.2 BACKGROUND

Silos 1 and 2 material consists of approximately 8,890 cubic yards of residues from uranium extraction operations at the Mallinckrodt Chemical Works and the FCP in the 1950s. Samples collected from Silos 1 and 2 indicate the presence of significant activity and concentrations of the radionuclides within the uranium decay series, confirming prior process knowledge. The predominant radionuclide of concern identified within Silos 1 and 2 is Radium-226. Approximately 3,770 curies of Radium-226 are distributed within the Silos 1 and 2 materials. (Note: The 3,770 curies is a mean inventory value. The 95% upper confidence limit inventory value is approximately 4,740 curies. For most determinations, the upper confidence limit values are used for conservatism.)

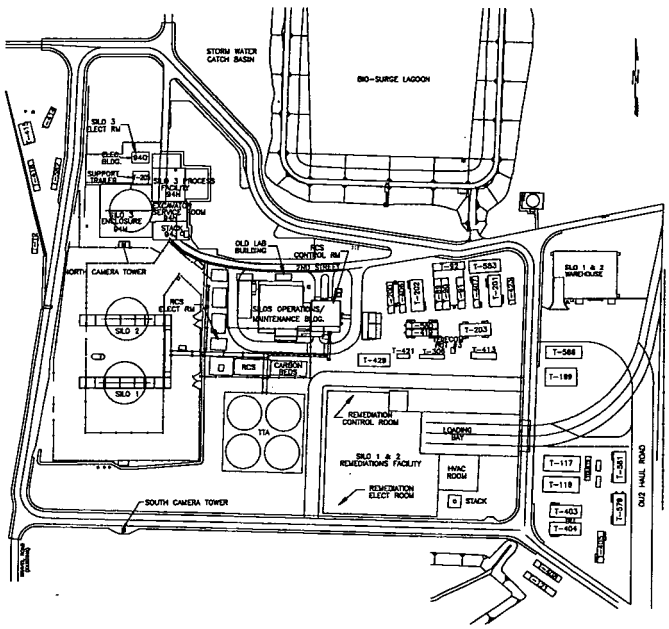
Since the time that DOE assumed ownership of the material in 1984, the Silos 1 and 2 materials have been classified as by-product material under Section 11e.(2) of the Atomic Energy Act (AEA), of 1954, as amended. This classification arises from the origin of the material, as "residue from the extraction or concentration of uranium from ores processed primarily for their source material content." The basis for DOE's classification of the Silos 1 and 2 material as 11e.(2) by-product material was documented in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Environmental Policy Act (NEPA), and approved by the DOE and U.S. EPA in the original Final Record of Decision for Operable Unit 4 Remedial Action in December 1994. Due to its classification as 11e.(2) by-product material, the Silos 1 and 2 materials are specifically exempt, as defined, from regulation as solid or hazardous waste under the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.4(a)(4).

The Record of Decision (ROD) Amendment for Operable Unit (OU) 4 Silos 1 and 2 Remedial Action (40700-RP-0008, approved July 13, 2000) requires treatment by chemical stabilization. The Final Explanation of Significant Differences (ESD) for Operable Unit 4 Silos 1 and 2 Remedial Action (40750-RP-0038, approved November 24, 2003) modified the Silos 1 and 2 remedy specified in the ROD amendment to allow disposal at a Permitted Commercial Disposal Facility (PCDF), in addition to the previously-approved option of disposal at the Nevada Test Site (NTS), and removed the RCRA Toxicity Characteristic Leaching Procedure (TCLP) analysis as a treatment criterion for the stabilization process. The Final ESD for Operable Unit 4, signed January 18, 2005, modified the OU4 remedy to allow the option for temporary offsite storage of treated Silos 1 and 2 materials prior to permanent offsite disposal. In adding the option for temporary offsite storage, the ESD specified the following constraints:

- Temporary offsite storage must be at an offsite government-owned facility in accordance with the appropriate DOE-orders and other applicable regulations or at a commercial facility appropriately permitted by the relevant regulatory agency.
- Storage will be limited to a period of two years. No more than two years from the date storage of material from a particular silo is initiated, the material from that silo must be either 1) permanently disposed at the storage facility in accordance with the OU4 remedy and all applicable regulatory requirements, or 2) transported to the NTS and/or a PCDF for permanent disposal.
- Under no circumstances will it be allowable for the silo material to be returned to the FCP after it has been accepted at an offsite facility for temporary storage and/or final disposal.
- Transportation from FCP to the storage facility, and any subsequent transportation to a disposal facility must meet the transportation risk criteria and all other criteria and applicable regulations specified by the current remedies.

The FCP cleanup contractor, Fluor Fernald Inc., is responsible for material retrieval, chemical stabilization, and packaging; selection of the storage and/or disposal facility(s) and mode of transportation; analysis of the Silos 1 and 2 materials for compliance with the applicable acceptance criteria; loading Silos 1 and 2 materials for shipment; and transporting the Silos 1 and 2 materials to the selected facility. Plans and requirements for completing this scope are described in the Silos 1 and 2 Project Remedial Design/Remedial Action (RD/RA) Package (40430-RDP-0001, Rev. 2, December 2003). The layout of the Silos Project Area is depicted below.

FIGURE 1-1 SILOS PROJECT AREA



Following a competitive procurement process, Waste Control Specialists, LLC in Andrews, Texas was awarded a contract for temporary storage of Silos 1 and 2 material in accordance with the requirements of the OU4 ESD. On February 23, 2005, WCS received approval modification to the radioactive materials license (L04971) from the Texas Department of State Health Services (TDSHS) to allow temporary storage of the treated Silos 1 and 2 materials at their disposal facility in Andrews, Texas. In addition, WCS has submitted an application for a license for disposal of 11e.(2) byproduct material to the TDSHS.

Fluor Fernald awarded a contract with Visionary Solutions, LLC to provide transportation of Silos 1 and 2 material from the FCP to WCS.

This plan is specific to direct-truck transportation of Silos 1 and 2 material to WCS for temporary storage in accordance with the OU4 ESD and the WCS radioactive materials license. Details concerning permanent disposal at WCS or another government owned or commercial facility, including any subsequent transportation, will be documented and submitted for review and approval once the permanent disposal location is selected. In

order to allow review and approval within the maximum storage period allowed by the ESD, the Transportation and Disposal Plan revision providing the details for final disposal of the Silos 1 and 2 material will be submitted for approval no later than 18 months from the initiation of temporary storage at WCS. Disposal at any other government or commercial site, or use of another mode of transportation, will require a revision of this Transportation and Disposal Plan to reflect the receiving facility's license and permits and/or the alternate transportation mode.

2.0 CHARACTERISTICS OF SHIPPED MATERIAL

Prior to being packaged, the Silos 1 and 2 materials will be stabilized with a formulation of flyash and Portland cement. The waste loading in the stabilized waste is expected to average from 17 to 30 weight-percent Silos 1 and 2 material; therefore, 70 to 83 weight-percent of the final stabilized waste form will be inert, non-waste material additives. The chemical stabilization process results in a significant volume increase in exchange for elimination of free liquid and reduced mobility (leachability) of lead.

Radionuclide concentrations per waste package are expected to be in the following range (pCi/g):

Radium	226	-	100,000
Thorium	230	-	15,000
Lead	210	-	100,000
Polonium	210	-	100,000
Actinium	227	-	2,000

The final physical form of the treated waste will be a concrete monolith inside a sealed steel-shipping container. Anticipated direct radiation dose rates on the outside of the shipping container are:

- 75 millirem/hour on contact (DOT standard specifies on contact dose rate shall not exceed 200 millirem/hour)
- 9 millirem/hour at 2 meters from the package (DOT standard specifies dose at 2 meters shall not exceed 10 millirem/hour)

In accordance with 49 Code of Federal Regulations (CFR) Part 173.403, the treated Silos 1 and 2 material is classified as LSA-II material. Specifically, Silos 1 and 2 materials are considered "other material in which the radioactive material is distributed throughout and the estimated average specific activity does not exceed 10-4 A2/g for solids..." The results of the LSA-II determination on Silos 1 and 2 materials are presented in Appendix A.

3.0 PACKAGING

Based on the LSA evaluation discussed above, the packaging requirement for the Silos 1 and 2 materials is an Industrial Packaging – Type 2 (IP-2) container. The current Silos 1 and 2 packaging design consists of a 76-inch diameter, 80-inch high, ½-inch thick

cylindrical carbon steel containers with external volume of 208 cubic feet. In accordance with DOT IP-2 requirements, the containers have successfully passed all required DOT tests (i.e., free drop test and stacking test). The containers will be filled with the stabilized Silos 1 & 2 materials, weighed, labeled, and surveyed before being placed onto the flatbed trailer for shipping. There will be two containers on each trailer. The filled container will have a maximum weight of 21,950 pounds. The treated waste form will be a low compressive strength cement monolith with no free liquid present. Up to 7,000 filled containers are to be generated over an 11-month period.

The packaging configuration is illustrated below.

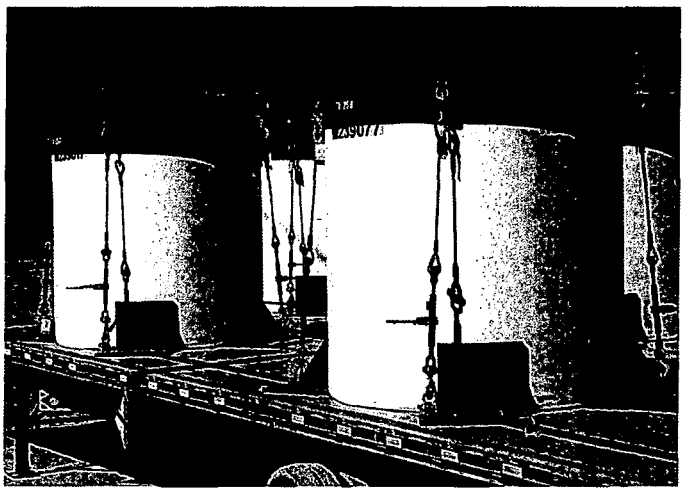


Figure 3-1: Silos 1 and 2 Packaging Configuration

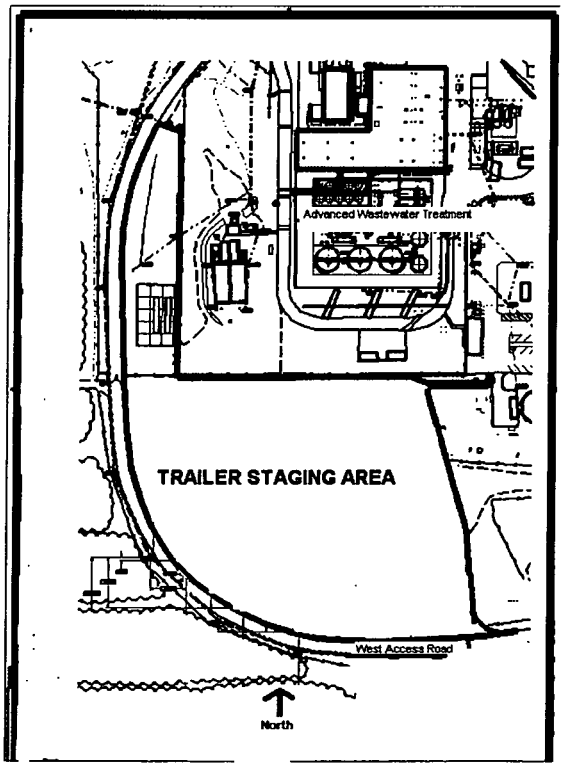
"Radioactive, Class 7" placards will be placed on the front, back, and both sides of the tractor trailer in accordance with DOT placarding requirements.

4.0 ON-SITE STAGING AND INSPECTION

4.1 CONTAINER STAGING

The loading will be done inside the Silos 1 and 2 Remediation Facility. Once the packages are approved for disposal, a flatbed trailer will be pulled into the facility and an overhead bridge crane will be utilized to load the containers as described in Section 3.3. *After being loaded, the trailers will be moved to the Trailer Staging Area (Figure 4-1) to be staged for shipment. The Trailer Staging Area has the capacity to store up to 180 containers.* Staging of filled containers that have been certified for shipment will be limited to the period of time necessary to facilitate ongoing, continuous shipments to WCS. Once a container has been filled, inspected, and certified for shipment, it will remain on-site for only the length of time required to facilitate logistics between FCP, transportation contractors, and WCS.

FIGURE 4-1 TRAILER STAGING AREA



fter the trailer is surveyed and released from the Silos area for shipment, the Shipping organization will prepare the remaining paperwork. Individual containers of Silos 1 and 2 materials will be tracked using the existing on-site waste tracking databases.

4.2 CONTINGENCY STAGING

In addition to the Trailer Staging Area, additional, contingency staging capacity will be provided to avoid the need to suspend waste treatment and packaging operations during an unforeseen temporary interruption in the FCP's ability to ship Silos 1 and 2 material to WCS. In the event of such a temporary interruption, containers will be filled, prepared & certified for shipment, and staged in the following areas:

- *The Trailer Staging Area*
- *The Trailer Loading Bay of the Silos 1 and 2 Remediation Facility*
- *The Contingency Staging Area located northwest of the Onsite Disposal Facility (OSDF)*

The layout of the Contingency Staging Area is depicted in Figure 4-2:

The total capacity of these storage areas (440 containers) would be sufficient to withstand a 30-day interruption in shipments at a nominal production rate of 15 containers per day. Once shipments to WCS are resumed, the containers in contingency staging will be shipped to WCS as soon as possible, as allowed by trailer availability, and shipment of the containers generated by ongoing production. Assuming a nominal production rate of 15 containers per day, and considering the time necessary to safely resume maximum shipping rate, an inventory of 440 containers in contingency staging would be depleted within 30 – 60 days of resuming shipments.

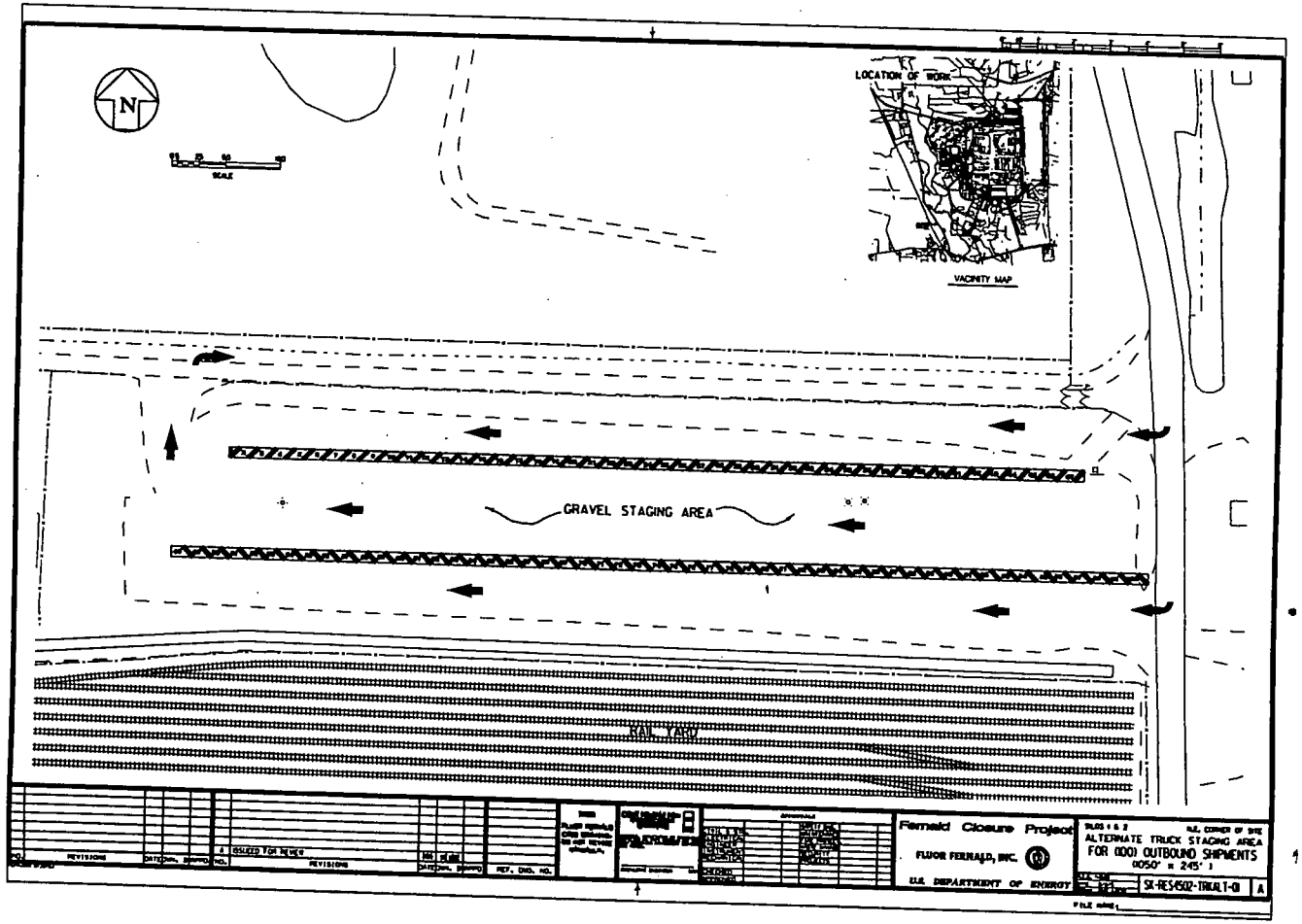
4.3 INSPECTIONS

In order to ensure the safety and integrity of containers of Silos 1 and 2 material during onsite management and subsequent transportation, the inspection program includes the following inspection activities:

- Quality inspection of containers at the vendor site, before shipment to the FCP, to verify that the container has been manufactured in accordance with approved specifications.
- Inspection of empty containers upon receipt at the Silos 1 and 2 Remediation Facility for signs of damage during transport, verify the integrity of the gasket and lid, and verify the absence of liquid or foreign objects in the container.
- Quality Control oversight during Container filling, closure and weighing
- Quality control review of process control data to verify WAC compliance
- Quality Control inspection after containers have been loaded to verify labeling, proper tie-down and container integrity.

After being unloaded at WCS, trailers will be surveyed and released for the return trip to the FCP. Visionary Solutions will maintain an ongoing, documented inspection program to ensure the operability and safety of the trailers. Upon arrival at the FCP, Inbound trailers will be moved to the Trailer Staging Area (TSA) for staging and any required maintenance and repair of unfit trailers.

Figure 4-2
LAYOUT OF CONTINGENCY STAGING AREA



5981

5.0 MATERIAL TRANSPORT

5.1 DEPARTMENT OF TRANSPORTATION REQUIREMENTS

The FCP shall comply with applicable federal, tribal, state, and local regulations. As described in Section 3, each package and shipment of hazardous materials for off-site shipment shall be prepared in compliance with 49 CFR 171-180, Hazardous Materials Regulations (HMR) and the applicable tribal, state, and local regulations.

5.2 MODE OF TRANSPORTATION

Direct truck, direct rail, and intermodal (combined truck/rail) were all considered as potential modes of transportation during design of the Silos 1 and 2 Remediation Facility, and subsequent transportation planning. Evaluation of transportation risk demonstrated that all three modes would provide safe transportation of the Silos 1 and 2 material. Truck transportation was used as the design basis to provide the flexibility for shipment to offsite locations not accessible by rail transport. Although the WCS facility is accessible by rail as well as by direct truck, it is not feasible at this stage of the project to retrofit the necessary on-site infrastructure to support rail shipments.

5.3 MOTOR CARRIER SELECTION

A contract has been awarded with Visionary Solutions, LLC to furnish motor carriers with satisfactory ratings under the Department of Energy (DOE) Motor Carrier Evaluation Program (MCEP).

The FCP provides a detailed briefing to every driver of radioactive material before the shipment departs the FCP. That briefing stresses emergency response actions to take in the unlikely event of an accident or severe weather, instructions for maintenance of exclusive use shipment controls, and the importance of remaining on the routes assigned by FCP. The FCP also requires motor carriers to utilize a satellite tracking system (e.g., Qualcomm) for each shipment and has made arrangements with the motor carriers to access that data as necessary to randomly verify the motor carrier is adhering to the assigned routes. Motor carrier drivers that fail to adhere to the assigned routes are prohibited from hauling future shipments of material for the FCP.

5.4 RISK AND SAFETY REQUIREMENTS

To demonstrate compliance with the transportation risk criteria imposed by the OU4 remedy, a transportation risk assessment was performed utilizing direct truck shipment to the NTS as a scenario representative of potential transportation modes and disposal locations. The assessment, which evaluated both potential risks associated with accident-free waste transportation (direct radiation) and the risks associated with an accident scenario, demonstrated that the transportation risk to members of the general public for both scenarios meets the criteria specified by the Silos 1 and 2 ROD Amendment. Evaluation of the assumptions and input parameters used for the evaluation documented in

the Revised Feasibility Study for Silos 1 and 2 indicates that the evaluation sufficiently bounds the risk associated with direct truck transportation to WCS to demonstrate compliance with the criteria specified by the Silos 1 and 2 remedy.

5.5 ROUTING

As defined by 49 CFR 172.403, Truck shipments of Silos 1 and 2 material are classified as Class 7 (Radioactive material), but do not contain a Highway Route Controlled Quantity (HRCQ). The planned route for truck shipments to WCS was selected In consideration of the requirements of 49 CFR 397 Subpart D, Routing of Class 7 (Radioactive) Materials, for minimization of radiological risk. Accident rates, transit time, population density and activities, and the time of day and week in which transportation will occur were considered as factors in evaluating potential transportation routes.

Potential transportation routes between the FCP and WCS were evaluated using DOE's Transportation Routing Analysis Geographic Information System (TRAGIS). TRAGIS results for the HRCQ preferred route, quickest route, shortest route, and commercial route are summarized below.

ROUTE	DISTANCE (miles)	TRAVEL TIME (hours)	POPULATION (within 800m)	PASS-THROUGH STATES
HRCQ Preferred	1389.4	24:07	549.032	OH, KY, TN, AR, TX
Quickest	1373.1	23:52	632,297	OH, KY, TN, AR, TX
Shortest	1307.7	25:53	456,907	OH, IN, IL, MO, OK, NM, TX
Commercial	1339.6	23:56	466,659	OH, IN, IL, MO, OK, NM, TX

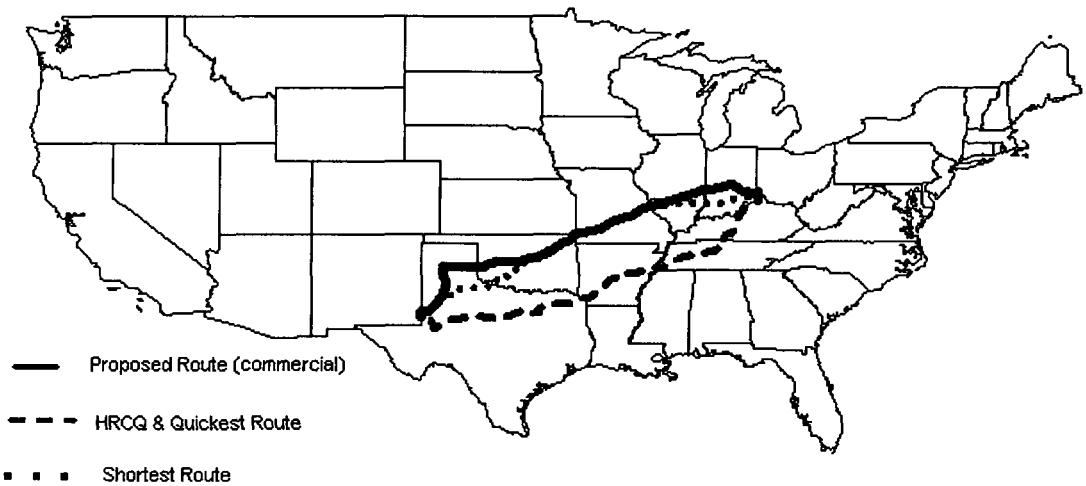
The planned primary route selected for shipments of Silos 1 and 2 material from the FCP to WCS falls along the TRAGIS 'Commercial Route'. As shown by the TRAGIS data summarized above, this route provides the best minimization of the three factors (travel time, distance, and population density. The route is described below, and illustrated on the map that follows.

FERNALD TO WCS, ANDREWS TEXAS
(1340 estimated miles)

From Fernald, OH Rte 128 to I275 to I74
I74 West to I465 loop (Indianapolis IN) to I70 West
I70 West to I255/I270 loop (St. Louis MO) to I44 West
I44 West (loops around Oklahoma City OK) to I40 West
I40 West to I27 South (Amarillo TX)
I27 to US62/82 (Lubbock TX)
US62/82 to Seminole TX
US62/180 to Hobbs NM
State Route 18 south to WCS

Interstate loops will be utilized around the following cities: Indianapolis, Indiana; St. Louis, Missouri / East St. Louis, Illinois, and Oklahoma City, Oklahoma. Bypass loops around other cities will be utilized where they exist.

Figure 5-1 TRAGIS Transportation Routes



Any necessary modification to the primary route will be communicated in advance to the impacted states.

6.0 EMERGENCY RESPONSE

6.1 INTRODUCTION

This section documents the emergency response procedures that are in place to respond to transportation accidents involving shipments of Silos 1 and 2 materials. The scope of this discussion focuses on off-site occurrences and references procedures for on-site occurrences.

DOE Order 151.1B, Comprehensive Emergency Management System, provides for a DOE Emergency Management System (EMS). This order requires sites and facilities to have emergency plans and procedures in place and to address transportation emergencies for onsite and offsite. The FCP has established plans and procedures. Also, pursuant to DOE Order 151.1, EM has authority to maintain the Transportation Emergency Preparedness Program, which assists Department of Energy (DOE) and other federal, state, tribal and local authorities to prepare for response to a transportation incident involving DOE shipments of radioactive material. DOE Order 151.1 also addresses DOE's

responsibilities under the National Contingency Plan (NCP) and the Nuclear Rad Annex of the National Response Plan.
DOE Order 435.1, Radioactive Waste Management and associated manual DOE M 435. 1-1, Chapter IV, Section L.2, Transportation, also state that the volume of waste and number of waste shipments shall be minimized to the extent practical. This requirement was considered in development of the Silos 1 and 2 waste form and associated transportation planning.

6.2 FCP EMERGENCY RESPONSE PREPAREDNESS PLANS

The FCP Transportation Emergency Plan (TEP), PL-3043, is part of the DOE-FCP Transportation Emergency Preparedness Program. The FCP TEP provides a centralized program approach to off-site transportation emergency response including products, samples, and waste shipments.

The FCP TEP describes the overall DOE/FCP process developed for the coordination of response efforts to off-site transportation incidents. This assistance planning is accomplished by adherence to applicable federal, state, and local transportation-related emergency response requirements, plus utilizing existing DOE programs designed to protect the well being of citizens and the environment from accidental release of transported materials.

Procedures for on-site emergencies are addressed in PL-3020, FCP Emergency Plan, which details the procedures to be followed at the FCP in the event of an accident or emergency, highlights FCP safety features, and governs the spill response actions. The FCP Emergency Plan is distributed to participating mutual aid organizations, such as local fire departments and hospitals, in the general vicinity of the FCP. Additionally, PL-2194, the FCP Spill Prevention Control and Countermeasure Plan will be implemented accordingly for incidents on, or in close proximity to, the FCP. Silos-specific emergency procedures are addressed in EM-0030, Silos Area Emergency Procedure.

6.3 EMERGENCY RESPONSE FOR THE FCP OFF-SITE SHIPMENTS

A Silos 1 and 2 material shipment will become an off-site shipment at the point when the entire shipment crosses the facility boundary. When the shipment is off-site, the motor carrier will be responsible for providing emergency response support to the local authorities in proximity of any incident. The carrier also will have contractors available for containment and cleanup as necessary. The FCP will provide technical assistance via the 24-hour emergency response telephone number. DOE will advise and provide support as requested by the local response authority (49 CFR 174.750). Local response personnel including police, firefighters, and emergency responders, typically are the first to arrive on the scene of an incident. They must be provided with the technical information needed by first responders to accurately identify the hazards involved in the incident. Information contained in the shipping papers includes source terms, health and safety concerns, and recommended protective actions. The information is consistent with the DOT, Research

and Special Programs Administration (RSPA) publication, North American Emergency Response Guidebook, Guide 162.

Advance notification will be provided to state and tribal emergency response organizations prior to the beginning of the Silo 1 and 2 shipping campaign. The notification will include information such as the number of shipments, the type of material and packaging configuration, the projected dates for initiation and completion of shipments, and on-site contact information. Primarily for security reasons, current policy for waste shipments does not provide for notification of the date, time, and route of individual Silo 1 and 2 waste shipments.

The following is an overview of the emergency response responsibilities of the motor carriers, DOE, individual states, and the FCP to support local authorities at an accident scene.

1. Carriers
   - Trained in accordance with DOT Emergency Response Guidebook and the carrier's respective Emergency Response Plans
   - Stabilize situation
   - Provide notification of incident to carrier home office
   - Provide notification to Visionary Solutions, LLC

2. Carrier Emergency Response Organization
   - Make appropriate additional notification (local authorities, DOE, etc.)
   - Dispatch Emergency Response Personnel to the scene to support On-Scene Commander
   - Mobilize strategically positioned emergency response subcontractors, if necessary
   - Responsible for Recovery Actions

3. Local Authorities
   - Typically function as the On-Scene Commander

4. State Emergency Response Organizations
   - Each state possesses an Emergency Response Organization capable of responding to radiological emergencies

5. DOE Regional Radiological Assistance Teams
   - Eight Radiological Assistance Team offices across the United States
   - Provide On-Scene Commanders with support in terms of radiological monitoring, communications, and information coordination during an emergency
   - Consist of DOE and contracted personnel possessing expertise in health physics, public information, and communications

The FCP TEP is activated when Visionary Solutions, LLC, the truck driver, or the local response organizations contacts the FCP to notify DOE that an incident has occurred. The FCP maintains a 24-hour emergency response telephone number (513-648-4444) through its Communications Center. Communication Center personnel are trained in the communication and notification procedures in the unlikely event of a transportation incident. In addition, all drivers are provided with a 24-hour toll-free contact number (513-738-2073) to provide responders on-scene with comprehensive emergency response and incident mitigation information regarding the material in the shipment.

The FCP Communications Center provides communication capability for the FCP, monitors conditions, and makes notifications as required. The FCP Communication Center establishes and maintains direct communication with the On-Scene Commander and the FCP Assistant Emergency Duty Officer (AEDO) until the Emergency Operations Center (EOC) is activated.

The FCP EOC is activated at the direction of the AEDO or Emergency Duty Officer (EDO) for events categorized at the emergency level, including transportation events and for non-emergency events at the discretion of the EDO. The EOC officially becomes operational when the Emergency Director or Deputy Emergency Director arrives at the EOC, determines that sufficient personnel are available to manage the response, and declares the EOC operational. The combined efforts of EOC staff members provide support, guidance, and direction to the On-Scene Commander in the field. The EOC staff assumes responsibilities such as making protective action recommendations, providing notifications, and obtaining necessary resources, as required by the specific circumstances of the event.

Motor carriers maintain Emergency Response Plans (ERP), which outline the procedures the carrier's employees must take in the event of an incident. The plan includes notification responsibilities, emergency response procedures for personnel on the scene, environmental considerations, and additional precautions to take in the event of an incident. DOE, as the shipper, will be notified by Visionary Solutions, LLC within 1 hour should an incident occur. Both Visionary Solutions, LLC, and DOE will initiate emergency procedures upon notification.

In addition, all DOT required emergency response information will be contained in the shipping papers and readily available for all law enforcement and emergency response personnel. These are located in a pocket located on the driver's door or within arm's length of the driver.

7.0 OFFSITE STORAGE / DISPOSAL

7.1 TEMPORARY OFFSITE STORAGE OF SILOS 1 AND 2 MATERIALS

7.1.1 Regulatory Information

WCS has an approved Radioactive Materials Possession License (License Number 04971) issued by the TDSHS, authorizing WCS to possess radioactive material for storage and/or treatment. On February 23, 2005, an amendment to this license, specifically addressing temporary storage of the Silos 1 and 2 11e.(2) material in accordance with the limitations of the OU4 ESD, was approved by the DSHS.

7.1.2 WCS Waste Acceptance

Upon arrival at WCS, each container will be surveyed for radioactivity and inspected for proper labeling/markings and container integrity. After being surveyed and inspected, each container will be bar coded with a unique WCS ID# that will be used to track all container movements at WCS. Wireless bar code readers will be used to update WCS's waste management and tracking database. WCS data entry personnel will enter receipt dates, manifest numbers, FCP inventory numbers, radionuclide data, and gross weights for each container into the database.

In order to minimize handling of each container, trucks will be unloaded in the licensed waste storage area via a crane equipped with the specialized grapple device. Trucks will then be surveyed and released for return to the FCP.

7.1.3 Temporary Storage at WCS

The Silos 1 and 2 containers will be stored on an asphalt pad that has been sealed with an impervious coating and equipped with engineered Stormwater run-off and drainage control features. Throughout the storage period, the containers will be inspected by trained WCS personnel on a monthly basis for evidence of tampering, leakage and container deterioration.

7.2 FINAL DISPOSAL

As required by the OU4 ESD, and by WCS's Radioactive Materials License, no more than two years from the date storage of Silos 1 and 2 material at WCS is initiated, the material will be either 1) permanently disposed at WCS facility in accordance with the OU4 remedy, an approved 11e.(2) disposal license, and all other applicable regulatory requirements, or 2) transported to a government-owned facility and/or a PCDF for permanent disposal. The details concerning permanent disposal at WCS or another government owned or commercial facility, including any subsequent transportation, will be

documented and submitted for review and approval in a Transportation and Disposal Plan revision no later than 18 months from the initiation of temporary storage at WCS.

8.0 FCP HEALTH AND SAFETY REQUIREMENTS

8.1 NUCLEAR AND SYSTEMS SAFETY

The FCP Nuclear and System Safety Program is identified in RM-2116, System Safety Requirements and is implemented by Fluor Fernald through site procedures. Safety analyses are performed to help ensure the health and safety of the public, the workers, and the environment. A Nuclear Health and Safety Plan (NHASP) for operation of the Silos 1 and 2 Project has been prepared and approved by DOE.

The Silos Project safety analysis documentation addresses staging of material and on-site motor vehicle shipping activities. All shipments and containers (including Silos 1 and 2 shipping containers) will comply with DOT regulations, which will help to ensure the health and safety of the public, the workers, and the environment.

8.2 OCCUPATIONAL SAFETY AND HEALTH

The FCP Occupational Safety and Health Program requirements are defined in the RM-0021, Safety Performance Requirements (SPR) Manual. The SPRs apply to activities at the FCP. SPRs identify requirements established by federal, state, and local regulations, in addition to requirements from DOE Orders and Best Management Practices established by Fluor Fernald through experience, lessons learned, and employee input. SPRs identify safety and health standards for assessing and planning work at the FCP. Silos 1 and 2 material shipments will be performed in accordance with existing shipping procedures, which incorporate the required SPRs.

8.3 RADIOLOGICAL PROTECTION

Equipment and material, including containers of Silos 1 and 2 materials, will be released from the Silos 1 and 2 facility when the exterior of the item meets DOT surface contamination limits. Therefore, it is planned that shipment-preparation activities will take place in a Controlled Area. FCP Radiological Control Technicians (RCTs) will conduct routine radiological surveys to ensure contamination levels are maintained below Contamination Area limits. FCP Radiological Control will survey the exterior of each container for compliance with DOT regulations and Fluor Fernald Radiological Protection Program (RPP) requirements. Exterior non-fixed contamination levels will be determined per 49 CFR 173.443, Contamination Control for shipments and 10 CFR 835, Occupational Radiation Protection for staging. Once the containers have been surveyed and are ready for release, they will be loaded onto flatbed trailers. After the trailers have been surveyed and released, they will be transported to the TSA or other on-site staging location.

If the equipment or material in the Controlled Area exceeds Contamination Area levels, a Contamination Area will be established and a new Radiation Work Permit (RWP) will be issued. The RWP will define the level of anti-contamination clothing and RCT coverage required. If decontamination is feasible, decontaminating the work surface to a level below Contamination Area limits will eliminate the need for routine wearing of anti-contamination clothing and reduce the RCT coverage requirements. If/when Contamination Areas are established, whole body monitoring will be required for exiting the area. Immediately following the completion of work, the area will be decontaminated, as necessary, and surveyed for the purpose of down-posting.

Detailed project-specific radiological control requirements are developed and incorporated into procedures and work permits.

Only necessary personnel with the appropriate training will be given access to the radiologically controlled areas. The crew will ingress/egress through a radiological control point(s) and will be subject to personal contamination monitoring upon exit. Incidents of personal contamination will be addressed per existing, approved site procedures.

In addition to the FCP radiation protection program, transportation contractors will be required to implement a personnel radiation protection program in accordance with 10CFR 20 to ensure that no driver exceeds the 5000mrem (5rem) annual dose limit.

8.4 SECURITY

Areas where Silos 1 and 2 materials will be loaded and staged pending the completion of shipment will be provided with the appropriate levels of security and lighting. FCP Security monitors site access by using stationary posts and conducting walking, driving, and perimeter patrols on a 24-hour basis.

9.0 REFERENCES

Code of Federal Regulations, 10 CFR 835,"Occupational Radiation Protection"

Code of Federal Regulations, 10 CFR Chapter 1,"Nuclear Regulatory Commission"

Code of Federal Regulations, 40 CFR 261.4, "Identification and Listing of Hazardous Waste, Exclusions"

Code of Federal Regulations, 40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan"

Code of Federal Regulations, 41 CFR 101-40, "Transportation and Traffic Management"

Code of Federal Regulations, 49 CFR 171-180, "Hazardous Materials Regulations"

Code of Federal Regulations, 49 CFR 107, "Hazardous Materials Program Procedures"

Code of Federal Regulations, 49 CFR 350-399, "Federal Motor Carrier Safety Administration"

Fernald Environmental Management Project, 1994, "Remedial Investigation Report, Operable Unit 4," OU4RI-6-Final, November, 1994

Fluor Fernald, 2000, "Record of Decision Amendment for Operable Unit 4 Silos 1 and 2 Remedial Action," 40700-RP-0008, July 13, 2000.

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Fluor Fernald, 2002, "Radiological Control Requirements Manual," RM-0020, Revision 15, March 2002

Fluor Fernald, 2001, "System Safety Requirements," RM-2116, Revision 7, April 2001

Fluor Fernald, 2002, "Safety Performance Requirements," RM-0021, Revision 35, February 2002

Fluor Fernald, 2002, "Silos Area Emergency Procedure," EM-0030, Revision 6, October 17, 2002

Fluor Fernald, 2002, "Fluor Fernald Waste Certification Program Plan, Revision 7, December 2002.

Fluor Fernald, 2003, "Silos 1 and 2 Remediation Facility Remedial Design Package," 40750-RP-0028, Rev. 0, April 2003.

Fluor Fernald, 2003, "Final Record of Decision Amendment for Operable Unit 4, Silos 1 and 2 Remedial Action, (40430-RP-0026, Rev. 0), August 2003.

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Fluor Fernald, 2004, "Silos 1 and 2 Retrieval and Disposition Nuclear Health and Safety Plan," Revision 0, February 9, 2004

Fluor Fernald, 2005, "Final Explanation of Significant Differences for Operable Unit 4 Remedial Actions," 40000-RP-0037, January 2005

U.S. Department of Energy, 1984, "Radioactive Waste Management," DOE-435.1

U.S. Department of Energy, 1992, "Hazard Categorization and Accident Analysis Techniques For Compliance With DOE Order 5480.23, Nuclear Safety Analysis Reports," DOE-STD-1027-92, December 1992

U.S. Department of Energy, "Departmental Materials Transportation and Packaging Management," DOE-460.2-1, September 2002

U.S. Department of Energy, "Packaging and Transportation Safety," DOE Order 460.1B, April 2003

U.S. Department of Energy, "Comprehensive Emergency Management System," DOE-151.1B, October 2003

U.S. Department of Energy, , "Radioactive Waste Management," DOE-435.1, August 2001

U.S. Department of Energy, 2003, "Safety Basis Requirements," 10 CFR 830, Subpart B, January 2003

APPENDIX A
SILOS 1& 2 MATERIAL LSA DETERMINATION (HM-230, EFF. OCTOBER 1, 2004)

APPENDIX A
SILOS 1& 2 MATERIAL LSA DETERMINATION (HM-230, EFF. OCTOBER 1, 2004)

DOT regulations, under 49 Code of Federal Regulations (CFR) Part 173.403, categorize low specific activity (LSA) material into three classifications: LSA-I, LSA-II, and LSA-III. To be considered LSA material, the material need only meet criterion under one of the classifications. Evaluation of the radiological content of the Silos 1 and 2 materials indicates these materials meet one criterion for LSA-II material. Specifically, Silos 1 and 2 materials are considered "other material in which the radioactive material is distributed throughout and the estimated average specific activity does not exceed 10-4 A2/g for solids..."

Table A-1 below represents the source term for the Silos 1 and 2 materials, as well as the LSA classification and packaging determinations.

Column 1 identifies each radionuclide present in the Silos 1 and 2 materials.

Columns 2 and 4 identify the activity concentration for each radionuclide in terabecquerels per gram (TBq/g) and becquerels per gram (Bq/g), respectively. Columns 3 and 5 identify the total activity of each radionuclide in terabecquerels (TBq) and becquerels (Bq), respectively. The values in Columns 3 and 5 were arrived at by taking the activity concentration per radionuclide multiplied by the net weight in grams of material.

The radionuclide specific limits shown in Columns 6 and 8 are prescribed by 49 CFR 173.436. 49 CFR 173.436 Footnote (b) specifies the progeny that have been taken into consideration when assigning the activity concentration and consignment limits of the parent. The table provides a list of these parent/progeny relationships included in Silos 1 and 2 materials.

Column 7 contains the result of the unity calculation per nuclide for the activity concentration limit for exempt material (ACEM) and is derived by the following:
Column 4, "Activity Concentration (Bq/g)" divided by Column 6, "ACEM [Activity Concentration Limit for Exempt Material] (Bq/g)"

Column 9 contains the result of the unity calculation per nuclide for the activity limit for exempt consignment (ALEC) and is derived by the following:
Column 5, "Total Activity (Bq)" divided by Column 8, "ALEC [Activity Limit for Exempt Consignment] (Bq)"

If the sum of either column is less than or equal to 1, then the material is not regulated as Class 7 radioactive material. As demonstrated in the table, the sum of each unity calculation individually exceeds 1; therefore, the Silos 1 and 2 material meets the definition of Class 7 radioactive material.

Column 10 identifies the applicable LSA-I limit, which is 30 times the ACEM. Column 11 contains the result of the unity calculation per nuclide for LSA-I and is derived by the following:
Column 4, "Activity Concentration (Bq/g)" divided by Column 10, "LSA-I(1)(iv) 30x Activity Concentration Limit (Bq/g)"

If the sum of Column 11 exceeds 1, then the radioactive material cannot be shipped as LSA-I material. As shown in the table, the LSA-I unity calculation greatly exceeds 1; therefore, it does not meet the definition of LSA-I.

Column 14 identifies the A2 values prescribed by 49 CFR 173.435. 49 CFR 173.435, Footnote (a), indicates that certain A2 values already include the contributions from daughter nuclides with half-lives less than 10 days and considered to be in secular equilibrium with their parent nuclide. The table provides a list of these parent/daughter relationships included in Silos 1 and 2 materials.

The definition of LSA-II solid material found at 173.403 *LSA material* requires that the activity is distributed throughout and the average specific activity of the material is less than 10^{-4} A_2/g. This limit is identified in Column 12. Column 13 contains the result of the unity calculation per nuclide for LSA-II and is derived by the following:
Column 2, "Activity Concentration (TBq/g)" divided by Column 12, "LSA-II (2)(ii) Limits 10^{-4} A2/g"

If the sum of Column13 exceeds 1, then the radioactive material cannot be shipped as LSA-II material. As shown in the table, the sum of the LSA-II unity calculation does not exceed 1; therefore, it can be classified and shipped as LSA-II material. At this point, it has been determined the Silos 1 and 2 material meets the DOT definitions of radioactive and LSA-II material.

Column 15 contains the result of the A2 unity calculation per nuclide and is derived by the following:
Column 3, "Total Activity (TBq)" divided by Column 14, "A2 Limits (TBq)"

If the sum of Column 15 exceeds 1, thereby exceeding an A2 quantity, the material cannot be shipped in an excepted package as permitted by 173.427(b)(4). As shown in the table, the sum of the A2 unity exceeds 1; therefore, the Silos 1 and 2 material must and will be packaged in a Type IP-2 packaging, subject to the limitations of Table 6, as required by 49 CFR 173.427 (b)(1). Per Table 5, the activity limit for the conveyance is unlimited for LSA-II Non-combustible Solids.

TABLE A-1

Project: Silos 1 & 2 Transportation & Disposal Plan - Appendix A
Container: Non-Bulk IP-2
Weight/Unit: 19000 Lbs.
Net Weight: 19000.0 Lbs. **Net Wt (Gms):** 8,618,210.0

					49 CFR 173.436 [HM-230]				49 CFR 173.403 [HM-230]				49 CFR 173.435 [HM-230]	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Radionuclide	Activity Concentration (TBq/g)	Total Activity (TBq)	Activity Concentration (Bq/g)	Total Activity (Bq)	ACEM [Activity Concentration Limit for Exempt Material] (Bq/g)	ACEM Unity	ALEC [Activity Limit for Exempt Consignment] (Bq)	ALEC Unity	LSA-I (1)(iv) 30X Activity Concentration Limit (Bq/g)	LSA-I Unity	LSA-II (2)(ii) Limits 10^{-4} A2/g	LSA-II Unity	A2 Limits (TBq)	A2 Unity
Ac-227	5.809E-11	5.006E-04	5.809E+01	5.006E+08	1.000E-01	5.809E+02	1.000E+03	5.006E+05	3.000E+00	1.936E+01	9.000E-09	6.454E-03	9.000E-05	5.563E+00
Ac-228	4.736E-12	4.082E-05	4.736E+00	4.082E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Bi-210	3.134E-09	2.701E-02	3.134E+03	2.701E+10	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Bi-211	5.809E-11	5.006E-04	5.809E+01	5.006E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Bi-212	4.736E-12	4.082E-05	4.736E+00	4.082E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Bi-214	3.134E-09	2.701E-02	3.134E+03	2.701E+10	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Fr-223	8.029E-13	6.920E-06	8.029E-01	6.920E+06	1.000E+01	8.029E-02	1.000E+04	6.920E+02	3.000E+02	2.676E-03	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Pa-231	5.809E-11	5.006E-04	5.809E+01	5.006E+08	1.000E+00	5.809E+01	1.000E+03	5.006E+05	3.000E+01	1.936E+00	4.000E-08	1.452E-03	4.000E-04	1.252E+00
Pa-234m	3.156E-12	2.720E-05	3.156E+00	2.720E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Pb-210	3.134E-09	2.701E-02	3.134E+03	2.701E+10	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	5.000E-08	6.268E-04	5.000E-02	5.402E-01
Pb-211	5.809E-11	5.006E-04	5.809E+01	5.006E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Pb-212	4.736E-12	4.082E-05	4.736E+00	4.082E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Pb-214	3.134E-09	2.701E-02	3.134E+03	2.701E+10	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-210	3.134E-09	2.701E-02	3.134E+03	2.701E+10	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	2.000E-08	1.567E-03	2.000E-02	1.350E+00
Po-211	1.587E-13	1.368E-06	1.587E-01	1.368E+06	1.000E-01	1.587E+00	1.000E+03	1.368E+03	3.000E+00	5.291E-02	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-212	3.034E-12	2.615E-05	3.034E+00	2.615E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-214	3.134E-09	2.701E-02	3.134E+03	2.701E+10	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-215	5.809E-11	5.006E-04	5.809E+01	5.006E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-216	4.736E-12	4.082E-05	4.736E+00	4.082E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Po-218	3.134E-09	2.701E-02	3.134E+03	2.701E+10	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Ra-223	5.809E-11	5.006E-04	5.809E+01	5.006E+08	1.000E+02	5.809E-01	1.000E+05	5.006E+03	3.000E+03	1.936E-02	7.000E-07	8.299E-05	7.000E-03	7.152E-02
Ra-224	4.736E-12	4.082E-05	4.736E+00	4.082E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Ra-226	3.134E-09	2.701E-02	3.134E+03	2.701E+10	1.000E+01	3.134E+02	1.000E+04	2.701E+06	3.000E+02	1.045E+01	3.000E-07	1.045E-02	3.000E-03	9.003E+00
Ra-228	4.736E-12	4.082E-05	4.736E+00	4.082E+07	1.000E+01	4.736E-01	1.000E+05	4.082E+02	3.000E+02	1.579E-02	2.000E-08	2.368E-06	2.000E-02	2.041E-03
Rn-219	5.809E-11	5.006E-04	5.809E+01	5.006E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Rn-220	4.736E-12	4.082E-05	4.736E+00	4.082E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Rn-222	3.134E-09	2.701E-02	3.134E+03	2.701E+10	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Th-227	5.809E-11	5.006E-04	5.809E+01	5.006E+08	1.000E+01	5.809E+00	1.000E+04	5.006E+04	3.000E+02	1.936E-01	5.000E-07	1.162E-04	5.000E-03	1.001E-01
Th-228	4.736E-12	4.082E-05	4.736E+00	4.082E+07	1.000E+00	4.736E+00	1.000E+04	4.082E+03	3.000E+01	1.579E-01	1.000E-07	4.736E-05	1.000E-03	4.082E-02
Th-230	4.662E-10	4.018E-03	4.662E+02	4.018E+09	1.000E+00	4.662E+02	1.000E+04	4.018E+05	3.000E+01	1.554E+01	1.000E-07	4.662E-03	1.000E-03	4.018E+00
Th-231	1.443E-13	1.244E-06	1.443E-01	1.244E+06	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Th-232	4.736E-12	4.082E-05	4.736E+00	4.082E+07	1.000E+01	4.736E-01	1.000E+04	4.082E+03	3.000E+02	1.579E-02	Unlimited	0.000E+00	Unlimited	0.000E+00
Th-234	3.156E-12	2.720E-05	3.156E+00	2.720E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	3.000E-05	1.052E-07	3.000E-01	9.087E-05
Tl-207	5.809E-11	5.006E-04	5.809E+01	5.006E+08	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
Tl-208	1.706E-12	1.470E-05	1.706E+00	1.470E+07	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(b) - Progeny	0.000E+00	(a) - Daughter	0.000E+00	(a) - Daughter	0.000E+00
U-234	3.156E-12	2.720E-05	3.156E+00	2.720E+07	1.000E+01	3.156E-01	1.000E+05	2.720E+02	3.000E+02	1.052E-02	6.000E-07	5.260E-06	6.000E-03	4.533E-03
U-235	1.443E-13	1.244E-06	1.443E-01	1.244E+06	1.000E+01	1.443E-02	1.000E+04	1.244E+02	3.000E+02	4.810E-04	Unlimited	0.000E+00	Unlimited	0.000E+00
U-238	3.156E-12	2.720E-05	3.156E+00	2.720E+07	1.000E+01	3.156E-01	1.000E+04	2.720E+03	3.000E+02	1.052E-02	Unlimited	0.000E+00	Unlimited	0.000E+00
TOTALS						1.433E+03		4.173E+06		4.777E+01		2.546E-02		2.194E+01
RESULTS					RADIOACTIVE ? (T/F): TRUE				Not LSA-I		LSA-II		>A2	

173.436, Footnote (b) - Parent nuclides and their progeny included in secular equilibrium are listed in the following:	
Parent	Progeny
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
U-235	Th-231
U238	Th-234, Pa-234m

173.435, Footnote (a) - A_2 values include contributions from daughter nuclides with half-lives less than 10 days.:	
Parent	Daughter
Ac-227	Fr-223
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Po-211, Tl-207
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Bi-210
Ra-228	Ac-228
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Th-234	Pa-234m
U-235	Th-231

FLUOR

Memorandum

Fluor Fernald, Inc.

To:	Dennis Carr, MS 77	Date:	September 8, 2005
Location:	Fernald	Reference:	N/A
From:	Stanley J. Waligora Jr., CHP MS 90 ALARA Committee Chair	Fernald #:	M:SHQ:2005-0048
Location:	Fernald	Client:	DOE DE-AC24-01OH20115
Phone # :	648-4616	Subject:	**ALARA ANALYSIS INCREASED ON SITE STAGING**

c: File Record Subject ALARA
Jim Barber, MS 17
Pat Fisk, MS 19
Letter Log Copy, MS 1

PR-9 of Table 10-1: Silos 1 & 2 Remediation Project System Safety Requirements, within the *Silos 1 & 2 Remediation NHASP*, 40710-PL-0015 indicated that 180 filled waste containers would be staged on site. To allow for some flexibility in shipping logistics, the NHASP has been revised with PCN 8 to include staging of an additional 200 sealed containers in a remote area near the northwest corner of the OSDF. Operational planning had already assumed 60 sealed containers would be staged in the remediation facility. This radiation dose to personnel within the remediation facility had already been evaluated. PCN 8 allowed for PR-9 to reflect a total of 440 sealed containers to be staged on site: 180 in the primary staging area, 200 in the new alternate staging area, and 60 within the remediation facility.

A number of estimates of dose rates have been made. The containers modeled with MicroShield in SD-2091 (Feb. 10, 2005) used a weighted average of the 95 percent upper confidence concentrations for Silo 1 and for Silo 2 radionuclides. This corresponded to an average radium-226 concentration of 409,000 pCi/g. Then a single container, filled to 95.9 percent of the volume, was assumed to contain 100,000 pCi/g. This corresponds to 24.4 percent waste loading. Empirical measurements usually lie between the dose rates modeled with and without air gap build up.

Estimated Container Dose Rates from SD-2901

Location	Dose Rates (mrem/hr) With Air Gap	Without Air Gap
Contact on Container (one inch)	91.5	23.9
Edge of the trailer (from each container)	65.6	19.3
Two meters from the trailer (from each)	9.0	2.8
Truck cab	2.0	0.63

For the first 115 cylinders, the radium-226 concentrations averaged 7.71 ± 1.85 E+04 pCi/g. Contact instrument measurements averaged 48.3 ± 18.4 mrem/hr. At one meter, the average dose rate has been 14.0 ± 4.5 mrem/hr.

Dose rate surveys of trailers loaded with two waste cylinders showed the dose rate at two meters from the sides of the trailers to be 5.3 ± 2.3 mrem/hr. Where dose rates at the front of the trailer were less that 2.0 mrem/hr, in-cab dose rates were not measured. It is certain that the dose rates within the cab will be less than 1.5 mrem/hr.

The most exposed individuals will be the truck drivers. It is estimated that each driver will spend 15 minutes in a field of five mrem/hr and 15 minutes in a field of 1.5 mrem/hr This includes pick up, travel and off-loading in the staging area. This amounts to 1.85 person-mrem per trailer and 370 person-mrem for 200 trailers. Reversing the process for shipping will entail the same dose for a total cumulative dose of 740 person-mrem.

The staged trailers will be inspected monthly. It is estimated that inspection of the 200 trailers will require five hours per month in a field of 5 mrem/hr. This is equivalent to 25 person mrem per month. This will certainly be less than one year and less than 300 person-mrem.

This total of 1.04 person-rem does not deserve or require any further ALARA analysis. It represents an incremental 1.5 percent increase to the projected collective dose.

There are no neighboring activities in this relatively remote part of the FCP. The area will be fenced and posted at 50 μrem/hr to guarantee that no individual could approach a dose of 100 mrem/yr.

SJW:sjw:wls

Silos Project Design Change Notification Review and Concurrence Form
Project No.: 40750
Project Name: Silos 1 and 2 Project
Design Change Notice (DCN) No.: 40750-JEG-492
Document Change Notice Title: **Revise NHASP, Document no. 40750-PL-0015, Revision 2, PCN 8 to Revise PR-9 for Additional Staging Positions**
Summary of Change: The Silos 1 and 2 Project needs to revise PR-9 to allow to the increase on-site staging of filled containers from 180 containers to 440 containers. The revision to the NHASP is necessary to document the analysis of hazards at anticipated operating conditions.

REQUIRED CONCURRENCES:	NO	YES		
1. Safety Basis Doc. Acceptable?		X		
Safety & Health			P.L. Fisk / P.L. Fisk	9-6-05 Date
2. SRC Review Required?	X			
3. Engineering			[signature]	9/6/05 Date
4. Construction			NA [signature]	9/6/05 Date
5. QA/QC			[signature]	9/6/05 Date
6. Environmental Compliance			NA [signature]	9/6/05 Date
7. Operations			[signature]	9/6/05 Date
8. Maintenance			NA [signature]	9/6/05 Date
9. Radiological Engineering			[signature]	09/06/05 Date
10 Waste Shipping			[signature]	9-6-05

PE [signature] Date: 9-6-05

Concurrence: ___ Rejected: ___

Verification that change is complete per Silos DCN Process

PE Concurrence: _____ Date: _____

ORIGINAL

DCN No.:	40750-JEG-492	Date:	9-06-05
Subject:	Revise NHASP, Document no. 40750-PL-0015, Revision 2, PCN 8 to Revise PR-9 for Additional Staging Positions	QA/QC Reviewer:	B Sell

Electrical / Instrumentation		Megger / Continuity		Calibration		O&M Manuals		Tags & Labels		Other		Construction Acceptance Test	
Item No.	Component ID No.	REQ	VER	REQ	VER	REQ	VER	REQ	VER	REQ	VER	Test Requirement	VER
1.													
2.													
3.													
4.													
5.													
6.													

Mechanical		Lubrication		Stroking		O&M Manuals		Tags & Labels		Clean / Flush		Construction Acceptance Test	
Item No.	Component ID No.	REQ	VER	REQ	VER	REQ	VER	REQ	VER	REQ	VER	Test Requirement	VER
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													

Preventative Maintenance Required ?	Y	N	PM Reviewer:		Date:
Functional Test of Changes Required ?	Y	N	Comments:		
Test Plan No.:					

ORIGINAL

598

SILOS 1 & 2 REMEDIATION SAFETY BASIS IMPACT SCREEN (SBIS)

(Use this form for changes related to RCS, AWR, or WT&P (waste treatment and packaging)

Description of Activity/Design Change: Silos 1&2 Remediation N-HASP Rev. 2 PCN 8

Page Change 8 to 40710-PL-0015 Rev. 2, Silos 1&2 Remediation N-HASP is being issued to revise PR-9 to reflect additional designated staging positions.

Work Plan/ Design Doc. No.: DCN 40750-492	**Change Originator: Pat Fisk**
SBIS Originator: Jeff Stone	**SBIS Date: 09/6/2005**

1	Will the proposed change affect any parameters used in calculations supporting the Hazard Analysis as documented in the Remediation N-HASP? **X YES** ☐ **NO** / **EXPLAIN:** The additional staging positions will not impact any EB assumptions, but will affect ALARA parameters.
2	Will the proposed change affect any of the System Safety Requirements in the Remediation N-HASP? • Safety Basis Requirements (SBRs)? • Process Requirements (PRs)? **X YES** **NO** ☐ / **EXPLAIN:** This revision changes PR-9 to address additional designated staging positions..
3	Does the proposed change identify a potential inadequacy (e.g., new accident, hazard) in the Remediation N-HASP or any potential reduction in any SBR? ☐ **YES** **X NO** / **EXPLAIN:** This revision does not identify any new accidents or hazards.
4	Does the proposed change affect the activities or requirements of a nearby or adjacent facility or activity operating under a different safety basis (i.e., Silo 3)? ☐ **YES** **X NO** **EXPLAIN:** Adjacent facilities/activities are not impacted by this change. Radiological controls will be in place for the new staging area as required by site procedures. The safety bases for adjacent facilities are not impacted.
5	Does the proposed change result in a change in the inventory or amount of hazardous material? ☐ **YES** **X NO** / **EXPLAIN:** Inventory is not impacted by this revision.

IF the answer to ANY of these questions is **YES, THEN:** (1) update the analysis; (2) determine whether the change will put the project or affected project outside the safety envelope; (3) incorporate any mitigators or controls into the work plan/permit; (4) attach the updated analysis to this impact screen.

6	Per this SBIS, the proposed change **X DOES** ☐ **DOES NOT** impact the Remediation safety basis.

Signature: P.L. Fisk / P.L. Fi **Date:** 9-6-05
System Safety Analyst

SSA: Are there descriptive changes not requiring analysis, but requiring inclusion in the annual update? ☐ **Y** **X N**

NOTE: IF there is an impact to the safety basis, **THEN** the Project Manager's signature is required.

Signature: Danny Carr **Date:** 9-6-05
Remediation Project Manager

FS-F-5867
Rev. 4: 03-22-05, 40710-PL-0015

EFFECTIVE DATE	PCN NO.	REV. NO.	DESCRIPTION
05-10-05	5	2	Change to: (1) Section 1.1, *Purpose and Scope*, to update bullet 3 with DOE's Phase 3 authorization letter number; (2) Section 1.4.3, *WT&P Operations*, under *TWRS*, to update wt% solids value; (3) Section 5.0, *Safety Basis*, to update reference to the DOE SER approving Rev. 2 of this document; (4) Section 8.21.3, *WT&P Radiological Hazards*, under *WT&P Systems Operation*, to delete wt% value; (5) Section 10.0, *System Safety Requirements*, under *Derivation of System Safety Requirements*, to update Para. 5 on EBAs with consequences over 1 Rem at 30m; (6) Section 20.0, *References*, to update Ref. 46 (TSR doc.); (7) Appendix B, *Executive Summary*, Bullet 3, to change the event with the largest potentially-releasable inventory; (8) Section B-1.2, *Bounding Accidents*, to fix a typo; (9) Table B.1-1, *EBAs and Bounding Hazards*, to change values and/or conclusions for Segments D2, D3, D4, and D5; (10) Table B.2-4, *Nominal Inventory of K-65 Material in Remediation Facility*, to reflect new wt% solids values; (11) Table B.2-5, *Nominal Inventory of Radioactive Mat. in Remed. Fac.*, to reflect new wt% solids; (12) Section B-3.1, *Accident Scenarios*, to specify new values for flow rates and wt% solids; (13) Section B-3.2.1, *Material at Risk and Potentially Releasable Inventory*, to change results for Scenarios D2, D3, D4, and D5 to reflect new flow rates and wt% solids; (14) Section B-3.2.3, *Potentially Releasable Inventory Comparison Results*, to specify how many scenarios warrant a preliminary categorization of HC-3; (15) Table B.3-7, *WT&P: PRI Comparison to Adjusted 1027-92 Thresholds*, to replace Clarifier Failure with RCS Discharge Breach and provide new values; (16) Section B-3.3.3, *WT&P Accidents*, to update the CEDE value for RCS Discharge Breach based on new flow rates and wt% solids; (17) Section B-3.4.2, *C2 & D2: Comparison of Haz. Chem. To Threshold Limits*, to specify the bounding chemical spill based on new flow rates and wt% solids; (18) Table B.3-12, *Scenario D2 Organic Chemical Inventory*, to delete Scenario C2 and specify new inventory values for Scenario D2; (19) Table B.3-13, *Scenario D2 Inorganic Chemical Inventory*, to delete Scenario C2 and specify new inventory values for Scenario D2; (20) Table B.3-15, *Scenario D2 Chem. Conc. To ERPG Thresholds*, to delete Scenario C2, add Aroclor 1254 and Selenium, and specify new values for Scenario D2; (21) Appendix G, Section G-2.1, *Common Assumptions*, Bullet 7, to update wt% solids values; (22) Sections G-3.6, G-3.7, G-3.8, and G-3.10 (EBAs 6, 7, 8, and 10), to revise calculation values to reflect new wt% solids and flow rates; and (23) Appendix G, *Attachment*, to provide revised spreadsheets for EBAs 6, 7, 8, and 10 to reflect new wt% solids and flow rates.

5981

EFFECTIVE DATE	PCN NO.	REV. NO.	DESCRIPTION
05-24-05	6	2	Change to: (1) Section 1.4.1, *RCS Operations*, to update Figure 1-3 to reflect a new location for Rally Point 4; Section 1.4.3, *WT&P Operations*, under *TWRS*, to correct the wt.% solids value; (2) Section 8.21.3, *WT&P Radiological Hazards*, under *Basic WT&P Systems Operations*, to remove wt. % solids value; (3) Section 10.0, *System Safety Requirements*, under *Derivation of System Safety Requirements*, to re-specify the EBAs with consequences over 1 Rem at 30m based on new analyses done for PCN5; (4) Section 16.0, *Emergency Response Plan*, to reflect replacement of landline phones with cell phones, elimination of the Communications Center, and clarification of Silos Project rally points; (5) Appendix F, *Fire Hazards Analysis*, to generally shift from future tense to present tense; and to reflect Silos 1 & 2 demolition/berm removal, consolidation of Control Rooms, replacement of land line phones with cell phones, and the replacement of the Savannah Communications Center monitoring system with local Protected Premises alarms.
6/17/05	7	2	Change to: (1) Section 1.4.3, *WT&P Operations*, under *TWRS*, to update wt% solids value; (2) Section B-1.2, *Bounding Accidents*, to specify the bounding accident for WT&P; (3) Table B.1-1, *EBAs and Bounding Hazards*, to change entry for Item D1; (4) Table B.2-4, *Nominal Inventory of K-65 Material in Remediation Facility*, to reflect new wt% solids values; (5) Table B.2-5, *Nominal Inventory of Radioactive Mat. in Remed. Fac.*, to reflect new wt% solids; (6) Section B-3.1, *Accident Scenarios*, to specify new wt% solids for D3; (7) Section B-3.2.1, *Material at Risk and Potentially Releasable Inventory*, to change D2, D3, and D5 to reflect new wt% solids; (8) Table B.3-7, *WT&P: PRI Comparison to Adjusted 1027-92 Thresholds*, to provide new values for Transfer Line Break; (9) Section B-3.3.3, *WT&P Accidents*, to update the CEDE value for RCS Discharge Breach based on new wt% solids; (10) Section B-3.4.2, *C2 & D2: Comparison of Haz. Chem. To Threshold Limits*, to clarify the bounding chemical spill; (11) Table B.3-12, *Scenario D2 Organic Chemical Inventory*, to specify new inventory values for Scenario D2; (12) Table B.3-13, *Scenario D2 Inorganic Chemical Inventory*, to specify new inventory values for Scenario D2; (13) Table B.3-15, *Scenario D2 Chem. Conc. To ERPG Thresholds*, to specify new values for Scenario D2; (14) Appendix G, Section G-2.1, *Common Assumptions*, Bullet 7, to update wt% solids value; (15) Sections G-3.6, G-3.8, and G-3.10 (EBAs 6, 8, and 10), to revise calculation values to reflect new wt% solids; and (16) Appendix G, *Attachment*, to provide revised spreadsheets for EBAs 6, 8, and 10 to reflect new wt% solids.
	8	2	Revise Table 10-1, PR-9 to reflect additional designated staging positions

5981

TABLE 10-1: SILOS 1 & 2 REMEDIATION PROJECT SYSTEM SAFETY REQUIREMENTS

SBR, PR	REQUIREMENT	BASIS/SOURCE	IMPLEMENTATION
PR-3	The pressure relief valves on the TTA tanks must be inspected every two years.	Worker protection (N-HASP Vol. 2, App. G, EBA-1) DELETION Failure of TTA tank (N-HASP Vol. 2, App. G, EBA-5) API 576, *Inspecting of Pressure Relieving Devices*	• Tabware • OWI/MWI • QEP
~~PR-4~~	DELETED (SEE DISCUSSION IN 10.0 SUBSECTION)	DELETED	DELETED
~~PR-5~~	DELETED (SEE DISCUSSION IN 10.0 SUBSECTION)	DELETED	DELETED
ACCELERATED WASTE RETRIEVAL			
PR-6	When the RCS is operating, maintain TTA tank pressure between −3.5 in. and +4.5 in.	TTA failure from over- or under-pressurization (N-HASP Vol. 2 App. G, EBA-5)	Engineering controls: • Pressure reliefs • Process controls and Interlocks
PR-7	AWR operations (transfer in or out of TTA tanks) shall not occur if the RCS is not operational.	Defense-in-depth	• SOPs • Engineering control: Process controls and Interlocks
WASTE TREATMENT AND PACKAGING			
PR-8	If a package sealing failure occurs at a filling station, filling operations at that station must cease until the issue is resolved.	Public and Worker protection	• Operations procedure
PR-9	Only 440 sealed containers may be staged on site: -180 in the primary staging area, -200 in the alternate staging area, NW corner of OSDF -60 in the Remediation facility	Public and Worker protection	• Operations procedure • ALARA evaluation

PCN4

PCN4

PCN8

10.2 Silos Project Technical Safety Requirement (TSR)

5981

Technical Safety Requirements (TSRs) are the limits, controls, and related requirements necessary for the safe operation of a nuclear facility and, as appropriate for the work and the hazards identified in the documented safety analysis for the facility, includes management controls, use and application provisions, and design features, as well as a basis appendix. TSRs are subject to 10 CFR 830, Subpart B [Ref. 6].

NOTE: The Silos Project (which includes Silos 1 & 2 Remediation and Silo 3 Retrieval and Disposition) has operated with one TSR related to weight limits on the silo domes [Ref. 46]. In early 2005, AWR was completed. Silo 1 was emptied and grouted in January; it was downgraded in February, 2005. Silo 2 was emptied and grouted in March; it was downgraded in March, 2005. Because Silos 1 & 2 have been downgraded to Less Than Nuclear, the TSR no longer applies to Silos 1 & 2.

NOTE: Section numbering and pagination is being maintained to support the PCN process and referencing procedures.

PCN4

DELETION:
TABLE 10-2, SILOS PROJECT TECHNICAL SAFETY REQUIREMENT (TSR)