3604

SILOS 1 AND 2
ACCELERATED WASTE RETRIEVAL PROJECT

DRAFT FINAL

REMEDIAL DESIGN PACKAGE

REVISION 1

April 2001

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

VOLUME 1

This RD Package documents the remainder of the design for the AWR Project. The principle design elements detailed in the package include

- Design of the TTA
- Design of the RCS
- Design of the Silo Waste Retrieval System, including installation of the Silo superstructure
- Design of the Full-scale Mockup System at Silo 4
- Excavation and disposition of the Silo berm material in support of both the Silo superstructure installation and Silo waste retrieval operation
- Design of the Decant Sump Waste Retrieval and TTA Waste Retrieval Systems
- Characterization and disposition of secondary wastes generated during construction and operation activities
- Environmental controls for air emissions, wastewater, and storm water generated during construction and operation activities
- Sampling and analysis and process controls

The documents contained in the RD Package to address these design elements are described in the following sections.

Following receipt of U.S. EPA and OEPA approval of this RD Package, a Final Design Report will be prepared documenting the detailed, Certified for Construction (CFC) design. Any changes to the design will be documented, reviewed, and approved through a formal change control process. Design Change Notices (DCNs) documenting proposed changes which impact the approved RD package will be provided to OEPA and USEPA for review and approval.

1.3 AWR Project RD Package – Summary of Significant Changes

The draft RD Package for the AWR Project was originally submitted to U.S. EPA and OEPA for review in June 2000. Revisions to the RD package were necessary to incorporate responses to comments received from U.S. EPA (August 29, 2000) and OEPA (August 28, 2000). In addition to these changes in response to U.S. EPA and OEPA comments, some changes to the documentation contained in the RD package were necessary due to evolution of the AWR design during the period since the June 2000 draft RD Package was submitted. The significant changes to each section of the June 2000 draft RD Package are summarized below.

<u>Table of Contents</u>

- Updated to reflect format and content of November 2000 revised draft.
- Added references to RD Package page numbers.

<u>Section 1.0 Introduction</u>

- Minor revisions to incorporate comments and to reflect current format of RD Package.

4.4 Water Management Strategy

One of the objectives of the AWR Project is to minimize the secondary waste generated, particularly the wastewater given the limitation of the FEMP Advance Waste Water Treatment (AWWT) facility. Therefore, it is very important that the AWR Project have a water management strategy, which will closely monitored secondary wastewater generation. The slurry water needed for the Silo Waste Retrieval operation will be supplied by recycling the sluicing water through the supernate pump module within the Transfer Storage Tanks. To meet the high-pressure water quality requirements the decanted sluicing water will be processed through the Ultrafiltration Skid prior to being supplied to the high-pressure pumps. These recycling steps reduce the water dispositioned to the AWWT. The water to the AWWT consists of the condensate water from the Radon Control System Phase 1 operation. The condensate water from the RCS operation in the latter phases will be recycled to the TTA system.

The key to the successful management of water usage during the AWR Project is to effectively account for the water throughout the systems. To minimize potential for release of wastewater the following water management strategy will be employed:

- The quantity of water into and out of the silos will be continuously monitored throughout the silo waste retrieval activities. Alarm limits are set such that if the water flow into the silos is 25% greater that the water flow out of the silos, the Silo Waste Retrieval operation will be automatically stopped until the water can be accounted for and corrective action taken.

- The Bulk Waste Retrieval Strategy will utilize a localized slurry pool. The size of the slurry pool will be minimized to the amount required to support the slurry pump operation.

The K65 Decant Sump Tank located between the silos (reference drawing #05FMD010 Rev 3 "Misc Facilities General Arrangement Key Plan" will have level instrumentation for continually monitoring the infiltrate liquid level and calculating the infiltrate liquid flow rate into the decant sump tank. The flow of the liquid infiltrate into the K-65 Decant Sump Tank will be monitored and recorded both on operator roundsheets and on the automated process control system. When the action limits discussed below require removal of the liquid from the decant sump tank, a submersible pump will automatically pump the liquid to the TTA.

(Note: The current K-65 Decant Sump Tank Maintenance Action Work Plan specifies that the decant sump tank will be pumped out when the level reaches 70% capacity. Historically this criteria requires the pumping of the decant sump tank once every 6 to 12 months)

A. If the flow of liquid into the Decant Sump Tank exceeds 1 gpm, the following action will be triggered:

- Increase operator monitoring of PLC data and silo condition and document the waste retrieval operation and silo area conditions at time of alarm.

Reduce the action level for pump-out of the tank to 60% capacity and analyze content for increased levels of K-65 materials.

B. If the flow exceeds 5gpm, the following action is triggered:

- Automatically stop addition of sluicing water and transfer the slurry pool to the TTA. Suspend waste retrieval activity and note the conditions of waste retrieval operations and silo area.
- Reduce the action level for pump-out of the tank to 50% capacity and analyze content for increased levels of K-65 materials.

C. If flow limits are not exceeded, the tank level limit established in the Maintenance Action Work Plan are to be maintained which requires the decant sump tank to be pumped out at 70% capacity.

- During Berm excavation activities, the berm soil will be sampled for presence of K-65 material which may have leaked out of the silos.

4.5 Heel Removal (Conditioning and Transfer) CAT System

Heel removal follows the bulk sluicing activities. The heel is defined as the slurry, supernate, and K-65 material located on the silo bottom left after the bulk sluicing. The heel removal operation as depicted on Exhibit 4-2 consists of the following major components:

- EMMA™ - EMMA™ is used to place the Silo Retrieval End Effector and other equipment in various locations where heel is present. (Not depicted on Exhibit 4-2)
- Slurry Pump Module – Pump slurry from heel waste surge tank to the Transfer StorageTanks
- Silo Retrieval End Effector – The SREE consists of three rotating jets that are used to locally slurry material. The SREE jet nozzles operate at up to a maximum of 10,000 psi. Water to SREE comes from the SREE high-pressure pump. (detail of CATS Mode not depicted on Exhibit 4-2)
- Jet Pump – Used to vacuum the slurry out of SREE and transfer the slurry to the heel waste surge tank. (detail of CATS Mode not depicted on Exhibit 4-2)
- Heel Waste Surge Tank – located under the slurry pump module to create a reservoir from which the slurry pump can operate. (detail of CATS Mode not depicted on Exhibit 4-2)

EXHIBIT 1-2: SUMMARY OF KEY ALARMS, SETPOINTS, AND ALARM RESPONSES

TAG NO.	FUNCTION	INSTRUMENT RANGE	L-SP	H-SP	ALARMS	RESPONSE	P & ID
PDIT-SILO-20-002	MONITOR AND CONTROL SILO PRESSURE	-5 TO 5 "W.G.	-2.0" W.G.	-0.1" W.G. - Target Operating limit 0.20" W.G. - Hi 0.45" W.G. - HiHi 2.0" W.G. - Safety Relief Valve	YES	Damper modulation to regain operating setpoint: RCS and SWRS System shutdown on unrelieved pressure conditions: To alleviate a high pressure condition, begin closing supply damper, followed by opening exhaust damper. Open bypass exhaust at hi setpoint. Shutdown RCS and waste retrieval at hi-hi.	20FMD012
FE/FIT-SILO-20-001	MONITOR FLOW FROM SILO 1	0-1000 ACFM	N/A	500 ACFM	YES	Measurement of flow from silo	20FMD013
FE/FIT-SILO-20-002	MONITOR FLOW FROM SILO 2	0-1000 ACFM	N/A	500 ACFM	YES	Measurement of flow from silo	20FMD013
LVR-20-001 Silo 2 Exhaust Damper	CONTROL SILO PRESSURE	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD013
LVR-20-002 Silo 2 Supply Damper	CONTROL SILO PRESSURE	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD013
LVR-20-003 Silo 1 Supply Damper	CONTROL SILO PRESSURE	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD013
LVR-20-004 Silo 1 Exhaust Damper	CONTROL SILO PRESSURE	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD013
PDIT-SILO-20-001	MONITOR AND CONTROL SILO PRESSURE	-5 TO 5" W.G.	-2.0" W.G.	-0.1" W.G. - Operating 0.20" W.G. - H 0.45" W.G. - HH 2.0" W.G. - Safety Relief Valve	YES	Damper modulation to regain operating setpoint: RCS and SWRS System shutdown on unrelieved pressure conditions: To alleviate a high pressure condition, begin closing supply damper, followed by opening exhaust damper. Open bypass exhaust at hi setpoint. Shutdown RCS and waste retrieval at hi-hi.	20FMD013
FE/FIT-CBD-20-001A	CONTROL FLOW ACROSS CARBON BED 1A	0 TO 1000 ACFM	100 ACFM	500 ACFM	YES	Supply damper modulation to alleviate reduction in bed performance or bed isolation by closing exhaust damper on bed	20FMD016
FE/FIT-CBD-20-001B	CONTROL FLOW ACROSS CARBON BED 1B	0 TO 1000 ACFM	100 ACFM	500 ACFM	YES	Supply damper modulation to alleviate reduction in bed performance or bed isolation by closing exhaust damper on bed	20FMD016
FE/FIT-CBD-20-002A	CONTROL FLOW ACROSS CARBON BED 2A	0 TO 1000 ACFM	100 ACFM	500 ACFM	YES	Supply damper modulation to alleviate reduction in bed performance or bed isolation by closing exhaust damper on bed	20FMD016
FE/FIT-CBD-20-002B	CONTROL FLOW ACROSS CARBON BED 2B	0 TO 1000 ACFM	100 ACFM	500 ACFM	YES	Supply damper modulation to alleviate reduction in bed performance or bed isolation by closing exhaust damper on bed	20FMD016
LVR-20-005	MODULATES FLOW THOUGH CARBON BED 2B	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by individual radon monitor	20FMD016
LVR-20-006	MODULATES FLOW THOUGH CARBON BED 2A	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by individual radon monitor	20FMD016
LVR-20-017	MODULATES FLOW THOUGH CARBON BED 1A	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by individual radon monitor	20FMD016
LVR-20-021	MODULATES FLOW THOUGH CARBON BED 1B	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by individual radon monitor	20FMD016
ME/MT-CBD-20-001	MONITORS MOISTURE PRIOR TO CARBON BEDS	0 TO 100% RH	N/A	15%	YES	Changeover of operating train	20FMD016
ME/MT-CBD-20-002	MONITORS MOISTURE AFTER CARBON BEDS	0 TO 100% RH	N/A	N/A	N/A	Moisture loading on bed	20FMD016

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1 Abbreviations are defined on Instrument Identification Sheet Drawing, 05FMD001

EXHIBIT 1-2: SUMMARY OF KEY ALARMS, SETPOINTS, AND ALARM RESPONSES

TAG NO.	FUNCTION	INSTRUMENT RANGE	L-SP	H-SP	ALARMS	RESPONSE	P & ID
PDIT-CBD-20-001A	INDICATING DIFFERENTIAL PRESSURE ACROSS CARBON BED 1A	0 TO 20" W.G.	4" W.G.	15" W.G.	YES	Indicates reduced airflow and alerts operation of possible problems	20FMD016
PDIT-CBD-20-001B	INDICATING DIFFERENTIAL PRESSURE ACROSS CARBON BED 1B	0 TO 20" W.G.	4" W.G.	15" W.G.	YES	Indicates reduced airflow and alerts operation of possible problems	20FMD016
PDIT-CBD-20-002A	INDICATING DIFFERENTIAL PRESSURE ACROSS CARBON BED 2A	0 TO 20" W.G.	4" W.G.	15" W.G.	YES	Indicates reduced airflow and alerts operation of possible problems	20FMD016
PDIT-CBD-20-002B	INDICATING DIFFERENTIAL PRESSURE ACROSS CARBON BED 2B	0 TO 20" W.G.	4" W.G.	15" W.G.	YES	Indicates reduced airflow and alerts operation of possible problems	20FMD016
RE/RQIT-CBD-20-001A	MONITORS RADIATION BREAKTHOUGH OF CARBON BED 1A	0 TO 500,000 pCi/L	N/A	H-25,000 pCi/L HH-60,000 pCi/L	YES	Redistribution of air flow upon high alarm: bed shutdown on high/high alarm Adjustable over operating phases	20FMD016
RE/RQIT-CBD-20-001B	MONITORS RADIATION BREAKTHOUGH OF CARBON BED 1B	0 TO 500,000 pCi/L	N/A	H-25,000 pCi/L HH-60,000 pCi/L	YES	Redistribution of air flow upon high alarm: bed shutdown on high/high alarm Adjustable over operating phases	20FMD016
RE/RQIT-CBD-20-002B	MONITORS RADIATION BREAKTHOUGH OF CARBON BED 2A	0 TO 500,000 pCi/L	N/A	H-25,000 pCi/L HH-60,000 pCi/L	YES	Redistribution of air flow upon high alarm: bed shutdown on high/high alarm Adjustable over operating phases	20FMD016
RERQIT-CBD-20-002A	MONITORS RADIATION BREAKTHOUGH OF CARBON BED 2B	0 TO 500,000 pCi/L	N/A	H-25,000 pCi/L HH-60,000 pCi/L	YES	Redistribution of air flow upon high alarm: bed shutdown on high/high alarm Adjustable over operating phases	20FMD016
TE/TT-CBD-20-001	MONITORS TEMPERATURE ENTERING CARBON BEDS	0 TO 100°F	N/A	42°F	YES	Changeover of operating train	20FMD016
TE/TT-CBD-20-002	MONITORS TEMPERATURE EXITING CARBON BEDS	0 TO 200°F	N/A	45°F	YES	Alerts operations of possible loss of environmental control in carbon bed rooms and/or carbon bed problems	20FMD016
TE/TT-CBD-20-001A	MONITORS TEMPERATURE EXITING CARBON BEDS	0 TO 200°F	N/A	140°F	YES	Alerts operations of possible loss of environmental control in individual carbon bed rooms and/or individual carbon bed problems like heat rise within bed during drying operations	20FMD016
TE/TT-CBD-20-001B	MONITORS TEMPERATURE EXITING CARBON BEDS	0 TO 200°F	N/A	140°F	YES	Alerts operations of possible loss of environmental control in individual carbon bed rooms and/or individual carbon bed problems like heat rise within bed during drying operations	20FMD016
TE/TT-CBD-20-002A	MONITORS TEMPERATURE EXITING CARBON BEDS	0 TO 200°F	N/A	140°F	YES	Alerts operations of possible loss of environmental control in individual carbon bed rooms and/or individual carbon bed problems like heat rise within bed during drying operations	20FMD016
TE/TT-CBD-20-002B	MONITORS TEMPERATURE EXITING CARBON BEDS	0 TO 200°F	N/A	140°F	YES	Alerts operations of possible loss of environmental control in individual carbon bed rooms and/or individual carbon bed problems like heat rise within bed during drying operations	20FMD016
FE/FIT-AWT-20-001	MEASURES FLOW TO AWWT	10 TO 200 GPM	N/A	Process Determined	N/A	Monitors flow to AWT	20FMD017
LE/LIT-TNK-20-002A	INDICATING WATER LEVEL IN HOLDUP TANK 002A	0 TO 12.5 FT	N/A	10 FT	N/A	Cycles operating trains and initiates pump operation and/or termination	20FMD017
LE/LIT-TNK-20-002B	INDICATING WATER LEVEL IN HOLDUP TANK 002B	0 TO 12.5 FT	N/A	10 FT	N/A	Cycles operating trains and initiates pump operation and/or termination	20FMD017
LE/LSH-SMP-20-001	DETECTS LIQUID IN SUMP	N/A	0.5 FT	2 FT.	YES	Alert operations and begin corrective action and cleanup	20FMD017
LSHH-TNK-20-002A	MONITORS HOLDUP TANK 002A LEVEL HIGH-HIGH	N/A	N/A	6.5 FT	YES	Alert operations and changes to different operating train	20FMD017

1 Abbreviations are defined on Instrument Identification Sheet Drawing, 05FMD001

EXHIBIT 1-2: SUMMARY OF KEY ALARMS, SETPOINTS, AND ALARM RESPONSES

TAG NO.	FUNCTION	INSTRUMENT RANGE	L-SP	H-SP	ALARMS	RESPONSE	P & ID
LSHH-TNK-20-002B	MONITORS HOLDUP TANK 002B LEVEL HIGH-HIGH	N/A	N/A	6.5 FT	YES	Alert operations and changes to different operating train	20FMD017
LSLL-TNK-20-002A	MONITORS HOLDUP TANK 002A LEVEL LOW-LOW	N/A	0.5 FT	N/A	YES	Terminates condensate transfer pump operations	20FMD017
LSLL-TNK-20-002B	MONITORS HOLDUP TANK 002B LEVEL LOW-LOW	N/A	0.5 FT	N/A	YES	Terminates condensate transfer pump operations	20FMD017
PDIT-TNK-20-002A	MONITORS PRESSURE IN TANK	-5 TO 5 "W.G.	-1.0" W.G.	0.1" W.G.	YES	Monitors pressure in condensate holdup tanks	20FMD017
PDIT-TNK-20-002B	MONITORS PRESSURE IN TANK	-5 TO 5 "W.G.	-1.0" W.G.	0.1" W.G.	YES	Monitors pressure in condensate holdup tanks	20FMD017
RE/RQIT-RCS-20-001	BUILDING ROOM MONITOR	0 TO 10,000 pCi/L	N/A	100 pCi/L	YES	Shutdown and assess ventilation supply and exhaust systems	20FMD017
GA-CHR-20-001A	MONITORS CHILLER PKG GENERAL ALARMS/INPUT	N/A	OUT OF PARAMETER CONDITIONS	OUT OF PARAMETER CONDITIONS	YES	Changeover of operating train	20FMD018
GA-CHR-20-001B	MONITORS CHILLER PKG GENERAL ALARMS/INPUT	N/A	OUT OF PARAMETER CONDITIONS	OUT OF PARAMETER CONDITIONS	YES	Changeover of operating train	20FMD018
GA-DDS-20-001A	MONITORS DESICCANT DRYING PKG GENERAL ALARM/INPUT	N/A	OUT OF PARAMETER CONDITIONS	OUT OF PARAMETER CONDITIONS	YES	Changeover of operating train	20FMD018
GA-DDS-20-001B	MONITORS DESICCANT DRYING PKG GENERAL ALARM/INPUT	N/A	OUT OF PARAMETER CONDITIONS	OUT OF PARAMETER CONDITIONS	YES	Changeover of operating train	20FMD018
LSHH-DDS-20-001A	MONITORS CHILLER UNIT 001A WATER LEVEL HIGH-HIGH	0 TO 6 FT	N/A	2 FT.	YES	Alerts operation and changeover if required	20FMD018
LSHH-DDS-20-001B	MONITORS CHILLER UNIT 001B WATER LEVEL HIGH-HIGH	0 TO 6 FT	N/A	2 FT.	YES	Alerts operation and changeover if required	20FMD018
ME/MT-TOT-20-001	MONITORS TOTAL MOSITURE GOING INTO DESICCANT UNITS	0 TO 100% RH	N/A	N/A	NO	Feedback to PLC for capacity control of chiller units	20FMD018
PDIT-DDS-20-001A	MONITORS PRESSURE ACROSS DESICCANT DRYER UNIT	0 TO 10" W.G.	N/A	4" W.G.	YES	Changeover of operating train	20FMD018
PDIT-DDS-20-001B	MONITORS PRESSURE ACROSS DESICCANT DRYER UNIT	0 TO 10" W.G.	N/A	4" W.G.	YES	Changeover of operating train	20FMD018
PDIT-DDS-20-002	MONITORS PRESSURE TO CARBON BEDS	0 TO 20" W.G.	N/A	15" W.G.	YES	Alert operations of blockage and possible shutdown for protection of desiccant dryers	20FMD018
PDIT-FLT-20-001A	MONITORS PRESSURE ACROSS ROUGHING FILTER	0 TO 5" W.G.	1.0" W.G.	2.5" W.G.	YES	Alerts operations and operating train changeover if required filter replacement Low setpoint refers to loading of roughing filter located in front of HEPA (low setpoint is high for roughing filter).	20FMD018
PDIT-FLT-20-001B	MONITORS PRESSURE ACROSS ROUGHING FILTER	0 TO 5" W.G.	1.0" W.G.	2.5" W.G.	YES	Alerts operations and operating train changeover if required filter replacement Low setpoint refers to loading of roughing filter located in front of HEPA (low setpoint is high for roughing filter).	20FMD018
PDIT-SILO-20-003	MONITOR TOTAL DIFFERENTIAL PRESSURE FROM BOTH SILO 1 & 2	0 TO 20" W.G.	N/A	10" W.G.	YES	Alerts operations of static pressure and flow from both silos	20FMD018
TE/TT-TOT-20-001	MONITOR AIR TEMPERATURE INTO DESICCANT DRYING UNITS	0 TO 200 F	N/A	150F	YES	Feedback to PLC for capacity control of chiller units	20FMD018
FE/FIT-FAN-20-001A/B	MONITORS FLOW DISCHARGE FROM FAN-20-001A/B TO STACK	0 TO 1500 ACFM	N/A	N/A	N/A	Required for dose calculations System shutdown on double failure	20FMD019
FE/FIT-FAN-20-001R	MONITORS FLOW DISCHARGE FROM FAN-20-001A/B TO SUCTION SIDE (RECIRC.)	0 TO 1500 ACFM	N/A	N/A	N/A	Operational control	20FMD019
FE/FIT-FLT-20-004	MONITORS FLOW FRESH AIR INLET	0 TO 1000 ACFM	N/A	N/A	N/A	Operational control and measures the amount of makeup air added into system	20FMD019

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1 Abbreviations are defined on Instrument Identification Sheet Drawing, 05FMD001

EXHIBIT 1-2: SUMMARY OF KEY ALARMS, SETPOINTS, AND ALARM RESPONSES

TAG NO.	FUNCTION	INSTRUMENT RANGE	L-SP	H-SP	ALARMS	RESPONSE	P & ID
IS-STK-20-001	STACK ISOKENITIC SAMPLER AND RADON MONITOR	Particulate - 0 - 10E-12 uCi/mL Radon: 0-20,000 pCi/L		Particulate - 1E-12 uCi/mL Radon: 2,000 pCi/L (H) Particulate - 5E-12 uCi/mL Radon: 6,000 pCi/L (HH)	YES	High measurements alerts operations to assess and correct RCS; At HH system shutdown	20FMD019
LE/LSH-STK-20-001	EXHAUST STACK SUMP LEVEL SWITCH HIGH	N/A	N/A	0.5 FT	YES	Alarms to alert operations personnel	20FMD019
LVR-20-015	CONTROLS INTAKE FLOW RATE	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by fan discharge pressure	20FMD019
LVR-20-016	CONTROLS EXHAUST FLOW RATE TO STACK	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by fan discharge pressure	20FMD019
LVR-20-020	CONTROLS RECIRC FLOW RATE	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by fan discharge pressure	20FMD019
PDIT-FAN-20-001A/B	MONITORS FAN-20-001A/B DISCHARGE PRESSURE	0 TO 15" W.G.	N/A	7" W.G.	YES	Controls stack exhaust and makeup air dampers located at fan; Adjustable over operations	20FMD019
PDIT-FLT-20-002A	MONITORS DIFFERENTIAL PRESSURE ACROSS FILTER TRAIN A	0 TO 10" W.G.	2.0" W.G.	4.0" W.G.	YES	Alerts operations and operating train changeover if required filter replacement Low setpoint refers to loading of roughing filter located in front of HEPA (low setpoint is high for roughing filter).	20FMD019
PDIT-FLT-20-002B	MONITORS DIFFERENTIAL PRESSURE ACROSS FILTER TRAIN B	0 TO 10" W.G.	2.0" W.G.	4.0" W.G.	YES	Alerts operations and operating train changeover if required filter replacement Low setpoint refers to loading of roughing filter located in front of HEPA (low setpoint is high for roughing filter).	20FMD019
PDIT-FLT-20-004	MONITORS DIFFERENTIAL PRESSURE ACROSS FILTER	0 TO 10" W.G.	1.0" W.G.	2.0" W.G.	YES	Alerts operations and operating train changeover if required filter replacement Low setpoint refers to loading of roughing filter located in front of HEPA (low setpoint is high for roughing filter).	20FMD019
RE/RQIT-RCS-20-002	MONITORS RADIATION IN THE RCS BUILDING	0 TO 10,000 pCi/L	N/A	100 pCi/L	YES	Shutdown and assess ventilation supply and exhaust systems	20FMD019
FQI-TOT-51-002	INDICATE TOTAL FLOW FROM POTABLE WATER SUPPLY	0 TO 50 gpm	N/A	N/A	N/A	Totalizes water used by system	51FMD002
PDIT-FLT-77-001	MONITORS DIFFERENTIAL PRESSURE ACROSS RCS BUILDING FRESH AIR FILTER	0 TO 5" W.G.	1.0" W.G.	2.0" W.G.	YES	Alerts operations and operating train changeover if required filter replacement Low setpoint refers to loading of roughing filter located in front of HEPA (low setpoint is high for roughing filter).	77FMD006
PDIT-RCS-77-001	MONITORS DIFFERENTIAL PRESSURE IN RCS BUILDING	-5 TO 5 "W.G.	N/A	0" W.G.	YES	Shutdown and assess ventilation supply and exhaust systems	77FMD006
PDIT-RCS-77-003	MONITORS DIFFERENTIAL PRESSURE IN CARBON BED 001A BUILDING	-5 TO 5 "W.G.	N/A	0" W.G.	YES	Adjust damper positions	77FMD006
PDIT-RCS-77-004	MONITORS DIFFERENTIAL PRESSURE IN CARBON BED 001B BUILDING	-5 TO 5 "W.G.	N/A	0" W.G.	YES	Adjust damper positions	77FMD006
PDIT-RCS-77-005	MONITORS DIFFERENTIAL PRESSURE IN CARBON BED 002A BUILDING	-5 TO 5 "W.G.	N/A	0" W.G.	YES	Adjust damper positions	77FMD006
PDIT-RCS-77-006	MONITORS DIFFERENTIAL PRESSURE IN CARBON BED 002B BUILDING	-5 TO 5 "W.G.	N/A	0" W.G.	YES	Adjust damper positions	77FMD006
FE/FIT-FAN-77-001A/B	MONITORS FLOW DISCHARGE FROM FAN-77-001A OR B	0 TO 15,000 ACFM	N/A	N/A	N/A	Required for dose calculations	77FMD008

1 Abbreviations are defined on Instrument Identification Sheet Drawing, 05FMD001

EXHIBIT 1-2: SUMMARY OF KEY ALARMS, SETPOINTS, AND ALARM RESPONSES

TAG NO.	FUNCTION	INSTRUMENT RANGE	L-SP	H-SP	ALARMS	RESPONSE	P & ID
PDIT-FLT-77-002A	MONITORS DIFFERENTIAL PRESSURE ACROSS RCS BUILDING A FILTER	0 TO 10" W.G.	2.0" W.G.	4.0" W.G.	YES	Alerts operations and operating train changeover if required filter replacement Low setpoint refers to loading of roughing filter located in front of HEPA (low setpoint is high for roughing filter).	77FMD008
PDIT-FLT-77-002B	MONITORS DIFFERENTIAL PRESSURE ACROSS RCS BUILDING B FILTER	0 TO 10" W.G.	2.0" W.G.	4.0" W.G.	YES	Alerts operations and operating train changeover if required filter replacement Low setpoint refers to loading of roughing filter located in front of HEPA (low setpoint is high for roughing filter).	77FMD008
RE/RQIT-RCS-77-001	MONITORS RADIATION IN THE RCS BUILDING	0 TO 2,000 pCi/L	N/A	100 pCi/L	YES	Shutdown and assess ventilation supply and exhaust systems	77FMD008
PDIT-SILO-10-001	MONITORS PRESSURE IN SILO 4	-5 TO 5 "W.G.	-2.0" W.G.	0.5" W.G.	NO	Mockup System	10FMD004
FE/FIT-FLT-10-001	MONITORS FRESH AIR FLO INLET FOR SILO 4	0 TO 1500 ACFM	N/A	N/A	NO	Mockup System	10FMD005
FE/FIT-SILO-10-001	MONITORS SUPPLY AIR FLOW TO SILO 4	0 TO 1500 ACFM	N/A	N/A	NO	Mockup System	10FMD005
FE/FIT-SILO-10-002	MONITORS RETURN AIR FLOW FROM SILO 4	0 TO 1500 ACFM	N/A	N/A	NO	Mockup System	10FMD005
LVR-10-003	CONTROL FRESH AIR INLET	0 TO 100%	N/A	N/A	NO	Mockup System	10FMD005
LVR-10-004	CONTROL EXHAUST TO STACK	0 TO 100%	N/A	N/A	NO	Mockup System	10FMD005
LVR-10-005	CONTROL RECIRCULATION AIR	0 TO 100%	N/A	N/A	NO	Mockup System	10FMD005
PIT-PMP-11-301P	MONITOR DISCHARGE PRESSURE	0 TO 500 psig	N/A	250 psig	YES	Alerts operations of out of potential problems (clogged slurry line)	11FMD011
PIT-PMP-11-301S	MONITOR DISCHARGE PRESSURE	0 TO 500 psig	N/A	250 psig	YES	Alerts operations of out of potential problems (clogged slurry line)	11FMD011
PIT-SP-001	MONITORS PRESSURE IN TRANSFER LINE	0 TO 500 psig	N/A	250 psig	YES	Alerts operations of out of potential problems (clogged slurry line)	11FMD012
PIT-SP-002	MONITORS PRESSURE IN TRANSFER LINE	0 TO 500 psig	N/A	250 psig	YES	Alerts operations of out of potential problems (clogged slurry line)	11FMD012
PIT-SP-003	MONITORS PRESSURE IN TRANSFER LINE	0 TO 500 psig	N/A	250 psig	YES	Alerts operations of out of potential problems (clogged slurry line)	11FMD012
PIT-SS-001	PRIMARY SLURRY LINE PRESSURE INDICATION	0 TO 500 psig	N/A	250 psig	YES	Alerts operations of out of potential problems (clogged slurry line)	11FMD012
PIT-SS-002	SPARE SLURRY LINE PRESSURE INDICATION	0 TO 500 psig	N/A	250 psig	YES	Alerts operations of out of potential problems (clogged slurry line)	11FMD012
PIT-SS-003	PRIMARY SLURRY LINE PRESSURE INDICATION	0 TO 500 psig	N/A	250 psig	YES	Alerts operations of out of potential problems (clogged slurry line)	11FMD012
AE/AT-PMP-12-200/201	MONITORS DENSITY/FLOW IN SLUICE WATER	300 GPM / 1.2 SG	N/A	1.2 S.G.	YES	Alerts operations of out of parameter sluice water concentrations	11FMD014
LT/LC-TNK-12-001A	MONITORS WATER LEVEL & SLUDGE LEVEL IN TTA TANK 1A	0 TO 40 FT	1 FT (DELTA)	26.5 FT	YES	Termination of decant pump operations	12FMD010
LT/LC-TNK-12-001B	MONITORS WATER LEVEL & SLUDGE LEVEL IN TTA TANK 1B OR 2B	0 TO 40 FT	1 FT (DELTA)	26.5 FT	YES	Termination of decant pump operations	12FMD011
LT/LC-TNK-12-002A	MONITORS WATER LEVEL & SLUDGE LEVEL IN TTA TANK 1A OR 2A	0 TO 40 FT	1 FT (DELTA)	26.5 FT	YES	Termination of decant pump operations	12FMD012
LT/LC-TNK-12-002B	MONITORS WATER LEVEL & SLUDGE LEVEL IN TTA TANK 1B OR 2B	0 TO 40 FT	1 FT (DELTA)	26.5 FT	YES	Termination of decant pump operations	12FMD013
LIT-DEC-14-001	MONITORS WATER LEVEL & INFILTRATION INTO DECANT SUMP	0 TO 10 FT		HIGH LEVEL - 5 FT 5 gpm infiltration*	YES	Alarms on high setpoint and high infiltration and alerts operation to shutdown SWRS activities. *setpoint based on 5gpm infiltration and time period for measurable level increase	14FMD011
RQIT-TTA-20-001	TTA AREA RADIATION MONITOR	0 TO 10,000 pCi/L	N/A	100 pCi/L	YES	Shutdown and assess ventilation supply and exhaust systems	20FMD014

1 Abbreviations are defined on Instrument Identification Sheet Drawing, 05FMD001

EXHIBIT 1-2: SUMMARY OF KEY ALARMS, SETPOINTS, AND ALARM RESPONSES

TAG NO.	FUNCTION	INSTRUMENT RANGE	L-SP	H-SP	ALARMS	RESPONSE	P & ID
FE/FIT-FLT-20-005	MONITORS INTAKE AIR FLOW TO TTA	0 TO 1000 ACFM	N/A	N/A	N/A	Measurement of flow to TTA tank	20FMD015
FE/FIT-TNK-12-001A	MONITOR TANK FLOW	0 TO 1000 ACFM	N/A	500 ACFM	YES	Measurement of flow from TTA tank	20FMD015
FE/FIT-TNK-12-001B	MONITOR TANK FLOW	0 TO 1000 ACFM	N/A	500 ACFM	YES	Measurement of flow from TTA tank	20FMD015
FE/FIT-TNK-12-002A	MONITOR TANK FLOW	0 TO 1000 ACFM	N/A	500 ACFM	YES	Measurement of flow from TTA tank	20FMD015
FE/FIT-TNK-12-002B	MONITOR TANK FLOW	0 TO 1000 ACFM	N/A	500 ACFM	YES	Measurement of flow from TTA tank	20FMD015
LVR-20-007	CONTROL PRESSURE IN TANK	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD015
LVR-20-008	CONTROL PRESSURE IN TANK	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD015
LVR-20-009	CONTROL PRESSURE IN TANK	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD015
LVR-20-010	CONTROL PRESSURE IN TANK	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD015
LVR-20-011	CONTROL PRESSURE IN TANK	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD015
LVR-20-012	CONTROL PRESSURE IN TANK	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD015
LVR-20-013	CONTROL PRESSURE IN TANK	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD015
LVR-20-014	CONTROL PRESSURE IN TANK	0 TO 100%	N/A	N/A	N/A	Opposed blade damper actuated by silo pressure	20FMD015
PDIT-FLT-20-005	MONITORS DIFFERENTIAL PRESSURE ACROSS TTA TANK FRESH AIR FILTER	0 TO 5" W.G.	1.0" W.G.	2.0" W.G.	YES	Sweep air across TTA tanks	20FMD015
PDIT-TNK-12-001A	MONITOR AND CONTROL TANK PRESSURE	-5 TO 5 "W.G.	-2.0" W.G.	0.5" W.G.	YES	Damper modulation to regain operating setpoint	20FMD015
PDIT-TNK-12-001B	MONITOR AND CONTROL TANK PRESSURE	-5 TO 5 "W.G.	-2.0" W.G.	0.5" W.G.	YES	Damper modulation to regain operating setpoint	20FMD015
PDIT-TNK-12-002A	MONITOR AND CONTROL TANK PRESSURE	-5 TO 5 "W.G.	-2.0" W.G.	0.5" W.G.	YES	Damper modulation to regain operating setpoint	20FMD015
PDIT-TNK-12-002B	MONITOR AND CONTROL TANK PRESSURE	-5 TO 5 "W.G.	-2.0" W.G.	0.5" W.G.	YES	Damper modulation to regain operating setpoint	20FMD015

1 Abbreviations are defined on Instrument Identification Sheet Drawing, 05FMD001

Excursions beyond the targeted range are mitigated as discussed below. The control devices, control strategy, and the relief mechanism ensure the "never-to-exceed" values of 0.5 and −2 inches WG. Targeted setpoints for the subsequent phases of operation (Phases 2A, 2B, 2C, and 3) will be optimized based testing during the Full-scale Mock-up System activities conducted on Silo 4 during Phase 1 RCS operations.

During Phase 1, the headspace air is withdrawn from Silos 1 and 2 and transferred to the RCS for treatment. The desired pressure condition is maintained by using an induced-draft, automatically, controlled fan and damper system.

A ventilation air stream from Silo 1 or Silo 2 is exhausted into an 8-inch main duct header to the RCS Building. Upon entering the building, the air is treated through one of two process trains. After the air is treated and leaves the fan, it flows to a 10-inch duct header whose branch supply lines exhaust air to the stack, the Silos, and in subsequent phases to the TTA tanks, as needed.

The dampers associated with pressure control for Silos 1 and 2 are modulating opposed blade dampers. These dampers and the associated instrumentation are depicted on Figure 2-2. The primary dampers consist of a silo supply damper (LVR-20-003), a silo exhaust damper (LVR-20-004), a make-up air damper (LVR-20-015), and an exhaust stack damper (LVR-20-016). A pressure differential transmitter provides pressure indication inside the silos to the HMI. A redundant pressure differential transmitter will be provided to ensure proper pressure is detected and maintained in the silos.

During normal pressure operations (range ≅ 0 to −1.0 inches WG), flow from the silos through the silo exhaust damper will be monitored against the desired flow setpoint. The exhaust stack and make-up air dampers will operate to provide a constant flow to the silos by maintaining a setpoint pressure in the 10-inch fan exhaust header. The pressure differential transmitter will transmit the pressure in the exhaust header to the PLC, which will control the make-up air and exhaust dampers to maintain required header pressure. If the exhaust air header pressure reaches the high setpoint, then the exhaust stack damper will automatically begin to open to alleviate this condition. When the PLC detects the low setpoint, the make-up air damper will automatically start to open to allow more air to flow into the RCS system to maintain the desired pressure in the exhaust air header. The difference between the high and low setpoints will be approximately 0.5 inches w.g.

This offset flow control method will ensure that the exhaust flowrate from the silos will be greater than the supply flowrate, which will maintain a negative pressure within the silos. Offset flow control will be overridden in the event of pressures outside the operating range, either high or low. If the pressure exceeds the high set point or low set points for normal operating pressure range then associated opposed blade dampers for silos supply and silos exhaust will be controlled by the PLC based upon the silo pressure differential transmitter control loop.

If the pressure in the silo exceeds the high end of the operating range, the RCS will begin to operate using a master/slave pressure control scheme. Pressure in the silos will be relieved, as required, by the supply dampers acting as the masters and exhaust dampers acting as the slaves. Pressure differential transmitters provide signals to the PLC to control the dampers.

Before hydraulic mining starts in Silo 2, the connections of the rigid ductwork on the bridge to the silo and to the duct header on the pipe rack must be verified. In Phase 2B, the dampers associated with Silo 1 control shall be used to control pressures in Silo 2 to minimize the number of specialized spool pieces required for movement of the bridge. To begin Phase 2B operations, airflow must be established through the ductwork on the bridge. The dampers associated with Phase 2B operation will be reopened and the dampers associated with Phase 2A operation will be closed. Once airflow is established through the ductwork on the bridge, the flexible hoses associated with Phase 1 operations for Silo 2 can be disconnected and removed. A blind flange shall be installed over the opening associated with the hose removal to provide additional sealing.

During material retrieval activities of Silo 2, the active waste storage tanks are TNK-12-002A and TNK-12-002B while TNK-12-001A and TNK-12-001B are ventilated at a lower rate. The majority of the TTA flow is committed to tanks TNK-12-002A and TNK-12-002B. After mining and decontamination activities are complete and before the application of the fixative to the inside surfaces of the silo, ventilation of Silo 2 will be discontinued. The dampers that were opened for initiation of mining activities listed earlier are now closed.

After completion of Phase 2B, decant sump waste retrieval begins. Details of the Decant Sump Waste Retrieval System (DWRS) are provided in Section 4.3 of the System Design Description document (Appendix D of this RD Package). Because of the transient nature of this operation, steady-state material balances were not required but RCS ventilation is balanced accordingly.

2.2.4 Radon Control during Interim Storage – Phase 2C

At the conclusion of the material retrieval campaigns from Silos 1 and 2, the operation of the RCS moves from Phase 2B to Phase 2C. During this phase, the RCS ventilates various TTA components as required. Limited airflow can be maintained through TTA components during this phase. The RCS has the flexibility to recycle treated air back through the TTA manifold, or exhaust it through the stack. During the interim waste storage period, the waste storage tanks each have approximately a 2-foot layer of water on top of the material for attenuating the release of radon to the TTA headspace.

The design flowrate for the ducting system for the ventilation of TTA tanks is based upon exhausting up to 125 cfm from each tank for Phase 2C RCS operations. Airflow to and from these tanks is controlled using the same methods as those described for the silos.

2.2.5 Radon Control during Full-Scale Remediation - Phase 3

During Phase 3, the RCS can accommodate a design airflow rate of up to 500 cfm from the future full-scale treatment facility and its support facilities. In addition, the design supports an airflow rate of up to 500 cfm from the TTA tanks. Dampers would again control the balance between the two inputs. If desired, the system can be operated in the recycle mode so that air from the TTA would pass through the carbon beds and return to the TTA, in much the same way the air is to be recycled through the silos during Phase 1.

relevant AWR Project contract and regulatory requirements are being met. In addition, the ratio between the concentrations measured by the upstream and downstream monitors is maintained at or above the design value. If the preset alarm levels are exceeded, then alarms will sound and indications will be shown on the control panel located in the AWR Project control trailer. Mitigation measures and corrective actions will be implemented accordingly. In the same sense, if the radon concentrations do not exceed the preset alarm level for the stack monitors, then the RCS is functioning within limits and no mitigative actions are required. If the preset stack alarm levels are exceeded, then alarms will sound and indications will be shown on the control panel located in the AWR Project control trailer, with corresponding mitigation measures and corrective actions implemented as described in the *Process Control Plan* for the AWR Project, Document No. 624-P622-36.

2.1.3 Silo Residues

Samples of the silo residues will be taken and stored onsite for future use as determined by Fluor Fernald. The specific means of obtaining the samples, sample storage requirements, and DQOs and related analytical requirements are not yet defined. Details related to silo residues sampling will be documented for review and approval upon finalization. These details will be submitted to USEPA and OEPA as part of the *Remedial Action Work Plan for Waste Retrieval Operation.*

2.2 Elements of Quality Control (QC)

This section presents QC requirements relevant to the analysis of wastewater and air emissions samples that shall be followed by the CSL during analytical activities producing definitive data (i.e., data not measured using onsite instruments) for the AWR Project. The purpose of these requirements is to produce data of known quality that satisfies the AWR Project goals and that meets or exceeds the requirements of the standard methods of analysis. These requirements provide a mechanism for ongoing control and evaluation of data quality measurements.

CSL QC samples (i.e., blanks and laboratory control samples) will be included in the preparation batch with the field samples. The preparation batch is a number of samples (not to exceed 20) that are similar in composition and that are extracted or digested at the same time and with the same lot of reagents. The identity of each preparation batch will be unambiguously reported with the analyses so that a reviewer can identify the QC samples and the associated wastewater or air emission sample. The type of QC samples used for spiking will include the analytes of interest. Additional QC samples may be added to those required by the method to ensure accurate and precise data.

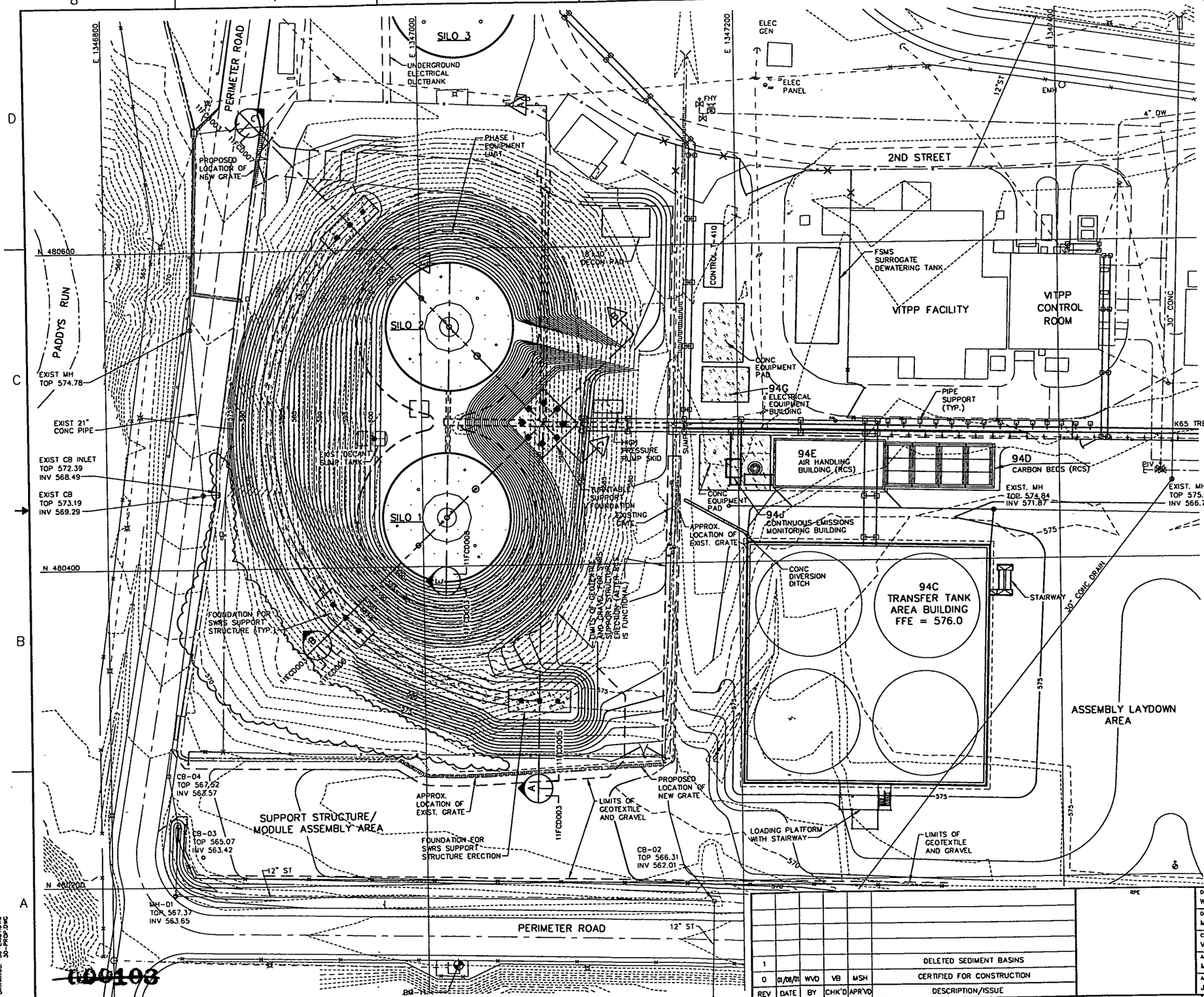
2.2.1 Laboratory Control Sample (LCS)

A LCS is an aliquot of a contaminant-free matrix fortified (spiked) with a known concentration of compound. Samples shall have a LCS spiked with appropriate analytes of interest. The CSL shall prepare and analyze a LCS with each batch of samples. The LCS is subjected to the entire analytical procedure in order to evaluate method performance. Present recovery determinations from these control samples shall be monitored to provide a continuous measure of each method's accuracy.

When an analyte in a LCS is outside the acceptable recovery limit, corrective action must be performed. After the system problems have been resolved and system control has been reestablished, samples in the analytical batch will be reanalyzed for the out-of-control method.

basin at the southeast portion of the Site. During construction of the TTA and RCS buildings, storm water will be removed from the excavation from a sump and pumped to the existing manhole in Area 4 and then to the east perimeter ditch. This will also be the method for removing stormwater when the slabs are being placed. The inlet and outlet protection at the ends of the pipes will remove the little amount of sediment involved in this procedure. The inlet and outlet protection will be maintenanced as noted on the drawings and in the Specifications. The post-development runoff is greater in each of the five areas, with diversion of the roof drainage through the existing storm drain to the perimeter ditch to the east the stormwater runoff into the perimeter ditch to the south increases only slightly from 8.19 cfs to 8.71 cfs. A 12" culvert pipe at two headwaters is capable of 5.5 cfs of flow, therefore the 2 12" dia. pipes in the south perimeter ditch have a combined capacity of 11.0 cfs. The 18" culvert pipe at the east perimeter at 2 headwaters is capable of 14.0 cfs of flow. The assumption is that this drainage system was originally designed to handle the flow from the area of the new TTA building. Since all the developed areas are to be treated with a gravel surface over a geotextile fabric, the chance of siltation and erosion in these areas is not considered to be significant. In the Silos 1 and 2 area, the configuration shown on the grading plan is the worst case scenario of Phase I grading. As excavation progresses to the Phase IIA and IIB grading, the erosion control measures will remain in the same configurations as shown for the Phase I excavation. The silt fence will collect any sediment contained in runoff from the berm excavations. Other areas around the silos are bounded by gravelled areas with silt fence protecting the concrete perimeter ditch from siltation. Further soil and erosion control measures will be deployed as noted on the Stormwater Drainage Plan Drawings and in the Construction Specifications. Proposed modifications to the existing SWS are also shown on the Drawings and are made to facilitate existing drainage paths on the site.

R-
B



NOTES:

3604

1. SEE DRAWING 05FCD011 FOR GENERAL NOTES AND LEGEND.
2. SEE DRAWING 66FCD002 FOR STORM WATER SYSTEM DRAINAGE PLAN.
3. SEE DRAWING 66FCD007 FOR STORM WATER SYSTEM PROFILES.
4. SEE DRAWING NUMBERS 11FCD009 AND 11FCD010 FOR EROSION CONTROL PLANS.
5. CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING EXISTING UTILITIES BEFORE BEGINNING EXCAVATION.
6. ALL EROSION CONTROL MEASURES WILL BE INSTALLED AT THE BEGINNING OF EXCAVATION AND MAINTAINED FOR THE DURATION OF THE PROJECT.
7. AREAS DISTURBED BY EXCAVATION ACTIVITIES ARE TO BE SEEDED AND MULCHED AS SOON AS PRACTICAL, REFER TO SPECIFICATION SECTION 02924.
8. REFER TO SPECIFICATION SECTION 02300 FOR EARTHWORK.
9. BM-11 LOCATION: N 480,149.10, E 1,347,018.61, ELEV. 569.14
10. SEPARATION FABRIC SHALL BE MIRAFI 180 N OR EQUIVALENT.
11. REFER TO SPECIFICATION SECTION 02722 FOR AGGREGATE AND/OR GRADED, CRUSHED AGGREGATE BASE COURSE.
12. REFER TO SPECIFICATION SECTION 02630 FOR STORM DRAINAGE.
13. CONTRACTOR RESPONSIBLE FOR LOCATING EXISTING FEATURES WITH SURVEY TIE-INS.
14. EXISTING STANDPIPE AT DECANT SUMP TANK TO BE PROTECTED DURING ALL PHASES OF EXCAVATION WITH A 2' HAND EXCAVATION AREA AROUND PIPE.

STATE OF OHIO NORTH (NAD 83)

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

SECTION & DETAIL KEY

000015

30 0 30 60

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1					DELETED SEDIMENT BASINS
0	01/08/01	WVD	VB	MSH	CERTIFIED FOR CONSTRUCTION

RPE

DRAWN BY W. MARVIN	DATE 01/08/01	
DESIGNED BY M. HUGHES	DATE 01/08/01	
CHECKED BY V. BHATT	DATE 01/08/01	
APPROVED BY M. HUGHES	DATE 01/08/01	
APPROVED BY J. LAWSON	DATE 01/08/01	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM EXCAVATION PLAN PHASE 1

SIZE	SCALE:	DWG. NO.	REV
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FILENAME: 11FCD003.DWG

XREF DRAWINGS: 30-EXIST.DWG 30-PROP.DWG

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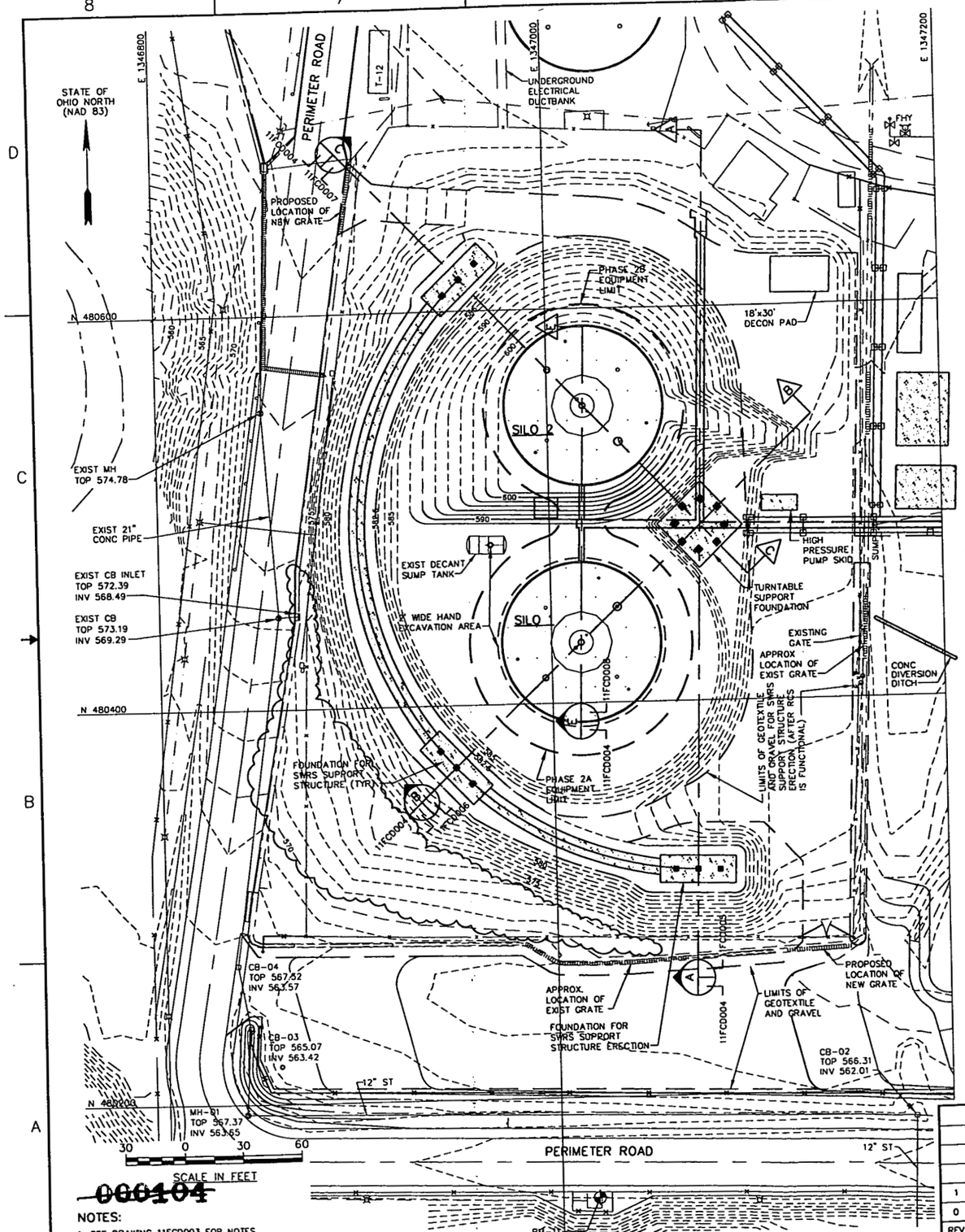

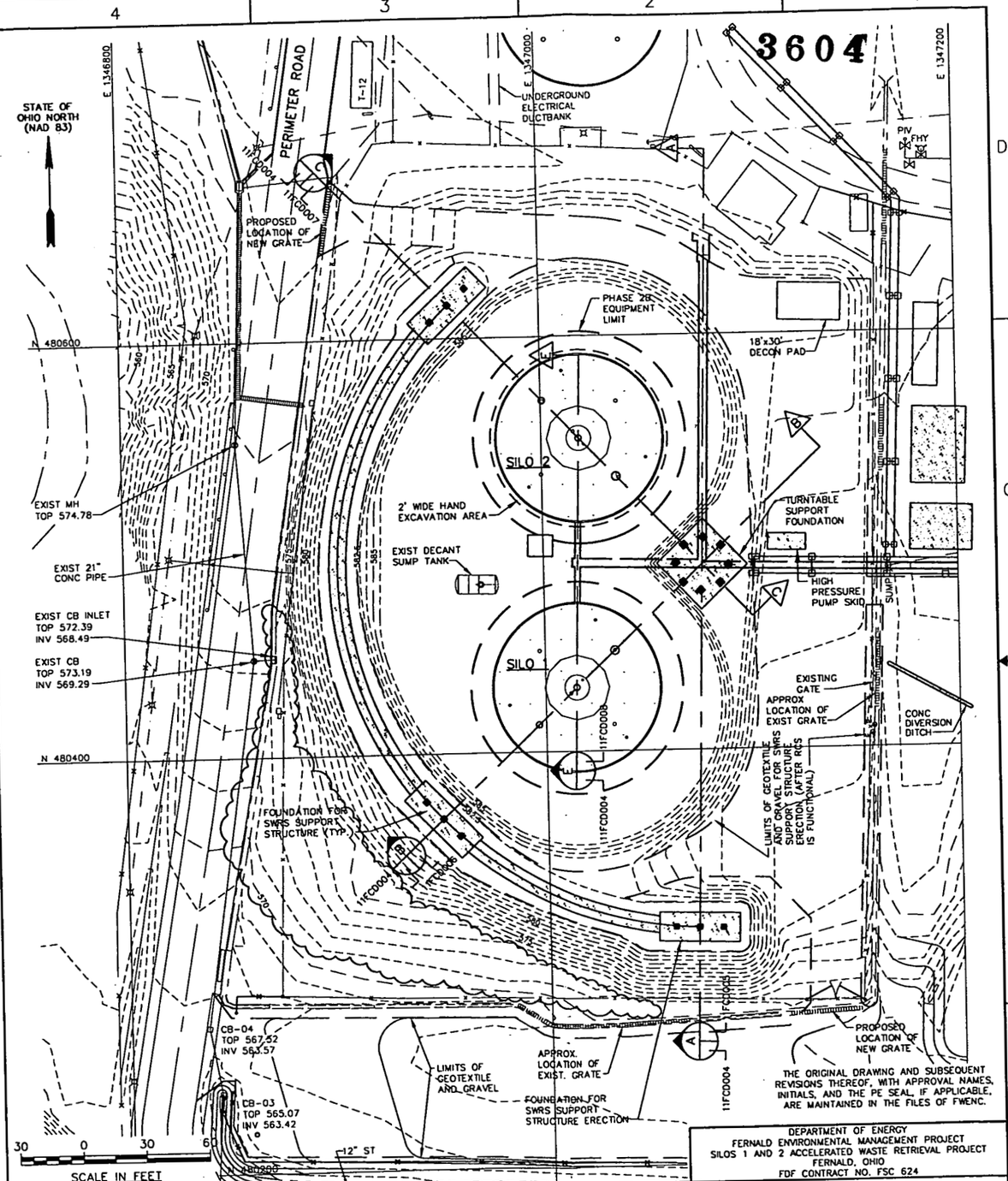

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SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

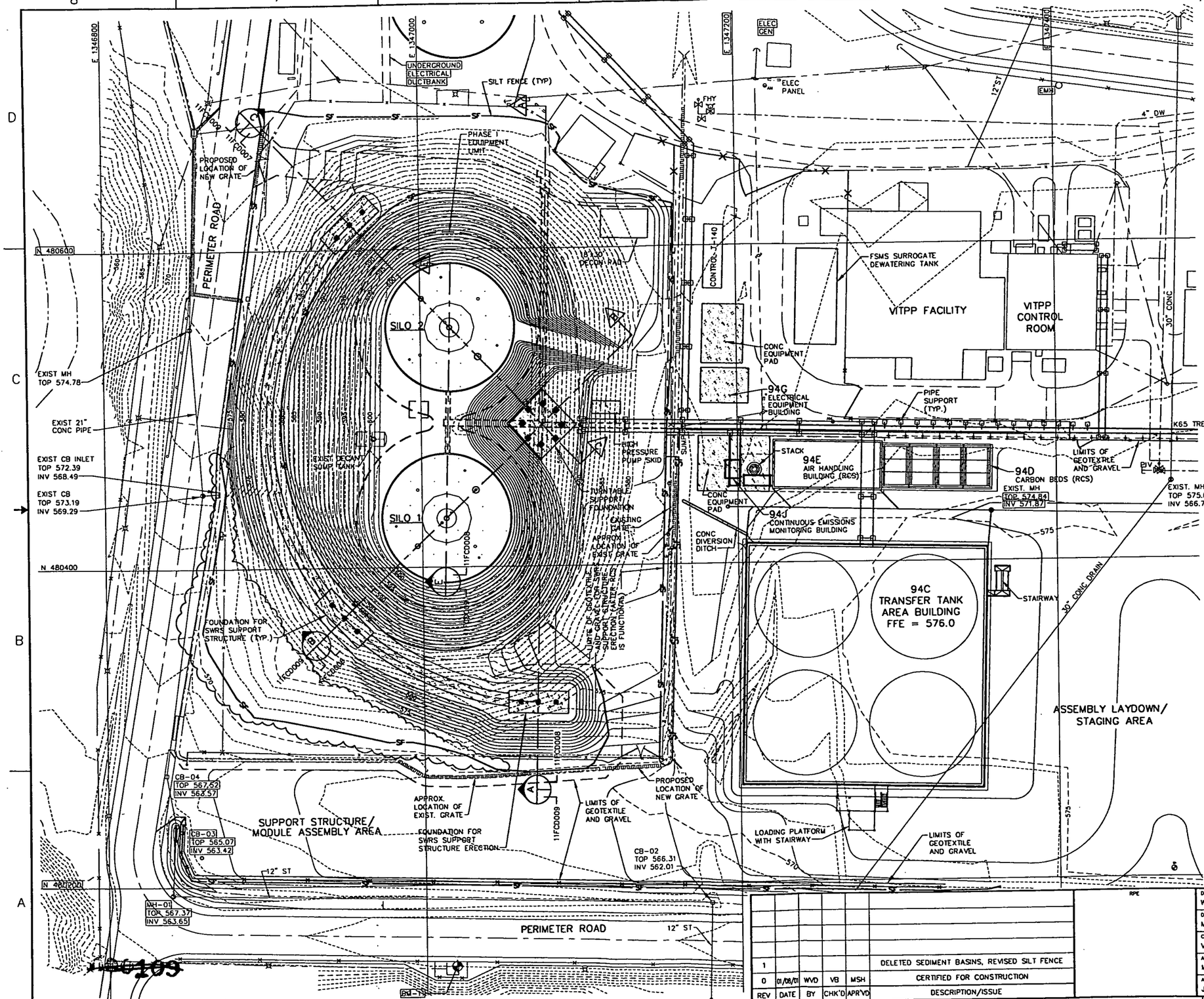
TITLE
SILO WASTE RETRIEVAL SYSTEM EXCAVATION PLAN PHASES 2A AND 2B

SIZE	SCALE:	DWG. NO.	REV
D	1"=30'	11FCD004	1

FILENAME: 11FCD004.DWG

NOTES:
1. SEE DRAWING 11FCD003 FOR NOTES.

3604



NOTES:

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7. REFER TO SPECIFICATION SECTION 02300 FOR EARTHWORK.
8. BM-11 LOCATION: N 480,149.10 E 1,347,018.61 ELEV. 569.14
9. SEPARATION FABRIC SHALL BE MIRAFI 180 N OR EQUIVALENT.
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11. REFER TO SPECIFICATION SECTION 02630 FOR STORM DRAINAGE.
12. CONTRACTOR RESPONSIBLE FOR LOCATING EXISTING FEATURES WITH SURVEY TIE-INS.
13. EXISTING STANDPIPE AT DECANT SUMP TANK TO BE PROTECTED DURING ALL PHASES OF EXCAVATION WITH A 2' HAND EXCAVATION AREA AROUND PIPE.
14. SEDIMENT TRAPS ARE DESIGNED TO GATHER SILT FROM RUNOFF AREA AT THE STORAGE RATE OF 67 cy. PER ACRE.

STATE OF OHIO NORTH (NAD 83)

30 0 30 60
SCALE IN FEET

LETTER OR NUMBER OF SECTION OR DETAIL
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DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

000017

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1					DELETED SEDIMENT BASINS, REVISED SILT FENCE
0	01/08/01	WVD	VB	MSH	CERTIFIED FOR CONSTRUCTION

RPE

DRAWN BY W. MARVIN	DATE 01/08/01
DESIGNED BY M. HUGHES	DATE 01/08/01
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DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM
EROSION CONTROL PLAN
PHASE 1

SIZE	SCALE:	DWG. NO.	REV
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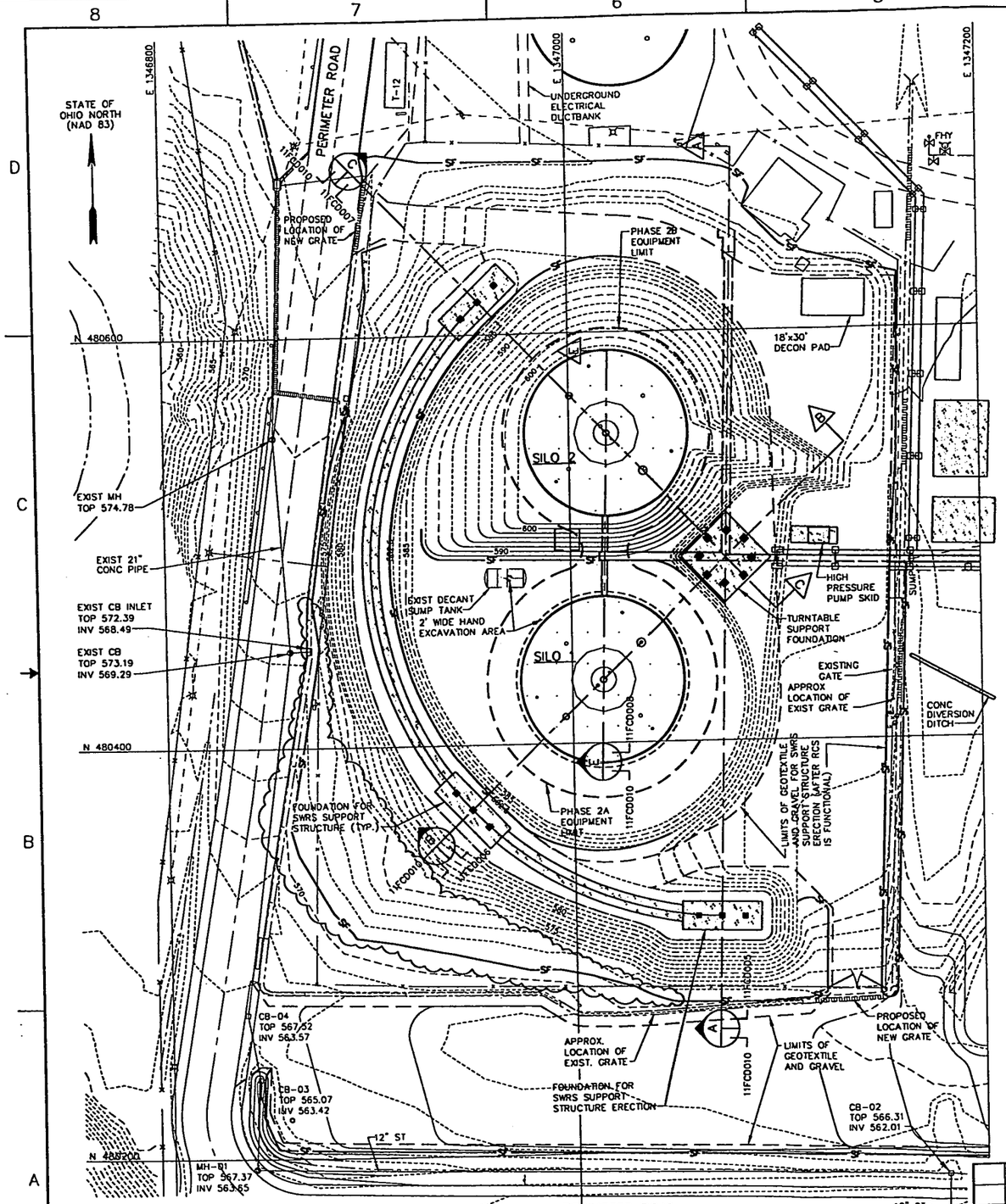

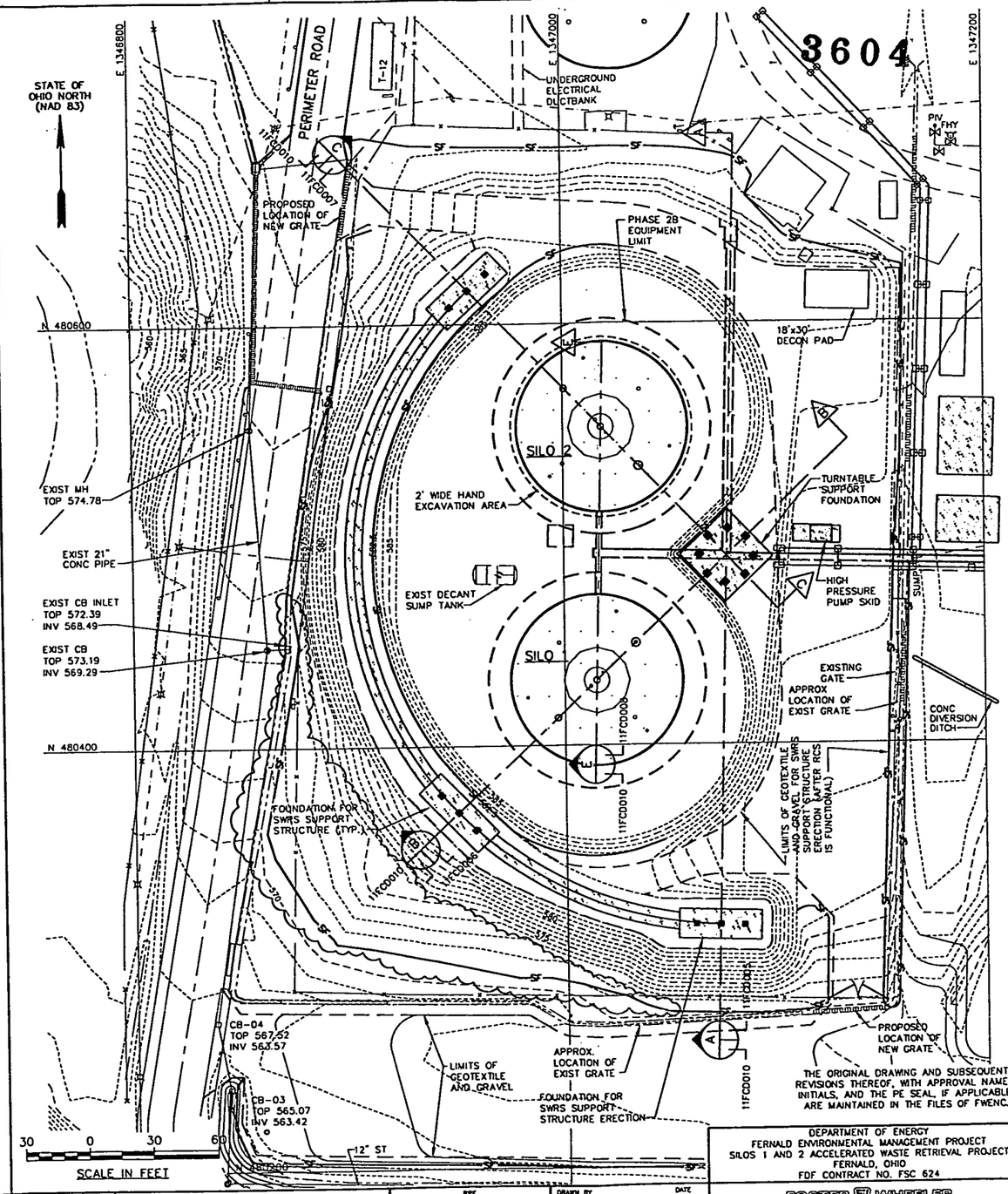

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PERIMETER ROAD

NOTES:
1. SEE DRAWING 11FCD009 FOR NOTES.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1					DELETED SEDIMENT BASINS, REVISED SILT FENCE
0	01/08/01	WVD	VB	MSH	CERTIFIED FOR CONSTRUCTION

RPE

DRAWN BY W. MARVIN	DATE 01/08/01	
DESIGNED BY M. HUGHES	DATE 01/08/01	
CHECKED BY V. BHATT	DATE 01/08/01	
APPROVED BY M. HUGHES	DATE 01/08/01	
APPROVED BY J. LAWSON	DATE 01/08/01	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

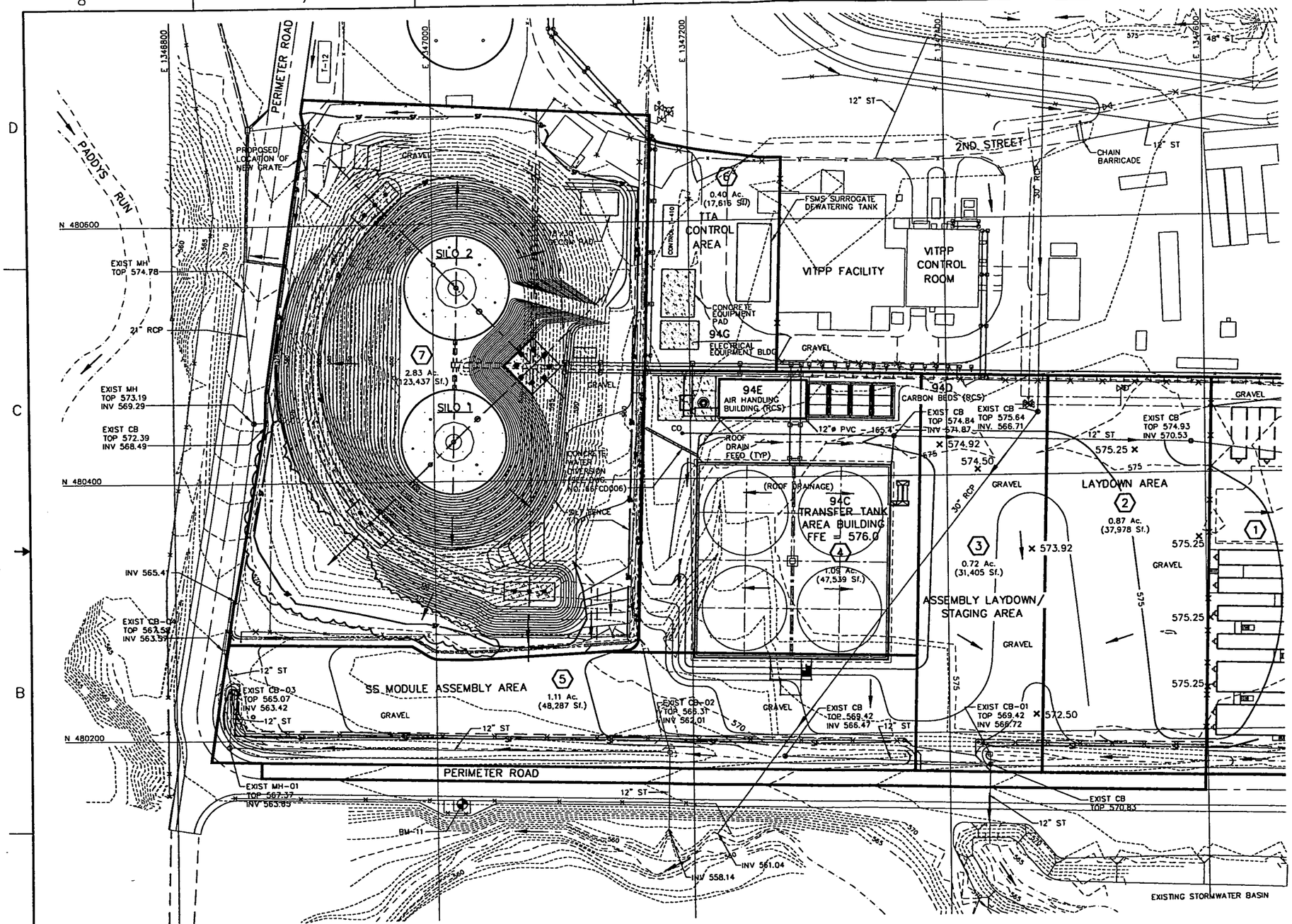
FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
SILO WASTE RETRIEVAL SYSTEM
EROSION CONTROL PLAN
PHASES 2A AND 2B

SIZE	SCALE:	DWG. NO.	REV
D	1"=30'	11FCD010	1

000018

FILENAME: 11FCD010.DWG



3604

NOTES:

1. SEE DRAWING 05FCD011 FOR GENERAL NOTES AND LEGEND.
2. SILT FENCE TO BE INSTALLED AT THE BOTTOM OF ALL DISTURBED SLOPES, AND FOLLOW CONTOUR.
3. CULVERT ENTRANCES AND EXITS TO BE PROTECTED BY COIR MATTING AND NATURAL VEGETATION.
4. AREAS DISTURBED BY EXCAVATION ACTIVITIES ARE TO BE SEEDED AND MULCHED WITHIN 7 DAYS.
5. OVERSEEDING AND RESEEDING ARE TO BE PERFORMED AS NECESSARY UNTIL VEGETATION IS ESTABLISHED.
6. SILT IS TO BE REMOVED FROM DIVERSION DITCHES AND SILT FENCE INSTALLED AS REQUIRED BY THE SPECIFICATIONS AND AT THE END OF CONSTRUCTION.
7. REINFORCED SILT FENCING IS TO INSTALLED AROUND CATCH BASINS AS SPECIFIED ON PAGE 125 OF THE ODNR RAINWATER AND LAND DEVELOPMENT MANUAL.
8. EROSION CONTROL MEASURES ARE TO BE INSPECTED WEEKLY AND WITHIN 24 HOURS OF A 0.5 INCH RAINFALL.
9. REMEDIATION OF PROBLEMS IDENTIFIED IN THE INSPECTION ARE TO BE COMPLETED IWTHIN 24 HOURS.
10. AWR PROJECT ACTIVITIES DO NOT SIGNIFICANTLY ALTER EXISTING DRAINAGE PATTERNS.
11. THE TTA BUILDING AREA ROOF DRAINAGE WILL BE DIRECTED TO THE EXISTING 12" STORM DRAIN SYSTEM AT THE NORTHEAST SECTION OF THE BUILDING.
12. EROSION AND SILTATION INTO THE CONCRETE CHANNEL IS TO BE PREVENTED.
13. ALL EROSION CONTROL MEASURES WILL BE BE INSTALLED AT THE BEGINNING OF EXCAVATION AND MAINTAINED FOR THE DURATION OF THE PROJECT.

STORMWATER LEGEND:

- (1) DRAINAGE AREA
- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- CO PROPOSED CLEANOUT
- PROPOSED SILT FENCE

STATE OF OHIO NORTH (NAD 83)

LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

40 0 40 80
SCALE IN FEET

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
4					DELETED SEDIMENT BASINS, REVISED SILT FENCE
3	11/10/00	WVM	VB	MSH	REVISED PER AWR-DCN-C-0008
2	6/1/00	WVM	VB	MSH	OHIO EPA COMMENTS
1	4/20/00	WVM	VB	MSH	AREA 2 GRAVELED, AREA 7 EXC & FNDN REMOVED
0	3/6/00	WVM	VB		CERTIFIED FOR CONSTRUCTION

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

RPE

DRAWN BY W. MARVIN	DATE 3/6/00	
DESIGNED BY M. HUGHES	DATE 3/6/00	
CHECKED BY V. BHATT	DATE 3/6/00	
APPROVED BY M. HUGHES	DATE 3/6/00	
APPROVED BY JOHN LAWSON	DATE 3/6/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
STORM WATER SYSTEM
SWRS – DRAINAGE PLAN
PHASE 1

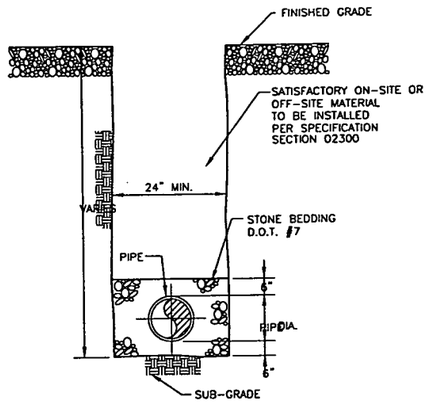
SIZE	SCALE:	DWG. NO.	REV
D	1"=30'	66FCD002	4

000019

FILENAME: 66FCD002.DWG

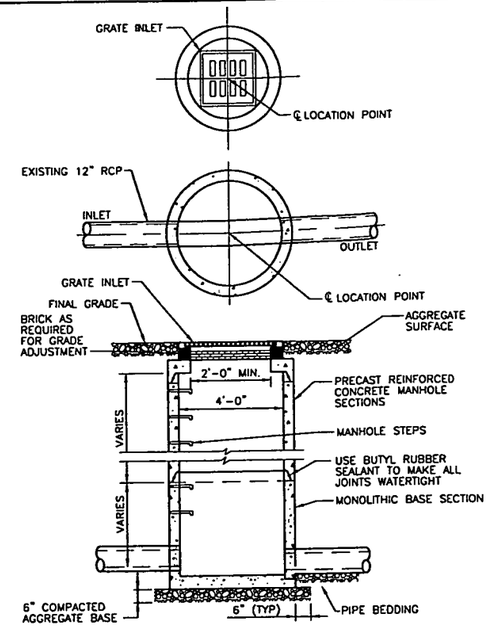
XREF DRAWINGS: 40-EXIST.DWG 40-PROP.DWG

000211



STORM PIPE BEDDING DETAIL

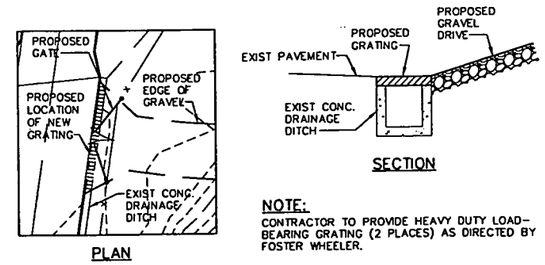
NOT TO SCALE



NOTE:
GROUT ANNULAR SPACE BETWEEN WALL AND PIPE WITH NON-SHRINK MORTAR TO ENSURE A WATERTIGHT SEAL OR USE NEOPRENE BOOT WITH COMPRESSION RING; CLAMP BOOT TO PIPE WITH STAINLESS STEEL CLAMP.

PRECAST CONCRETE AREA DRAIN DETAIL

NOT TO SCALE



NOTE:
CONTRACTOR TO PROVIDE HEAVY DUTY LOAD-BEARING GRATING (2 PLACES) AS DIRECTED BY FOSTER WHEELER.

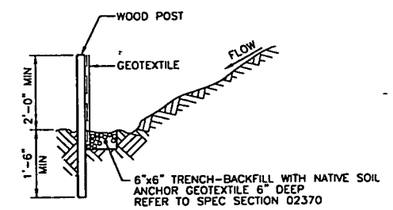
GRATING DETAIL

NOT TO SCALE

3604

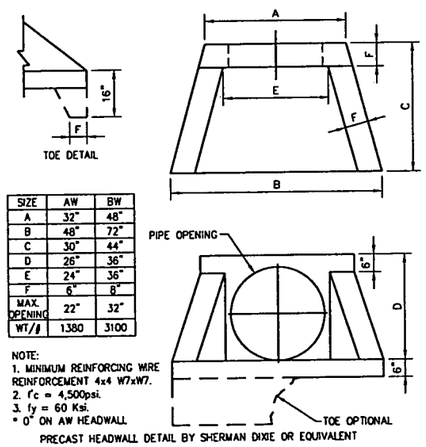
NOTES:

1. ALL EROSION CONTROLS ARE TO BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION.
2. ALL SITE WORK MUST CONFORM TO APPLICABLE CFC DRAWINGS AND CONSTRUCTION SPECS, WHICH INCORPORATE ODNR RAINWATER AND LAND DEVELOPMENT STANDARDS.
3. FWENC WILL CONDUCT WEEKLY SITE INSPECTIONS DURING CONSTRUCTION ACTIVITIES OF ALL EROSION CONTROLS, GENERAL HOUSEKEEPING PRACTICES, AND STORM WATER CHANNELS AS SET FORTH IN THE ENVIRONMENTAL CONTROL PLAN, DOCUMENT NO. 624-P621-10.
4. AT CULVERT INLETS AND OUTLETS, EROSION CONTROL BLANKETS (MATTING) AND SEEDING MAY BE SUBSTITUTED FOR RIP-RAP. REFER TO SPECIFICATION SECTION 02370, SLOPE PROTECTION AND EROSION CONTROL, AND SECTION 02924, SEEDING.



SILT FENCE DETAIL

NOT TO SCALE



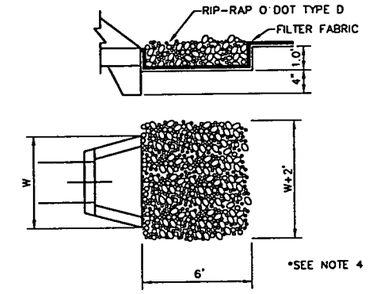
SIZE	AW	BW
A	32"	48"
B	48"	72"
C	30"	44"
D	26"	36"
E	24"	36"
F	6"	8"
MAX. OPENING	22"	32"
WT/#	1380	3100

NOTE:
1. MINIMUM REINFORCING WIRE REINFORCEMENT 4x4 W7xW7.
2. f'c = 4,500psi.
3. fy = 60 Ksi.
* 0" ON AW HEADWALL

PRECAST HEADWALL DETAIL BY SHERMAN DIXIE OR EQUIVALENT

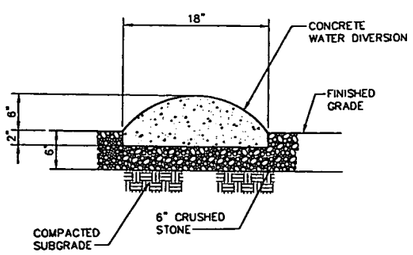
ENDWALL DETAIL

NOT TO SCALE



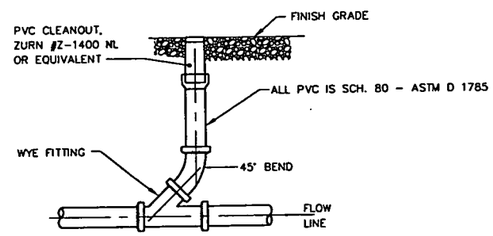
CULVERT INLET & OUTLET PROTECTION DETAIL

NOT TO SCALE



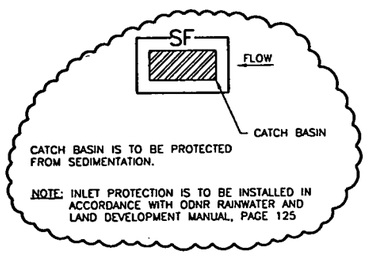
WATER DIVERSION DETAIL

NOT TO SCALE



STORM DRAINAGE CLEANOUT DETAIL

NOT TO SCALE



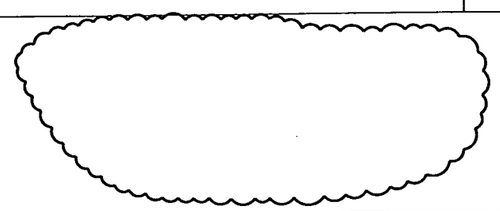
CATCH BASIN IS TO BE PROTECTED FROM SEDIMENTATION.

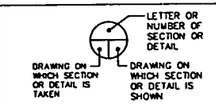
NOTE: INLET PROTECTION IS TO BE INSTALLED IN ACCORDANCE WITH ODNR RAINWATER AND LAND DEVELOPMENT MANUAL, PAGE 125

CATCH BASIN PROTECTION DETAIL

NOT TO SCALE

~~000214~~





SECTION & DETAIL KEY

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
3					REVISED DETAIL, DELETED DETAIL
2	11/10/00	WVM	VB	MSH	REVISED PER AWR-DCN-C-0008
1	4/20/00	WVM	VB	MSH	ADDED DIVERSION DETAIL, MINOR DETAIL EDIT
0	3/6/00	WVM	VB		CERTIFIED FOR CONSTRUCTION

PE

DRAWN BY W. MARVIN	DATE 3/6/00	
DESIGNED BY M. HUGHES	DATE 3/6/00	
CHECKED BY V. BHATT	DATE 3/6/00	
APPROVED BY M. HUGHES	DATE 3/6/00	
APPROVED BY JOHN LAWSON	DATE 3/6/00	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
STORM WATER SYSTEM
MISC DETAILS
SHEET 1

SIZE	SCALE:	DWG. NO.	REV
D	AS SHOWN	66FCD006	3

000020

FILENAME: 66FCD006.DWG

3604

STATE OF OHIO NORTH (NAD 83)

PERIMETER ROAD

T-12

UNDERGROUND ELECTRICAL DUCTBANK

PROPOSED LOCATION OF NEW GRATE

PHASE 2B EQUIPMENT LIMIT

18'x30' DECON PAD

SILO 2

SILO 1

EXIST MH TOP 574.78

EXIST 21" CONC PIPE

EXIST CB INLET TOP 572.39 INV 568.49

EXIST CB TOP 573.19 INV 569.29

EXIST DECANT SUMP TANK

2' WIDE HAND EXCAVATION AREA

HIGH PRESSURE PUMP SKID

TURNTABLE SUPPORT FOUNDATION

EXISTING GATE

APPROX LOCATION OF EXIST GRATE

CONC DIVERSION DITCH

N 480400

PHASE 2A EQUIPMENT LIMIT

FOUNDATION FOR SWRS SUPPORT STRUCTURE (TYP.)

LIMITS OF GEOTEXTILE AND GRAVEL FOR SWRS SUPPORT STRUCTURE ERECTION (AFTER RCS IS FUNCTIONAL)

CB-04 TOP 567.52 INV 563.57

CB-03 TOP 565.07 INV 563.42

CB-02 TOP 566.31 INV 562.01

APPROX. LOCATION OF EXIST. GRATE

FOUNDATION FOR SWRS SUPPORT STRUCTURE ERECTION

LIMITS OF GEOTEXTILE AND GRAVEL

PROPOSED LOCATION OF NEW GRATE

12" ST

N 489200

MH-R1 TOP 567.37 INV 563.65

PERIMETER ROAD

SCALE IN FEET

30 0 30 60

NOTES:

1. SEE DRAWING 11FCD009 FOR NOTES.

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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1					DELETED SEDIMENT BASINS, REVISED SILT FENCE
0	01/08/01	WVD	VB	MSH	CERTIFIED FOR CONSTRUCTION

DRAWN BY W. MARVIN	DATE 01/08/01	
DESIGNED BY M. HUGHES	DATE 01/08/01	
CHECKED BY V. BHATT	DATE 01/08/01	
APPROVED BY M. HUGHES	DATE 01/08/01	
APPROVED BY J. LAWSON	DATE 01/08/01	

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

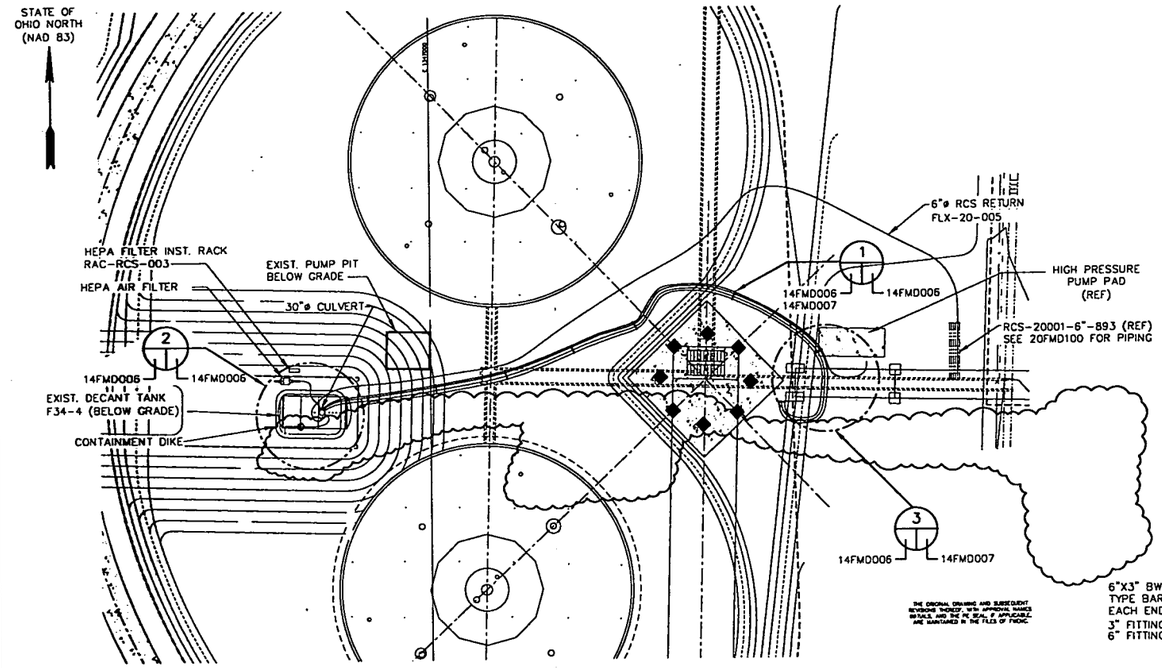
TITLE
SILO WASTE RETRIEVAL SYSTEM
EROSION CONTROL PLAN
PHASES 2A AND 2B

SIZE D | SCALE: 1"=30' | DWG. NO. 11FCD010 | REV 1

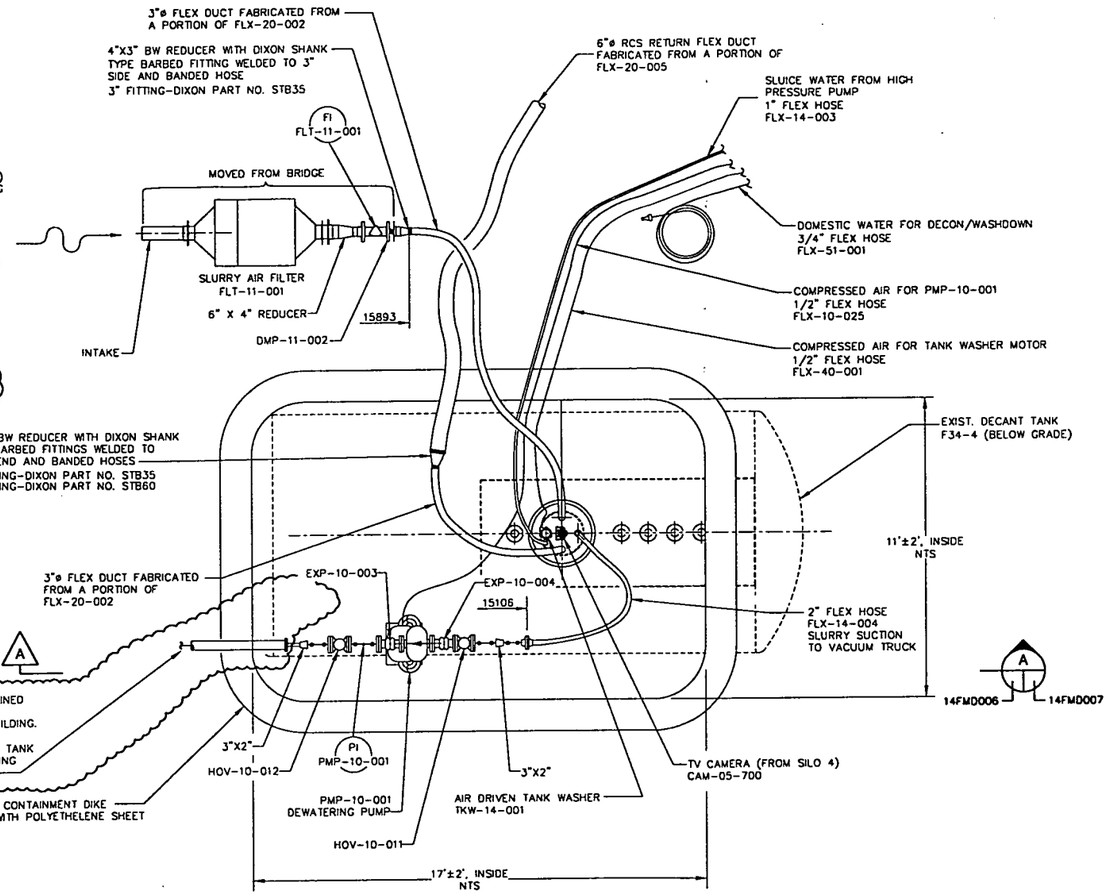
000021 1 FILENAME: 11FCD010.DWG

NOTES:

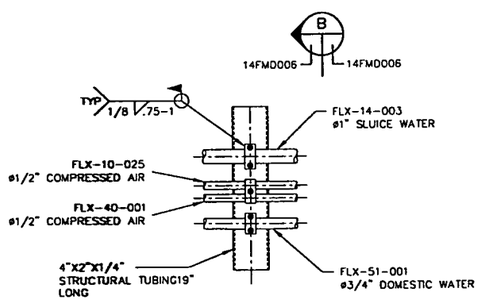
1. HEPA FILTER AND ASSOCIATED INSTRUMENT RACK TO BE SALVAGED FROM BRIDGE.
2. FIELD TO PROVIDE TEMPORARY SUPPORTS FOR PUMPS, HOSES, FILTERS & INSTRUMENT RACKS.
3. DIAPHRAGM PUMP TO BE SALVAGED FROM THE FULL SCALE MOCKUP SURROGATE DEWATERING TANK.
4. SEE CONSTRUCTION SPECIFICATION DIVISION 15120 FOR HOSE MATERIALS, INSTALLATION, TESTING AND MAINTENANCE.



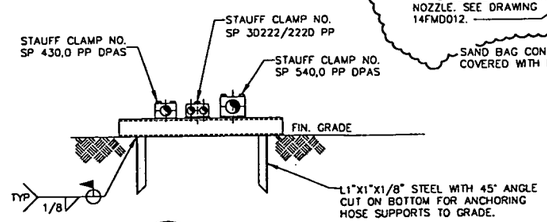
PLAN (EL 607'-0")
SCALE: 1"=20'-0"



2 DETAIL
SCALE: 3/8"=1'-0"
14FMD006 — 14FMD006



NOTE:
SUPPORTS REQUIRED AT 20'-0" INTERVALS FROM THE PIPE RACK/HP PUMP SKID AREA TO THE F34-4 DECANT TANK.



B SECTION
SCALE: 1 1/2"=1'-0"
14FMD006 — 14FMD006

B

1 DETAIL
SCALE: 1 1/2"=1'-0"
14FMD006 — 14FMD006

REFERENCE DRAWINGS:

05FMD010 GENERAL ARRANGEMENT KEY PLAN
14FMD020 DECANT TANK F34-4 INTERFACE FLANGE

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LETTER OR NUMBER OF SECTION OR DETAIL
DRAWING ON WHICH SECTION OR DETAIL IS TAKEN
DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
4	3/30/01	JAL	KDR	KDR	REVISED PER AWR-DCN-M-0005 & FLOUR FERNALD COMMENTS
3	8/31/00	BAL	RAR	KDR	REVISED PER CP-00-004
2	1/7/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
1	12/01/99	WCB	SWH		REVISED FOR NOZZLE LOCATIONS
0	11/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE
KENNETH D. RICKETT
P.E. NO. 103742
3/30/01
REVISION 4

		DATE
DRAWN BY	W C BLUME	01/07/00
DESIGNED BY	W C BLUME	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 524

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

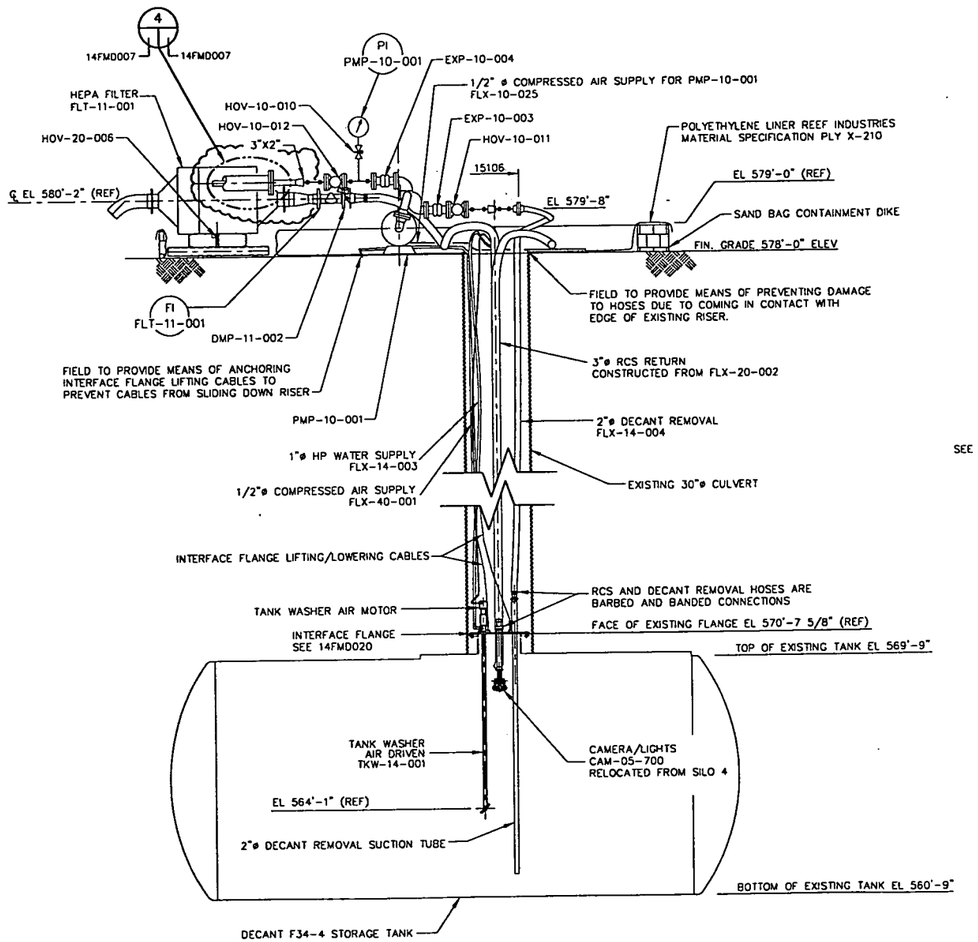
TITLE
DECANT WASTE RETRIEVAL SYSTEM
GENERAL ARRANGEMENT & PIPING
SHEET 1 OF 2

SIZE	SCALE:	DWG. NO.	REV
D	1"=20'-0"	14FMD006	4

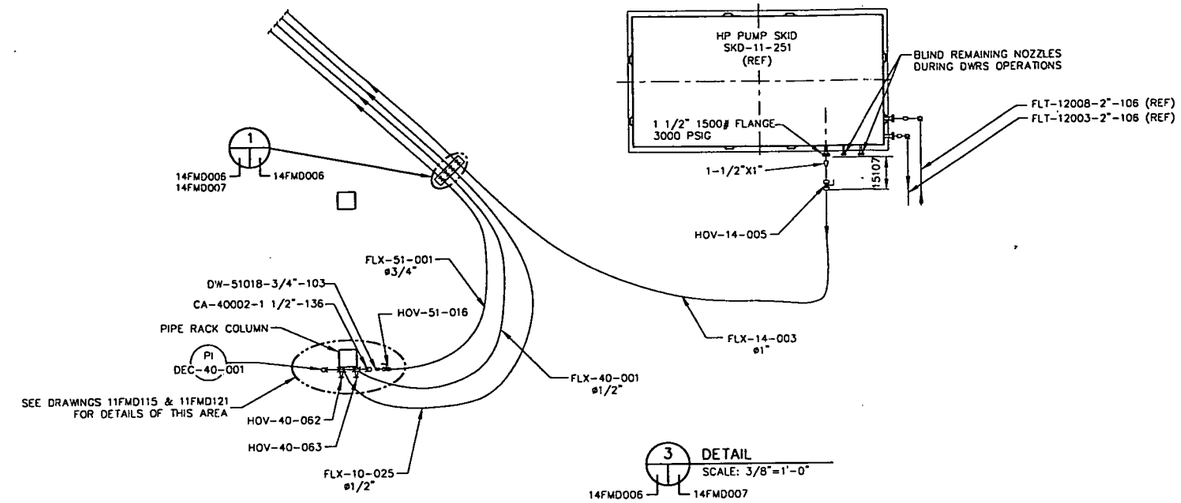
FILENAME: 14FMD006.DWG

XREF DRAWINGS: 14FCD001.DWG

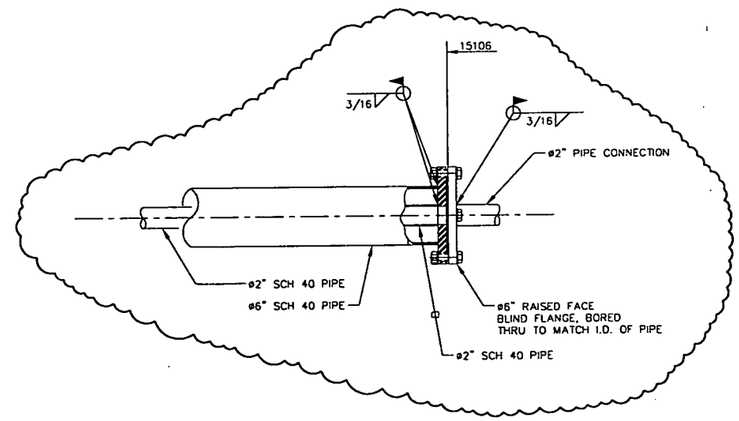
3604



A SECTION
SCALE: 3/8"=1'-0"
14FMD006 — 14FMD007



3 DETAIL
SCALE: 3/8"=1'-0"
14FMD006 — 14FMD007



4 DETAIL
SCALE: 1-1/2"=1'-0"
14FMD007 — 14FMD007

NOTES:

1. FOR GENERAL NOTES, SEE DRAWING 14FMD015.

THE ORIGINAL DRAWING AND SUBSEQUENT REVISIONS THEREOF, WITH APPROVAL NAMES, INITIALS, AND THE PE SEAL, IF APPLICABLE, ARE MAINTAINED IN THE FILES OF FWENC.

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DRAWING ON WHICH SECTION OR DETAIL IS SHOWN
SECTION & DETAIL KEY

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
4	3/30/01	JAL	KDR	KDR	REVISED PER FLOUR FERNALD COMMENTS
3	8/31/00	BAL	RAR	KDR	REVISED PER CP-00-004
2	01/07/00	WCB	SWH	KDR	CERTIFIED FOR CONSTRUCTION
1	12/01/99	WCB	SWH		REVISED FOR NOZZLE LOCATIONS
0	11/99	WCB	SWH		PRELIMINARY DESIGN SUBMITTAL

RPE
KENNETH D. RICKETT
P.E. NO. 103742
3/30/01
REVISION 4

		DATE
DRAWN BY	W C BLUME	01/07/00
DESIGNED BY	W C BLUME	01/07/00
CHECKED BY	S W HUNGATE	01/07/00
APPROVED BY	KENNETH RICKETT	01/07/00
APPROVED BY	JOHN LAWSON	01/07/00

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FOF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
DECANT WASTE RETRIEVAL SYSTEM
GENERAL ARRANGEMENT & PIPING
SHEET 2 OF 2

SIZE D | SCALE: 3/8"=1' | DWG. NO. 14FMD007 | REV 4

FILENAME: 14FMD007.DWG

000384

000023

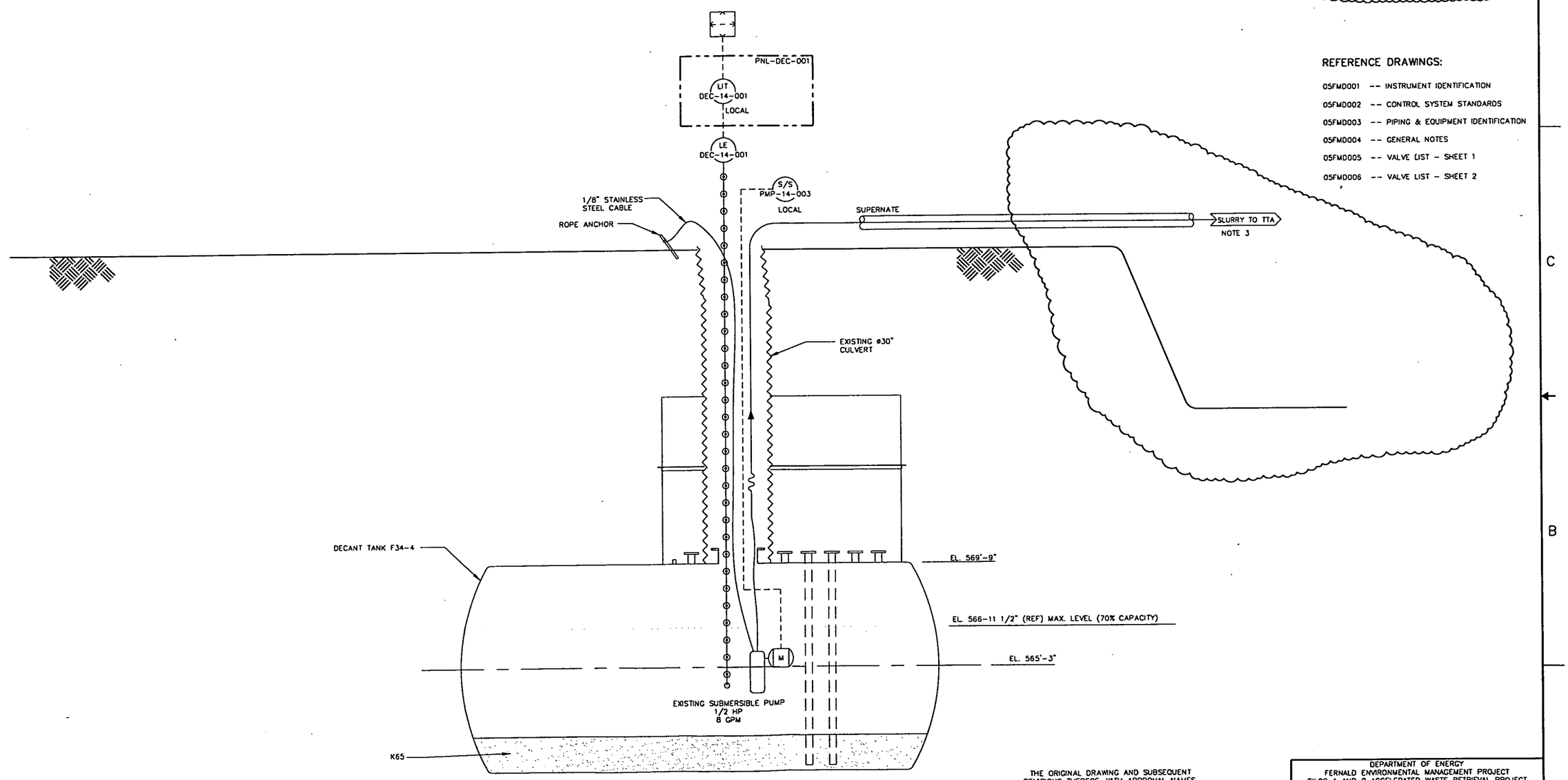
3604

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 05FMD004.
2. FOR MASS BALANCE TABLES SEE DRAWING 14FMD001.
3. FIELD ROUTE DOUBLE CONTAINMENT PIPE TO TTA.

REFERENCE DRAWINGS:

05FMD001 -- INSTRUMENT IDENTIFICATION
05FMD002 -- CONTROL SYSTEM STANDARDS
05FMD003 -- PIPING & EQUIPMENT IDENTIFICATION
05FMD004 -- GENERAL NOTES
05FMD005 -- VALVE LIST - SHEET 1
05FMD006 -- VALVE LIST - SHEET 2



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REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
1	3/30/01	JAL	KDR	KDR	REVISED PER FLOUR FERNALD COMMENTS
0	11/10/00	BJD	BAL	KDR	CERTIFIED FOR CONSTRUCTION

RPE
KENNETH D. RICKETT
P.E. NO. E-64418
3/30/01
REVISION 1

		DATE
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DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT
FERNALD, OHIO
FDF CONTRACT NO. FSC 624

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE
DECANT SUMP RETRIEVAL SYSTEM
PIPING & INSTRUMENT DIAGRAM
DECANT SUMP - SWRS MODE

SIZE	SCALE:	DWG. NO.	REV
D	NONE	14FMD011	1

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FILENAME: 14FMD011.DWG

SILOS 1 AND 2 ACCELERATED WASTE RETRIEVAL PROJECT

DRAFT FINAL

REMEDIAL DESIGN PACKAGE

REVISION 1

April 2001

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

VOLUME 2 – SUPPORTING INFORMATION

pressure pump water quality requirements. These recycling steps reduce the water dispositioned to the AWWT facility to solely the condensate water from the RCS.

The key to successfully managing the water usage during the AWR Project is to effectively account for the water throughout the systems. The AWR Project, being sensitive to the condition of the silos and the decant sump system and to the prevention of any potential uncontrolled release of wastewater, has employed the following water management controls:

- Measure quantity of water into and out of the silos throughout the SWRS activities. During mining operations, alarm limits are set to indicate that if the water flow into the silos is 25% greater than the water flow out of the silos, then the SWRS operation will be automatically stopped until the water is accounted for and/or corrective action taken.

- Bulk Waste Retrieval Strategy is based on localized slurry pools.

- The Decant Sump Tank will be emptied of liquid prior to initiating silo waste retrieval.

- The Decant Sump Tank will have level instrumentation for continually monitoring the infiltrate liquid level and calculating the infiltrate liquid flow rate into the decant sump tank. The level of the liquid infiltrate into the K-65 decant sump tank will be monitored and recorded on operator round sheets. In addition, the level, quantity, and flow rate are monitored and recorded by the programmable logic controller (PLC) human machine interface (HMI). The following action limits will be established:

  A. If the flow of liquid into the Decant Sump Tank exceeds 1 gpm, then the following action is required:
     - Increase operator verification of PLC data and silo conditions, and note the waste retrieval operation and silo area conditions at time of alarm, and
     - Reduce action level for pump-out of the tank to 60% capacity and analyze content for increased levels of K-65 materials.

  B. If the flow exceeds 5 gpm, the following action is required:
     - Stop waste retrieval activity and note the conditions of waste retrieval operations and silo area, and
     - Reduce action level for pump-out of the tank 50% capacity and analyze contents for increased levels of K-65 material.

  C. If flow limits are not exceeded, the tank level limit established in the Maintenance Action Work Plan are to be maintained requiring the decant sump tank to be pumped out at 70% capacity.

- During berm excavation activities, the berm soil will be sampled for the presence of K-65 material.

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carbon beds and return to the TTA, in much the same way the air is to be recycled through the silos during Phase 1. Airflow through TTA waste storage tanks would be discontinued after transfer of contents from that tank to the Future Full-Scale Remediation Facility is complete.

4.3 Decant Sump Waste Retrieval System

The DWRS will retrieve the waste from the Decant Sump located just west of and between the silos. The Decant Sump is a carbon steel, 18-foot long, 9-foot diameter cylindrical tank with dished ends. The tank is buried horizontally with a 20-inch opening centered at the top of the tank. A 30-inch corrugated manway centered over the 20-inch opening extends approximately 33 feet to the ground surface.

4.3.1 Deployment Strategy

Before silo recovery is initiated, a submersible pump and level indicator will be lowered into the Decant Sump Tank through the 20-inch opening. The Decant Sump Tank will be emptied prior to initiating silo waste retrieval. The pump and level indicator will remain in the tank throughout the Silo 1 and 2 retrieval campaigns. If the flow into the tank exceeds 5 gpm, the SWRS will be shutdown, the action level for tank pump-out reduced to 50% capacity, and contents will be analyzed for increased levels of K-65 material.

The berm soil above the Decant Sump will be excavated during SWRS operations from an elevation of 603 feet to 578 feet, leaving approximately 8½ feet of ground cover above the Decant Sump. Plastic surrounded by a sandbag dike will be placed around the riser for equipment laydown and to contain any possible leaks. The retrieval method will be similar to the bulk retrieval method used in the SWRS with the exception that, because of the small amount of waste and small size of any expected debris, a mechanical arm will not be deployed.

A flange-mounted sluicer will inject filtered water at a rate of 20 gpm at 1,000 psi into the Decant Sump to create slurry. An air-powered diaphragm pump will retrieve the slurry from the Decant Sump at a rate of approximately 80 gpm. This pump will send the contents to the TTA Storage Tanks via a double-contained hose system. The headspace pressure of the Decant Sump will be maintained at a negative pressure using the RCS during normal operations.

During the sluicing operation, a camera and light will be mounted in the tank to ensure the system is operating as designed. If debris is located in the Decant Sump, manually operated remote telescoping gripping tools will then be used to remove it. The system will be operated locally.

4.3.2 Component Descriptions

The DWRS main system components are as follows:

- Air-Powered Diaphragm Pump,
- Flange-Mounted Sluicer,
- Camera System, and
- Submersible Pump.

The flange-mounted sluicer consists of a blind flange, which has been modified to accept an air-powered tank-washing head, a 3-inch nozzle for RCS ventilation, a 2-inch nozzle for slurry

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