Department of Energy

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Fernald Closure Project
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DEC 1 2005

DOE-0032-06

Mr. James A. Saric, Remedial Project Manager
United States Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

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:

TRANSMITTAL OF THE FUNCTIONAL REQUIREMENTS/DESIGN BASIS DOCUMENT (FRDBD) AND DESIGN DRAWINGS FOR THE SILOS WATER TREATMENT FACILITY (SWTF)

Enclosed please find the subject Functional Requirements/Design Basis Document (FRDBD) and associated design drawings for you information. I recommend we meet to go over the enclosures and the associated construction schedule.

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

Sincerely,

Johnny Reising

Johnny W. Reising
Director

cc:
Dennis Riley, DOE-OH
Dennis Carr, Fluor Fernald, Inc./MS77
Cathy Glassmeyer, Fluor Fernald, Inc./MS19
Bill Hertel, Fluor Fernald, Inc./MS19
Con Murphy, Fluor Fernald, Inc./MS1
Jeff Stone, Fluor Fernald, Inc./MS20
Administrative Record/MS6

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FUNCTIONAL REQUIREMENTS/DESIGN BASIS DOCUMENT
FOR
SILOS 1 & 2 WASTEWATER TREATMENT PROJECT
40750-PL-0022

November 23, 2005

Submitted:

Jeff Stone, Site/Silos Engineering Manager — 11/23/05 Date

Cathy Glassmeyer, SWR Project Engineer — 11/23/05 Date

Approval:

Dennis Carr, Silos Project Director — 11/23/05 Date

ORIGINAL

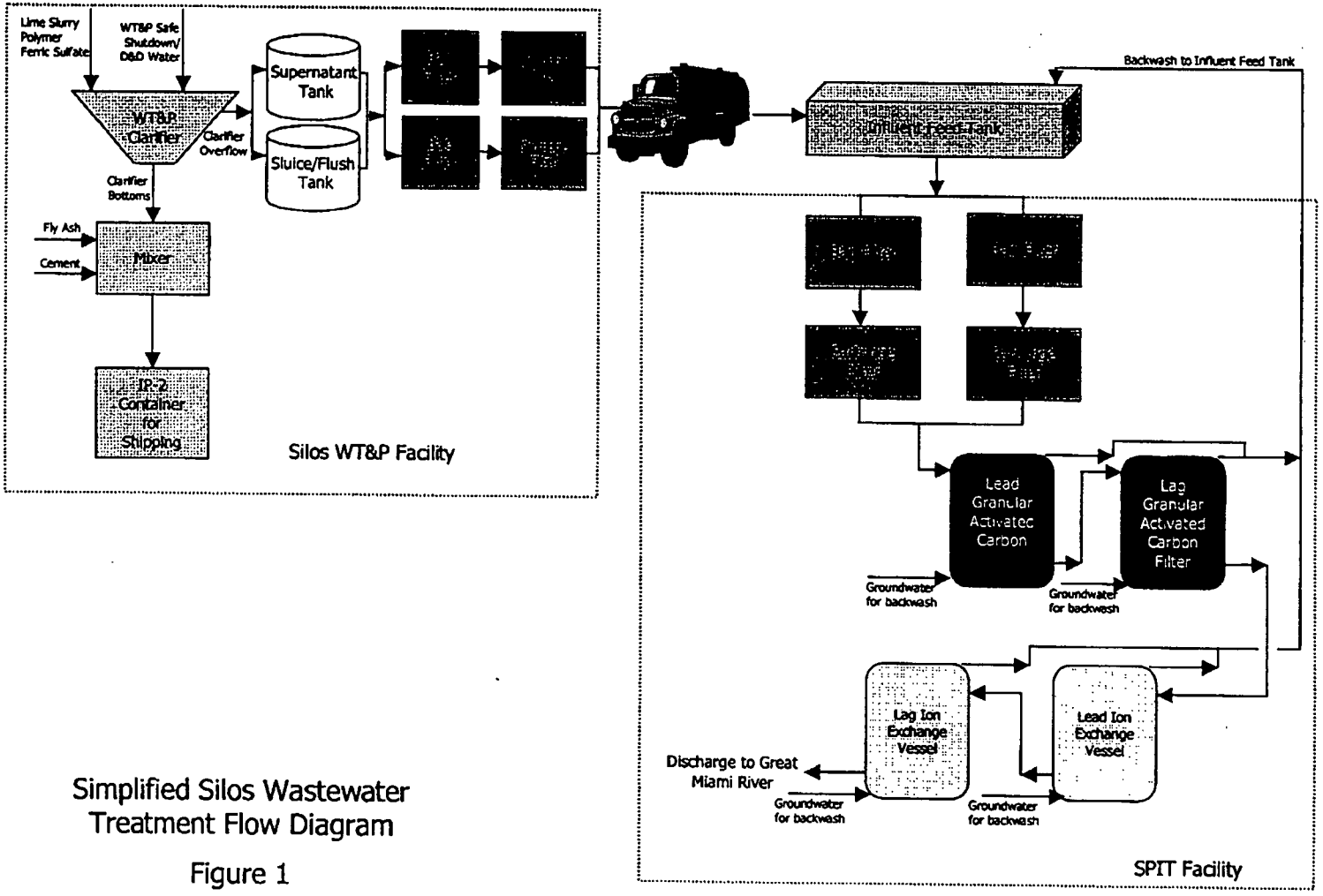
INTRODUCTION

The following Functional Requirements/Design Basis Document (FRDBD) is the result of a continuing dialog at the Fernald Closure Project (FCP) to ensure the timely treatment of the final waste stream from processing Silos 1 and 2 material.

The attachments contained herein reflect discussions and agreements with management, key personnel, and vendors during this dialog; most of which helped determine the final locations(s) and specific equipment needed for the Silos Wastewater Treatment (SWT) system.

The SWT will be a manual, batch operation utilizing existing equipment and processes as much as possible that provide operational flexibility and ensure regulatory compliance.

Figure 1 on the next page is a simplified flow diagram of the process.



Simplified Silos Wastewater Treatment Flow Diagram

Figure 1

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1.0 OBJECTIVE

The objective of the Project is to provide treatment for the Fernald Closure Project (FCP) wastewater generated from the final processing and safe shutdown of the Silos 1 and 2 Waste Treatment & Packaging Facility. Consistent with the requirements of the site's National Pollutant Discharge Elimination System (NPDES) Permit requirements and the Department of Energy (DOE) Orders for Environmental Protection, lead and radium have been identified as the wastewater stream constituents requiring treatment prior to discharge. Uranium has been determined to be a contaminant of concern for this wastewater stream for purposes of compliance with the Operable Unit No. 5 (OU5) Record of Decision (ROD) effluent discharge limit.

This objective will be accomplished by: 1) Incorporating the wastewater from Safe Shutdown of the Waste Treatment & Packaging (WT&P) equipment and piping into the final material processing plan for the facility; 2) Modifying the processing operations within the WT&P facility of the final approximate 100,000 gallons of wastewater exhibiting low solids to address the gross removal of radium, lead, uranium, and total suspended solids (TSS); 3) Trucking all treated wastewater from the WT&P to a new Silos Wastewater Treatment (SWT) facility installed in the modified South Plume Interim Treatment (SPIT) facility to address the trace removal of TSS, lead, and radium, and 4) Routing the SWT effluent to the Great Miami River (GMR) in a manner that conforms to the OU5 ROD uranium effluent limit as discussed below.

The Project design life will be for 6-months to 1 year. The Project will utilize, to the extent possible, existing equipment, piping, etc.

2.0 FUNCTIONAL REQUIREMENTS

The functional requirements establish the basis for final design, including treatment objectives. Five functional requirements were identified for the Project. They are:

1. Treatment of WT&P excess processing water

2. Treatment of WT&P Safe Shutdown water

3. Treatment of WT&P D&D water (if required)

4. Discharge of SWT effluent in a manner which is:
   a. not disruptive to CAWWT operations
   b. does not cause exceedances of the OU5 ROD specified uranium discharge limits
   c. meets required discharge limits for radium and lead (plant effluent with less than ~7000 pCi/L radium, and ~5400 ug/L lead)

5. Handle solid waste produced as a result of the SWT operations

2.1 TREATMENT OF WT&P EXCESS PROCESSING WATER

A cursory evaluation of the alternatives available for processing of the wastewater generated as a result of all of the WT&P activities was performed (from Attachment 1 –

"Evaluated Alternatives"). It was determined from this evaluation that the preferred path forward for the Project is to expand the WT&P material processing to include melding the Safe Shutdown wastewater with the ongoing material processing and to implement changes to provide for the gross removal of radium, lead, uranium, and TSS in the wash water before discharging to a new SWT facility. The safe shut down (i.e., rinse/cleanout of facility lines and tanks) of the WT&P facility is integrated into the operational plan of the facility to minimize the generation of wastewater requiring treatment. Providing for gross radium, lead, uranium, and TSS removal within the Silos 1 and 2 WT&P processing operation will simplify the treatment needed in the downstream SWT facility.

Lime solution (prepared by a vendor and supplied to the site in a tanker truck) will be discharged into one of the existing Chemical Feed Systems in the WT&P and subsequently supplied to the 1,100 gallon Reaction Tank (TNK-15-1003A) at a feed rate proportional to the flow. The lime slurry addition will be sufficient to raise the pH of the slurry discharged from the downstream Polymer Addition Tank (TNK-15-1003B) to approximately 10.5. Jar testing will determine the optimal pH. Similarly, ferric sulfate (if necessary, based on jar tests) will be added to the 360-gallon Polymer Addition Tank (TNK-15-1003B) at a feed rate proportional to the flow rate feeding the Reaction Tank. Jar testing will also determine the type and concentration of cationic polymer to be fed. Since it is important that the solids in the solution have adequate time to settle to maximize the removal of the radium, lead, uranium, and TSS contained in the solution, it may be necessary to slow down the material processing rate to something less than the planned 50 gpm.

The overflow from the Clarifier will be rerouted to the existing Supernatant Tank (TNK-55-1000) and/or Sluice/Flush Water Tank (TNK-62-1000). The associated pumps will be used to transfer the overflow at a flow rate of approximately 150 gallons per minute (gpm) through one of two newly installed parallel trains of bag and cartridge filters for gross solids removal. The filtering equipment will be relocated from the abandoned IAWWT trailers to the Slurry Receipt Tank Area (Second Floor). A work platform will be installed around the filters to provide a safe environment for removal of the spent filter cartridges. The spent cartridges will be removed and placed in an existing WT&P steel IP-2 container located in the facility. After passing through the filters, the water will be piped to tanker trucks for transfer to the new SWT Facility. The settled solids underflow from the Clarifier/Thickener being cemented into the IP-2 shipping containers will have a slightly higher quantity of cement added to accommodate the elevated pH in the wastewater.

To supplement the treatment accomplished in the WT&P, the new downstream 50 gpm (design capacity) SWT Facility will consist of an Influent Feed Tank, two feed pumps and three treatment steps. An existing 17,500-gallon Frac Tank (with double containment) will be used as the Influent Feed Tank. The Influent Feed Tank will be located adjacent to the SPIT building to receive and hold the wastewater to be treated in the new SWT. A 200 gpm Feed Pump (existing SPIT Feed Pumps; J301A & B) will be used to route the wastewater through the three treatment steps of SWT as necessary to meet discharge limits at the Great Miami River, then through the existing SPIT effluent tie-in piping to the FCP's combined effluent pipeline to the GMR.

The existing SPIT flow control system will be used to maintain the desired 50 gpm-flow rate with the oversized pumps. The wastewater transfer from the WT&P Building to the

SWT Influent Feed Tank will be stopped when a high level is observed in the tank. The flow to the SWT will be stopped when a low level is observed in the Influent Feed Tank.

In order to provide for the best management of any potential leaks/spills/etc., the truck-unloading pad will be configured to provide containment spills. In addition, exterior piping from the Influent Feed Tank to the SWT will be routed within the containment area. This containment area will be kept to a minimum to limit the quantity of storm water that must be handled. Storm water and any spills will be collected in a new sump within the containment area from which it will be pumped to the Influent Feed Tank. A nominal capacity will be reserved in the Influent Feed Tank to provide volume for a 24-hour, 25-year storm event on the containment area. An automatically controlled pump will be used to remove the water from the sump.

Flow from the Influent Feed Tank will be routed to the adjacent SPIT Building wherein the three treatment steps of SWT will occur as necessary to meet discharge limits at the Great Miami River. The existing trench located near the center of the SPIT Building (the floor of the building is sloped to this trench) will provide for collection of any potential leaks/spills/etc. within the building. The existing gravity outfall pipeline from the trench will be plugged and a new sump pump installed within the trench with pump discharge routed to the Influent Feed Tank.

In the first step of treatment at SPIT, flow will pass through one of two parallel trains of bag and cartridge filters, flow rated at 150 gpm to remove trace solids. Note that gross solids removal is provided at the Silos Remediation Building before transfer. The equipment will be relocated from the abandoned IAWWT trailers. By providing the two 150 gpm trains, one of the trains can be shutdown for cartridge replacement. Work platforms will be installed around the filters to provide a safe environment for removal of the spent cartridges. The spent cartridges will be removed and placed in an existing WT&P IP-2 container that will be pre-positioned adjacent to the filters.

The second step will utilize a skid of two of the three existing multi-media vessels located in the SPIT facility (G301B, & C). Note that the existing 3rd multi-media filter (G301A) is not needed and will be removed to allow for its disposal in the OSDF. These vessels are flow rated at 150 gpm. The vessels will be filled with a granular material support bed and Granular Activated Carbon (GAC) to provide trace lead removal as necessary to meet discharge limits at the Great Miami River. The piping on these two tanks will be modified to allow them to operate in a lead/lag mode.

The third step will utilize a skid of two of the three ion exchange vessels (lead/lag) from the abandoned SPIT facility (G305B, & C). Note that the existing 3rd ion exchange vessel (G305A) is not needed and is being removed to allow for disposal in the OSDF. These vessels are flow rated at 150 gpm. They will be filled with Dowex RSC resin as a secondary wastewater treatment step for radium as necessary to meet discharge limits at the Great Miami River.

From the ion exchange vessels, the treated SWT effluent will discharge through the existing SPIT ion exchange discharge pipeline which ties into the Fernald Closure Project's combined effluent pipeline which discharges to the GMR.

Because of the possibility of residual carryover of low concentrations of solids from the WT&P facility, there is a potential for limited generation of radon and release to the SWT equipment and surrounding areas. These potential conditions will be addressed through a SWT ALARA and Air Sampling Plan.

The backwash discharge headers for both the ion exchange skid and GAC filter skid will be connected to a new pipe header routed to the 17,500 gallon Influent Feed Tank. The existing SPIT Backwash Pump (J302A) will be used to route groundwater to the backwash influent headers for both the ion exchanger skid and the GAC filter skid and subsequently to the vessel requiring backwashing. A check valve and a double block valve arrangement around the existing pump (normally closed, but opened when ready to start a backwash) will be utilized to ensure that SWT wastewater is not inadvertently sent to the groundwater system.

2.2 TREATMENT OF WT&P SAFE SHUTDOWN WATER

In a normal progression of events, once the processing of Silos 1 & 2 material is completed, all of the existing WT&P facilities would be flushed clean. This would result in a significant amount of highly contaminated water being flushed to the new SWT facility. However, as described above, the tanks and lines within the WT&P facility will be flushed sequentially with the final waste processing to minimize wastewater generation. It is believed that the bulk of the Safe Shutdown operation can be incorporated into the WT&P processing and completed on a step-by-step basis as each vessel is emptied. Therefore, little additional wastewater (i.e. estimated to be less than 100,000 gallons is expected to be generated from the final processing and safe shutdown the facility. Also, it is anticipated that the wastewater generated from safe shutdown will have very low solids content (i.e. upper bound 2% solids or less) following lime/ ferric sulfate/polymer coagulation in the WT&P clarifier and filtration in the newly installed cartridge filters in the WT&P facility.

2.3 TREATMENT OF WT&P D&D WATER

Once Safe Shutdown is completed, the demolition and disposal of the WT&P facility will proceed. The D&D operation will collect the wastewater in 17,500 gallon Frac Tanks. D&D operations will be responsible for coordinating trucking the contents of the Frac Tanks to the SWT Building.

2.4 DISCHARGE SWT EFFLUENT IN A MANNER PROTECTIVE OF CAWWT AND CONFORMS TO THE OU5 ROD URANIUM DISCHARGE LIMIT

The supernatant water chemistry from the TTA tanks indicates that high concentrations of nitrates, sulfates, carbonates (see Attachment 2), and chlorides (based on estimated calculated concentration of 750 mg/L) can be expected in the influent to the SWT. Since treatment for these constituents is unnecessary from a regulatory perspective and would be cost prohibitive from a Project perspective, the SWT effluent concentrations can be expected to be the same as those in the influent. In 2003, high concentrations of these constituents were experienced at the AWWT from Waste Pit discharges. As a result, the resin in the Phase II AWWT system had to be replaced at a frequency approaching once

per week in order to maintain compliance with the OU5 ROD uranium discharge limit. This resulted in a significant expenditure of labor and funding resources.

Attachment 4 is a plot developed through laboratory studies performed during the 2003 event. It indicates the relationship of effluent uranium concentration to influent chloride concentration. Attachments 4 and 5 contain two slides used in the March 2003 presentation to the EPAs. The Attachment 4 slide indicates the variables affecting resin performance. Attachment 5 presents the anion selectivity coefficients (relative to chloride ion). Attachment 5 was prepared using information from: the Dow paper on ion exchange resins, personal communication with the Dow representative, and the User's Manual for software written by Dennis Clifford (professor at University of Houston brought to the FCP to consult on anion selectivity coefficients in 2003 when the AWWT was experiencing operational problems). Using the data for the anion constituents in TTA supernatant, the anion selectivity coefficients (Attachment 5), and the dilution effect from other wastewaters that would be treated in the 600 gpm CAWWT process system provides an equivalent chloride concentration for the wastewater (see Table 1).

TABLE 1

Dilution factor is 50 gpm/600 gpm = 0.0833

Anion	Concentration	Diluted Concentration	Coefficient	Net Calculated
Chlorides	750	63	1	63
Nitrates	7,100	592	3.2	1,894
Sulfates	4,100	342	9.1	3,109
Effective total concentration of chlorides =				5,066 mg/L

Taking this calculated equivalent chloride concentration of 5,066 mg/L and going to the Figure in Attachment 3 indicates that the effluent uranium concentration expected in the CAWWT discharge would be much greater than 30 ug/L.

Accordingly, the Project recommends that the SWT effluent should not be routed to the CAWWT as was planned when the FCP's current NPDES permit was obtained. Fluor Fernald Inc. Environmental Compliance discussed treated effluent discharges from the SWT facility to the FCP outfall line with OEPA-DSW on Wednesday, October 5, 2005. Consensus from that conversation was that an NPDES Permit modification was not required to accommodate flow from the SWT to the FCP's outfall line to the Great Miami River.

The project was concerned that the radium resin could suffer from the same type of problem the anionic resin used for uranium removal. Accordingly, the Dow vendor was contacted about this concern. Attachment 6 contains an E-mail from the Dow vendor and the output of the vendor's model runs used to determine if the concentrations of any of our chemical constituents would affect the resin at the proposed pH 10 to 10.5 of our waste stream. No impacts are noted.

Direct discharging of the SWT effluent may impact the site's ability to comply with the OU5 ROD requirement to achieve a maximum average monthly uranium discharge level of 30 micrograms per liter. Based on past site operating experience with pH adjustment and precipitation of uranium, a discharge level of 1 mg/L or less can be expected in the SWT effluent. Also, recent operating experience, indicates that the combined CAWWT and bypassed untreated groundwater effluent will be on the order of 5.2 MGD (3600 gpm) with a uranium concentration of approximately 23 ppb (October 2005). Assuming that the 50 gpm SWT-effluent will have a uranium concentration of 1mg/L, the combined 3650 gpm effluent can be expected to approach the 30 ppb limit on days when the silos water is being processed. Therefore, the uranium discharge levels of the SWT, the CAWWT, and the bypassed groundwater during the period of the SWT operation will be of significant importance in the FCP's compliance with the monthly OU5 ROD discharge limit.

To address this, the concentration of uranium in the discharge from the WT&P Facility will be measured. After several samplings of the effluent are analyzed, an average uranium value for the wastewater accumulated in the SWT Influent Tank can be estimated. Based on this analysis, and the composite analysis of the site's last few days of discharging to the GMR, an evaluation of processing and discharging the SWT at the 50 gpm-rate can be assessed. If required, the processing rate of the SWT can be adjusted, and/or resin replacement in the CAWWT (600 gpm process system or 1200 gpm groundwater system) may be required. After initial startup, daily composite samples will be used to monitor the ongoing SWT operation. Daily 24-hour SWT effluent composite samples will be taken corresponding with the site's GMR 24-hour composite discharge sampling. An ongoing analysis and evaluation of the SWT effluent impacts on the site's composite discharge will be performed to verify that the monthly average uranium discharge concentration is not exceeded. Lead and radium concentrations will also be tracked to ensure compliance with discharge limits.

2.5 HANDLE SOLID WASTE PRODUCED AS A RESULT OF THE SWT OPERATIONS

The two main solid wastes in this project are cartridge filters containing solids and spent media (ion exchange resin and GAC).

As mentioned in Section 2.1, spent filters will be placed into IP-2 shipping containers. The spent filters accumulated within the WT&P Building will be processed with ongoing cementation operations. The spent filters accumulated within the SPIT Building will be placed into IP-2 shipping containers staged adjacent to the filters. Grouting of the spent filters at the SPIT Building will be accomplished by ordering grout from a local concrete supplier. After the container is full, the container will be removed and shipped offsite and an empty container placed in the area for the next cycle of spent filters.

To facilitate the removal of spent cartridges, an access platform will be installed so that the top of the opened filters is only about two feet above the platform. This will allow for the use of a non-contact lifting device to be used to remove the spent filters to reduce radiological contact and provide better ergonomics for removal of the spent cartridges. The platform will extend over to the IP-2 container at a common elevation to allow for placement of the spent filters into the container. After a pair (bag and cartridge filter) is

taken off line for replacement, the water will be drained. Based on the influent and effluent pressure readings, a decision will be made to replace the spent cartridges in either the bag filter, the cartridge filter, or both. After opening the lids, spent cartridges (eight cartridges in the bag filter and twenty-one in the cartridge filter) will be removed and placed in the IP-2 container. After new cartridges are installed in the vessel(s), the lids will be reinstalled so that the pair can be placed back in service when the other pair of filters requires cartridge replacement.

It is anticipated that the initial resin placed in the two ion exchange vessels will be sufficient to process all of the WT&P wastewater and that no additional resin will be needed. However, since the resin has a four month procurement timeframe, an additional volume of resin equivalent to one vessels volume will be purchased and stored at the site. After the resin has been spent, it will be removed from the vessels. If/when breakthrough of the lead vessel occurs, the Project will remove the spent resin in the lead vessel and replace it with the standby extra resin. The Project can also evaluate and determine if additional resin should be purchased or if the extra vessel volume of resin in storage will be sufficient to process the remaining wastewater (note that this is not anticipated and is deemed to be highly unlikely).

Spent Resin and GAC will be removed from vessels and disposed of per all applicable DOE and DOT regulations.

2.6 IN-HOUSE SUPPORTING FUNCTIONS

It is anticipated that the modified SPIT building's existing West rollup door will allow a forklift to move the IP-2 shipping containers into and out of the building. A new operating platform will be provided for the bag/cartridge filters and IP-2 container as described above. Provisions will be made to allow ready mixed grout to be brought to the facility and poured into the IP-2 containers.

Major supporting functions for the SWT, beyond those already available at the Fernald site (sample shipping and receiving, portable toilets, portable safety showers, etc.) are not anticipated. A small operating station located in the Northwest corner of the adjacent Valve House may be used by the SWP operator(s). Decon facilities required for SWT operators will be determined by Radiological Control. Access to the SPIT Building area will be via existing or relocated roadways.

2.7 MINIMIZE IMPACTS TO SCHEDULED REMEDIATION EFFORTS

The SWT Facility in the SPIT building will need to be totally isolated and self-supporting to allow for D&D of the WT&P facilities. The design of any interconnecting utilities will be accomplished in such a manner as to minimize the impacts to scheduled remediation efforts.

Existing tanker trucks (currently used at the site for remediation of extraction wells and movement of miscellaneous wastewaters) will be used for transfer of the wastewater from the Silos area to the SWT. Spill collection will be provided at both the WT&P building and at the SPIT Building facility to insure that any wastewater inadvertently spilled during transfer to or from the tankers is collected.

3.0 DESIGN BASIS

Existing equipment or unit processes will be used to the maximum extent possible. Specifications for new equipment and valving will match the specifications for the existing reused equipment and valving. The SWT facility will be designed for a 6 months to one year operating life. Provision is made for sampling at various key locations (effluent after each treatment step). Manual valves and manual start/stopping of equipment are anticipated. Accordingly, most existing motor operated valves will be converted to manual. Instrumentation will be localized and kept to a minimum. The Project will be designed for the possibility of winter operation. Existing Valve House building electric heaters will form the basis for the heating of the SWT facilities.

3.1 MODIFICATIONS TO WT&P PROCESSING

Five modifications are required to the WT&P process:

1) A lime slurry solution will be purchased from a vendor and transported to the site in a tanker truck. The tanker truck will be staged in the outside corridor West of the WT&P Building. The slurry will be pumped via pipe or hose to an existing chemical feed system.

2) Ferric Sulfate may be added to the Reaction Tank (TNK-15-1003A) for floc formation. A Carboy(s) with associated feed pump will be installed on top of the tank or nearby to provide the Ferric Sulfate. The existing Polymer Feed System shall be used to add polymer(s) required for gross removal of radium, lead, uranium, and TSS.

3) The WT&P Clarifier overflow will be pumped through filters (see below) to tanker trucks for transfer to the new SWT facility using the Sluice/Flush Water Tank (TNK-62-1000) and associated pumps (PMP-62-1001 A&B). Existing piping from these pumps is routed back to the Slurry Receipt Tank. This piping (line FLW-621611-3"-112) will be modified near the Receipt Tank to connect to the new filters and then to the outside of the West wall of the WT&P Building to a truck loading arm. Existing sampling stations will be used to monitor the gross removal of radium, lead, and uranium.

4) Two existing sets of IAWWT bag/cartridge filters will be moved to the WT&P Building. Piping will be installed to allow the wastewater to pass through two parallel trains to remove gross solids. Each of these units is flow rated at 150 gpm. By providing the two trains of 150 gpm units, one of the trains can be isolated for cartridge replacement. A work platform will be installed around the filters to provide for removal of the spent cartridges. The spent cartridges will be removed and transferred to the grouting operation in the WT&P Building.

5) Spill containment will be installed for the collection of any spills, which may occur when transferring the wastewater to the tanker trucks. Any water collected will be returned to the WT&P processing system.

3.2 SWT SYSTEM

The SWT equipment will be housed in the abandoned SPIT Building. One of the site's Frac Tanks (dual containment) will be used as the Influent Feed Tank, and SPIT Feed Pumps (K301A & B – one standby) will be used to pump the wastewater through the SWT and to the GMR. Existing SPIT Backwash Feed pump (J302B) will be used for backwashing. SPIT Backwash Feed Pump J302A will be relocated and used to transfer wastewater from the tanker trucks to the Influent Feed Tank. The existing SPIT Feed Pump flow control system will be used to set the nominal 50 gpm-treatment rate. Outside equipment and piping will be configured to prevent freezing if winter operation is necessary.

The following existing equipment will be used in the SPIT Building as part of the SWT system:

1) Two sets of cartridge filters from the abandoned IAWWT Trailers (T108 and T109), will be utilized to remove solids at the SPIT Building. Because of the extensive reconfiguring of these systems, all new interconnecting piping will be needed. In addition, a new operating platform, stairs, and handrails will be needed for access. Platforms, stairs, and handrails will be steel. Approximately 100 gross filtering cartridges and 50 fine cartridges are available from the Sea Land container located adjacent to the IAWWT facility. The mesh size of the cartridges will be evaluated to determine if these cartridges can be used or if new cartridges are needed. In either case, additional cartridges will be needed.

2) Ion exchange vessels and associated piping (2 tanks of existing 3-tank skid) will remain in the abandoned SPIT facility. The vessels will be reconfigured to operate in a lead/lag mode. Existing pipe and valving is sweat wrapped. The wrapping will remain in place except as required to install required piping reconfigurations. No new sweat wrap will be installed. The ion exchange vessels will be filled to a nominal four feet of depth with Dowex RSC resin for removal of radium. The Dow RCS resin is capable of loading 10,000 to 20,000 pico-curies/gram of resin. As the resin is a long lead purchase item, a request for purchase has been placed. Sampling ports exist on the discharge from each of the existing vessels.

3) Multimedia vessels and associated piping (2 tanks of existing 3-tank skid) from the abandoned IAWWT facility (located in the abandoned SPIT facility), will remain in the

SPIT facility. The multi-media filter skid will be modified to operate in a lead/lag mode. Existing pipe and valving is sweat wrapped. This wrapping will remain in place except as required to install required piping reconfigurations. No new sweat wrap will be installed. The vessels will be filled with approximately 45 cubic feet of granular material (3/4" x 1/2") prior to installing 3 to 4 feet (approximately 180 cubic feet) of Granular Activated Carbon (GAC) for the removal of trace amounts of lead. GAC will conform to American Water Works Association (AWWA) B100-01 and National Sanitation Foundation (NSF) Standard 53. Sampling ports exist on the discharge from each of the existing vessels.

4) Flow control system (FCV 307) currently used in the SPIT building will remain. Partial reconfiguration of the system will be required.

5) A new composite sampler will be installed on the SWT effluent pipeline to the GMR. The sampler will be located in the adjacent Valve House.

Grab sampling and analysis of the lead ion exchange and lead GAC vessels effluents will be used to monitor contaminant breakthrough. This will determine if spent media needs to be removed in the lead vessel(s) and new media installed, and when the operation needs to be changed to allow the lag vessel to become the lead vessel. The composite sampler will be used to monitor the SWT effluent radium, lead, and uranium concentrations.

Each ion exchange and GAC vessel has an existing pressure measurement gauge on the vessel's influent and effluent. These gages will be used to determine when backwashing of a vessel is necessary. Similar pressure gauges will be located on the inlet, outlet, and between the bag and cartridge filters for use in determining when and which filter should be replaced.

Valves necessary for SWT operation, but found to be difficult to operate, will be replaced with valves removed from removed equipment, reconditioned, or new valves. Existing air-operated butterfly valves on both the ion exchange and GAC vessels will be converted to manually operated valves. All valves will be lockable. Existing skid piping is stainless steel. However, all new piping spools will be carbon steel B31.3, Sch 80 plastic, or HDPE. Piping on skids may require flanged ends to meet existing pipe flanges.

3.3 HANDLING SOLID WASTE

A spent cartridge and spent media packaging operation will be installed in the SPIT Building. The details of this facility are in Section 2.5.

3.4 WASTEWATER TRANSFER AND UTILITIES

The wastewater from the WT&P facility will be trucked to the SPIT Building using tanker trailers. Spill containment will be installed at the SPIT and WT&P Building to contain any spills that may occur during the loading and unloading of the wastewater.

Electrical work will comply with the latest revision of the National Electric Code. Switches, conduit, wire, and general materials will comply with recognized national standards. Existing power supply, Motor Control Center, and Flow Control Panel in the

SPIT Building will be utilized. Existing lighting and heating within the SPIT Building should be sufficient for operation of the SWT. These systems will be checked, modified, and reconnected as needed.

Concrete for sumps, pipe supports, and other miscellaneous items shall have at least 4000 pounds per square inch (psi) compressive strength at 28 days per American Concrete Institute (ACI) 318.

Structural steel and anchor bolts will conform to American Standards for Testing and Materials (ASTM) A-36. Structural connecting bolts will be high-strength conforming to ASTM A-325. Structural welding will conform to American Welding Standard (AWS) D.1.1.

ATTACHMENT 1

EVALUATED ALTERNATIVES

Alternative No. 1

Alternative	Implement-ability	Performance	Regulatory and Public Acceptance	Reliability	Schedule	Cost	Solids Disposition
Transfer all wastewater to a new 30-gpm Silos Wastewater Treatment (SWT) facility (size limited by equipment available). SWT to include pH adjustment + polymer addition + ferric sulfate + flocculation + settling for gross radium, lead, uranium & solids removal, bag/cartridge filters for polishing of solids, ion exchange (IX) for radium removal, Granular Activated Carbon (GAC) for trace lead removal, and a slurry dewatering system for clarifier sludge.	MEDIUM Requires construction of a medium size wastewater treatment facility plus dewatering facilities and waste stabilizing facility.	HIGH	HIGH	HIGH	MEDIUM to LOW Dewater of clarifier sludge could lead to a longer construction schedule	LOW Requires production of a material that will require dewatering and stabilizing before disposal. Requires medium size wastewater treatment facility, with dewatering, and stabilizing facilities to be sent to offsite disposal.	Clarifier sludge will require dewatering and, along with solids filled cartridges from bag/cartridge filters and contents of treatment tanks will need to be stabilized before offsite disposal

Alternative No. 2

Alternative	Implement-ability	Performance	Regulatory and Public Acceptance	Reliability	Schedule	Cost	Solids Disposition
Modify Silos processing operation to include: 1) safe shutdown as an integral part of the operation; 2) addition of lime, cationic polymer, and ferric sulfate to provide gross radium, lead, uranium, and TSS removal in the existing clarifier/thickener during the processing of last ~100,000 gallons of K65 material. Transfer of all wastewater to a new small SWT facility containing bag/cartridge filter for polishing of solids followed by IX for removal of radium and GAC for trace lead removal.	MEDIUM Requires the installation of lime and ferric sulfate feed to existing K65 system (slurry from tanker truck, ferric sulfate from tote), and possible slowing K65 flow to enhance flocculation. Requires construction of a small size wastewater treatment facility and waste stabilizing facility.	HIGH	HIGH	HIGH	MEDIUM	MEDIUM to HIGH Requires small wastewater treatment facility to be sent offsite for disposal.	Solids produced from lead, uranium and colloid removal will increase canisters by ~20. Solids from bag/cartridge filters and contents of wastewater treatment tanks will need to be stabilized before off-site disposal

Alternative No. 3

Alternative	Implement ability	Performance	Regulatory and Public Acceptance	Reliability	Schedule	Cost	Solids Disposition
Solidify all process wastewater and safe shutdown water in the planned K65 residue operation. Transfer all other wastewater to a small size SWT facility containing a bag/cartridge filter operation for polishing of solids followed by IX for removal of radium and GAC for trace lead removal.	MEDIUM Requires extended operation of Silos processing system. Requires construction of a small wastewater treatment facility and waste stabilizing facility.	HIGH	HIGH	HIGH	MEDIUM	LOW Requires the production of a significant number of additional canisters. Cost for additional containers estimated at > $2 million[1].	Requires production of a minimum of another 100 containers of processing waste. Solids from bag/cartridge filters and contents of wastewater treatment tanks will need to be stabilized before off-site disposal

[1] Based on 100,000 gallons of final Silos 1 & 2 waste stream @ maximum allowable 40% liquid. Cost of container ($5,500) including shipping ($3,750) and 24 month storage ($1,000) = $10,250. Each IP-2 container is 1,390 gallons. Therefore, 100,000 gallons/0.40 (water fraction)/1,390 gallons per container x $10,250 per container = $1,888,489, or approximately $2 million. Note that this cost does not include additional costs for operating, etc.

6069

ATTACHMENT 2

From: Sutton, Chris
Sent: Friday, June 03, 2005 10:22 AM
To: Hughes, Jack, Glassmeyer, and Cathy
Cc: Sutton, Chris
Subject: Supernatant Water Sample Chemistry

Jack, Cathy:

Here are the results of the analyses we had performed for the TTA tank supernatant sample collected at the start of hot operations.

The data are consistent with data obtained by DIAL when they equilibrated water with dry K-65 material. We also submitted to ORNL for analysis a sample of supernatant from a slurry sample collected from near the end of AWR operations. We do not have final results back yet. But for your planning purposes, I believe the data below are good to go with.

Analysis	Units	GEL Ohio Data
pH	pH Units	8.05
Radium-226	pCi/L	17,800
Nitrate ion	mg/L	7,130
Sulfate ion	mg/L	4,100
Bicarbonate ion	mg/L	552
Carbonate ion	mg/L	3.07
Sodium ion	mg/L	3,610
Soluble lead	μg/L	2,560
Total uranium	mg/L	16.0

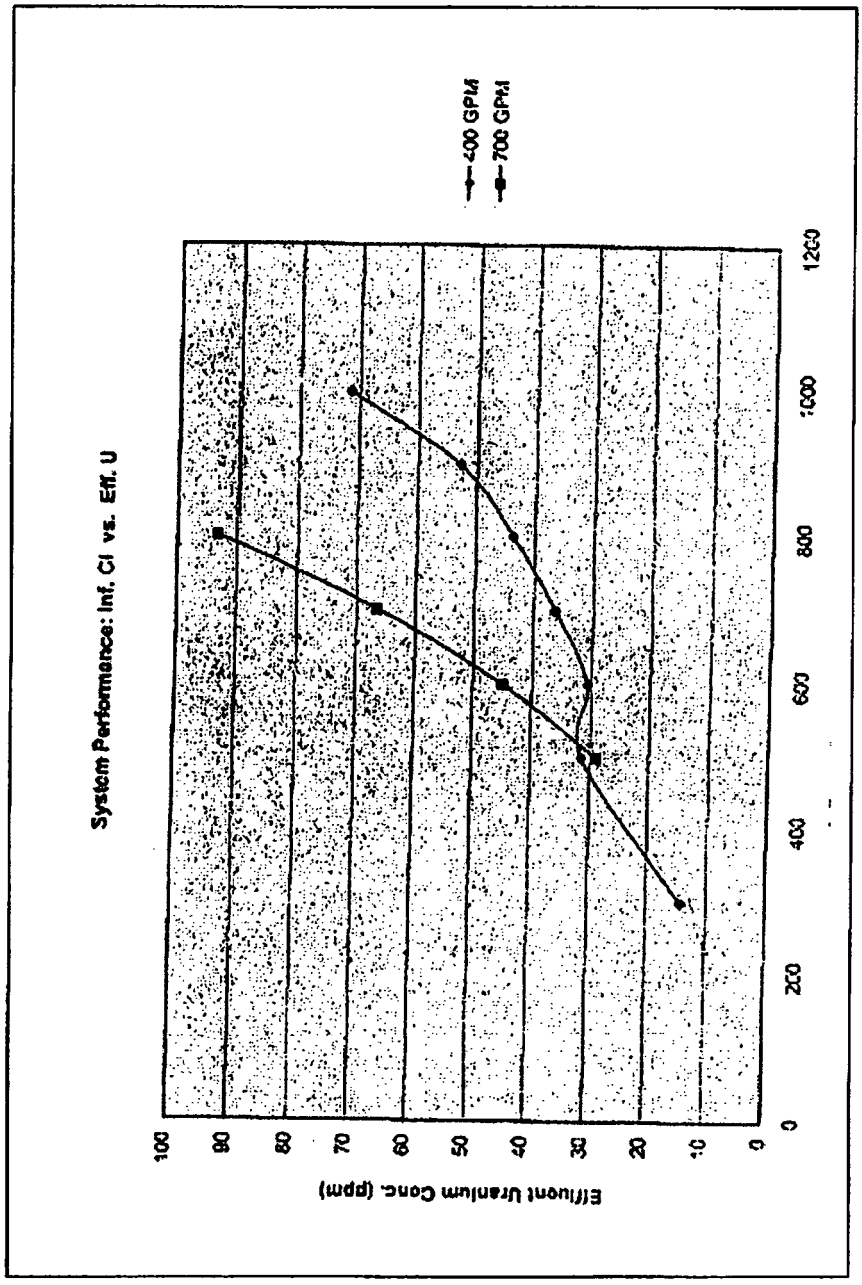
Note that we have not previously requested total uranium analysis for the various Samples we have previously had analyzed, so this is the first total uranium data I have seen from supernatant water.

If questions, please let me know.

Thanks,

Chris

ATTACHMENT 3



Typical Variables at the FEMP Affecting Resin Performance[2]

- Uranium concentration of influent
- Uranium loading rate
- Competition for adsorption sites from other anions

[2] Slide from March 2003 presentation to U.S. EPA and Ohio EPA.

Anion Selectivity Coefficients

(relative to chloride ion)[3]

- $UO_2(CO_3)_3^{4-}$ ---------- 1465
- $UO_2(CO_3)_2^{2-}$ ---------- 20.5
- SO_4^{2-} ---------- 9.1
- NO_3^{1-} ---------- 3.2
- Cl^{1-} ---------- 1.0
- HCO_3^{1-} ---------- 0.27

Selectivity coefficients depend upon resin type and ionic strength of feed water.

[3] Slide from March 2003 presentation to U.S. EPA and Ohio EPA.

ATTACHMENT 6

Forwarded Message:

Subject: **Radium removal from waste water and implications of chloride**
Date: 6/30/05 4:37:06 PM Eastern Daylight Time
From: HRGoltz@dow.com
To: DJBrettschneider@aol.com, Jamesjnk@aol.com
CC: DRRees-Nowak@dow.com
Sent from the Internet

Jim and Don...In your previous note you said that chloride levels would be in the 750 ppm range. This is similar to the bicarbonate levels. The model is attached. What we are looking at is the solubility of barium and radium. The large excess of sulfate and carbonate keep the barium and radium insoluble so the RSC will work to remove them. A 10-fold drop in carbonate did not change the solubility of Ba and Ra. Neither did a chloride concentration equal to the carbonate as shown in the third figure.
I hope this helps...bob

H. Robert Goltz, Ph.D.
Dow Liquid Separations
Phone 989-636-2023
Fax 989-638-9944
Email hrgoltz@dow.com

DOWEX* Resins Specialized Separations Home Page
http://www.dow.com/liquidseps/prod/sp_index.htm

-----Original Message-----
From: Reim, Robert (RE)
Sent: Monday, June 27, 2005 2:02 PM
To: Goltz, Bob (HR)
Subject: RE: Radium removal from waste water

Bob:

Here are some models that may answer your question. In summary, the models predict no change in the solubility of the RSC resin ($BaSO_4$) with the water components. Even if chloride were present equal to carbonate, there would be no effect. Keep in mind these models do not predict retention of ion on the resin, only the equilibrium solubility of the components.
Not sure if I've really answered the question in the original email, but hope this helps.
Regards,
Bob

-----Original Message-----
From: Goltz, Bob (HR)
Sent: Monday, June 20, 2005 5:16 PM
To: Reim, Robert (RE)
Subject: FW: Radium removal from waste water

Bob...I have another Barium sulfate solubility model for you to run. Please see the ions present below and the pH. I do not expect that barium solubility will be reduced, but I will ask if you can run this through your model. Any chance you could do this yet this week? bob

Bob Goltz
Dow Liquid Separations
Phone 989-636-2023

-----Original Message-----
From: DJBrettschneider@aol.com [mailto:DJBrettschneider@aol.com]
Sent: Thursday, June 16, 2005 8:53 PM
To: Goltz, Bob (HR)
Cc: Jamesjnk@aol.com
Subject: Radium removal from waste water

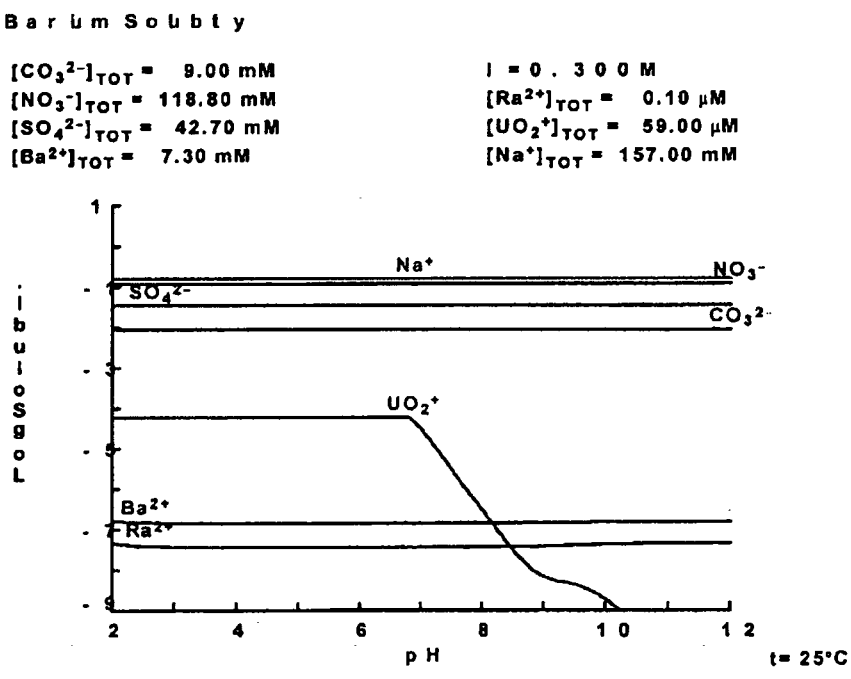
6069

Jim Jenkins and myself, David Brettschneider, spoke to you earlier today about the Dowex RSC resin. Jim and I are the consultants on this project. Jack Hughes had E-mailed you a couple of weeks ago about our need for the Dowex RSC resin. Since Jack has been moved to another project, Jim and I are following up with you about our water chemistry. These are the results we have from a sample that is as much like what we will use the RSC resin for as we have available at this time.

Analysis	Units	Data	Expected after pH adjustment to 10.5
pH	pH units	8.05	10.5
Radium	pCi/L	17,800	
Nitrate ion	mg/L	7,130	
Sulfate ion	mg/L	4,100	
Bicarbonate ion	mg/L	552	
Carbonate ion	mg/L	3.07	
Sodium ion	mg/L	3,610	
Soluble lead	ug/L	2,560	
Total uranium	mg/L	16.0	

One of our major concerns is that we experienced premature loading of the Uranium resin with high levels of anions in the past at AWWT. Do you see any problems with the high levels of cations/anions with the DSC resin? If so, we can mix some groundwater with the wastewater to reduce the levels if necessary. We can cut the concentrations by a factor of 3 or maybe more if needed.

We will call you Monday at 3:00pm to discuss.



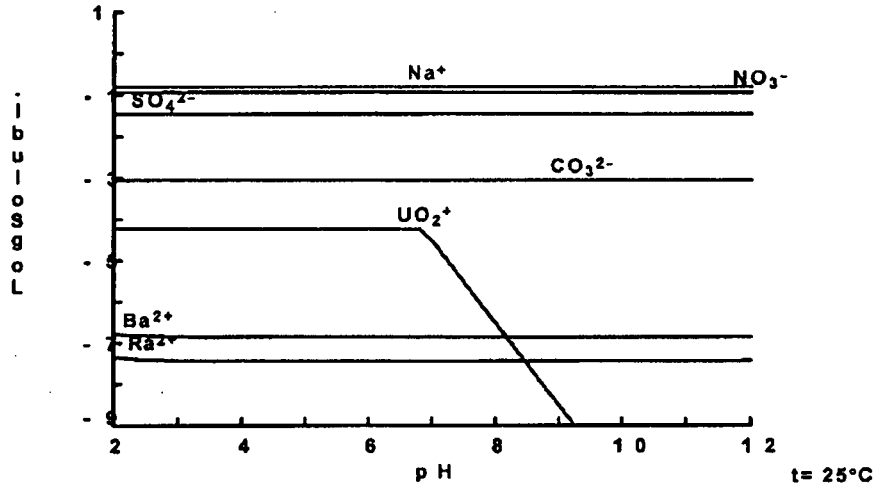
thanks djb

For this model, it was assumed total [Ba2+] = 1 ppm and total [Ra2+] = 1E-07 M. The solubility of barium and radium are controlled by the relatively large excess of sulfate and carbonate respectively. Also, the solubility of uranium is decreased by these anions at pH>7.

Barium Solubty

$[CO_3^{2-}]_{TOT}$ = 0.90 mM
$[NO_3^-]_{TOT}$ = 118.80 mM
$[SO_4^{2-}]_{TOT}$ = 42.70 mM
$[Ba^{2+}]_{TOT}$ = 7.30 mM

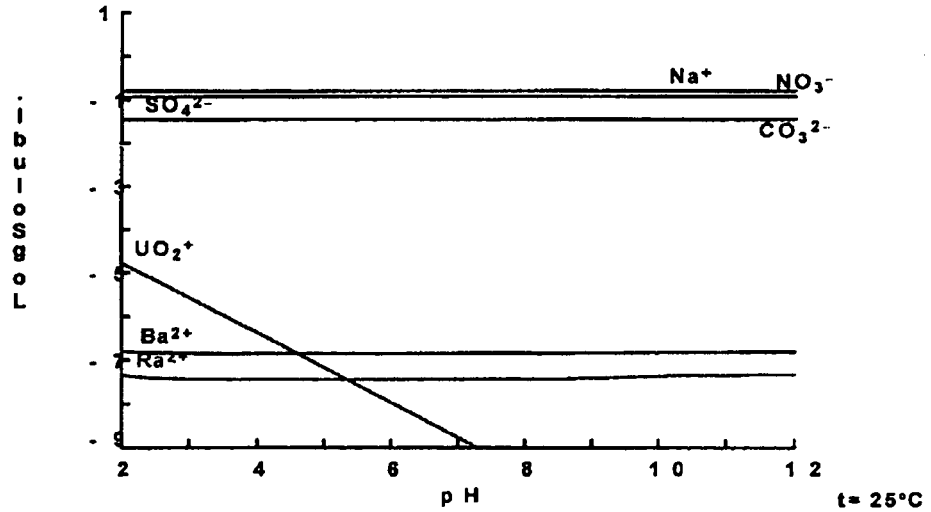
I = 0.300 M
$[Ra^{2+}]_{TOT}$ = 0.10 µM
$[UO_2^+]_{TOT}$ = 59.00 µM
$[Na^+]_{TOT}$ = 157.00 mM



A ten-fold decrease in carbonate concentration had no effect on solubility of barium, radium or uranium.

I = 0.300 M
$[Ba^{2+}]_{TOT}$ = 7.30 mM
$[SO_4^{2-}]_{TOT}$ = 42.70 mM
$[NO_3^-]_{TOT}$ = 118.80 mM
$[CO_3^{2-}]_{TOT}$ = 9.00 mM

$[Cl^-]_{TOT}$ = 9.00 mM
$[Na^+]_{TOT}$ = 157.00 mM
$[UO_2^+]_{TOT}$ = 59.00 µM
$[Ra^{2+}]_{TOT}$ = 0.10 µM



[Cl-] = [CO3-]

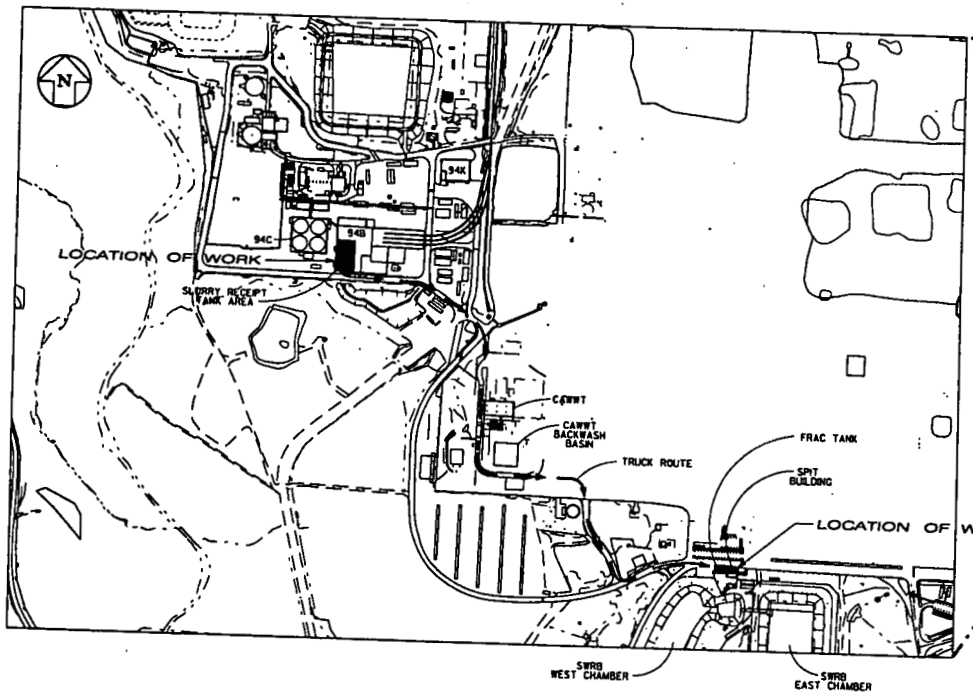
Assuming a chloride concentration equal to carbonate, there was no effect on the apparent solubility of barium or radium.

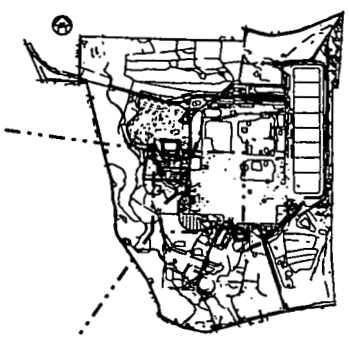
In summary, the solubility of RSC resin should be unaffected by the water components.

UNITED STATES DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

SILOS 1 & 2
WASTEWATER TREATMENT FACILITY
PROJECT 40750





DRAWING INDEX

DRAWING NO.	FILENAME	TITLE DESCRIPTION
94X-5500-X-05787	94XX5787.DGN	LOCATION PLAN, TRUCK ROUTING AND DRAWING INDEX
94X-5500-N-05788	94XN5788.DGN	P&ID SYMBOLS AND LEGEND
94X-5500-F-05789	94XF5789.DGN	K-65 REMEDIATION FACILITY MODIFICATIONS PROCESS FLOW DIAGRAM
18X-5500-N-01285	402.DGN (RTG)	(RTG) SPIT P&ID FILTRATION/ION EXCHANGE DIAGRAM DEMOLITION
94X-5500-N-05790	94XN5790.DGN	SWT HEADWORKS, FILTRATION AND SOLID WASTE P&ID
94X-5500-X-05791	94XX5791.DGN	IAWWT MULTIMEDIA FILTRATION P&ID DEMOLITION
94X-5500-N-05792	94XN5792.DGN	GRANULAR ACTIVATED CARBON P&ID
94X-5500-X-05793	94XX5793.DGN	SPIT ION EXCHANGE P&ID DEMOLITION
94X-5500-N-05794	94XN5794.DGN	ION EXCHANGE P&ID
18X-5500-P-01288	501.DGN (RTG)	(RTG) SPIT EQUIPMENT & PIPING DEMOLITION
94X-5500-P-05795	94XP5795.DGN	SWT EQUIPMENT AND PIPING PLAN
94X-5500-P-05796	94XP5796.DGN	BAG/CARTRIDGE FILTER ISOMETRIC
94X-5500-P-05797	94XP5797.DGN	GRANULAR ACTIVATED CARBON AND ION EXCHANGE ISOMETRIC
94X-5500-P-05800	94XS5800.DGN	STRUCTURAL PLATFORM PLAN & DETAILS
94X-5500-M-05801	94XM5801.DGN	30" BAG AND 16" CARTRIDGE FILTER MODIFICATIONS, PLAN AND DETAILS
94X-5500-S-05802	94XS5802.DGN	NEW CONCRETE SLAB AND PIERS - PLAN, SECTIONS AND DETAILS
94X-5500-M-05803	94XM5803.DGN	GENERAL ARRANGEMENT PLAN
94X-5500-E-05804	94XE5804.DGN	INSTRUMENTATION LOCATION AND CONNECTION PLAN
18X-5500-E-01295	603.DGN (RTG)	S.P.I.T. BUILDING POWER PLAN
18X-5500-E-01296	604.DGN (RTG)	S.P.I.T. BUILDING LIGHTING PLAN
18X-5500-E-01297	605.DGN (RTG)	S.P.I.T. BUILDING PANEL SCHEDULE
18X-5500-E-01298	606.DGN (RTG)	S.P.I.T. BUILDING ELEMENTARY DIAGRAMS
18X-5500-E-01299	607.DGN (RTG)	S.P.I.T. BUILDING CABLE SCHEDULE
18X-5500-E-01300	608.DGN (RTG)	S.P.I.T. BUILDING CONDUIT AND CABLE SCHEDULE
96X-5900-E-01012	96E01012.DGN	480VAC SINGLE LINE DIAGRAM, SUBSTATION M18-1 AND SWRB SERVICES
REF. DWG. 18X-5500-E-0134	622.DGN (RTG)	S.P.I.T. BUILDING CONDUIT PENETRATION PLAN
REF. DWG. 18A-5500-E-01364	18AE1364.DGN (RES #3489)	LAYOUT AND PANEL SCHEDULE

NO.	REVISIONS	DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
					0	ISSUED CFC PER DCN. 40750-JEC-517	9/5/8	JML		

NOTE: FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

APPROVALS

CIVIL & STR.		SAFETY ENG.	
ELECTRICAL		MAINTENANCE	
ENGINEER		FIRE PROTECT.	
INSTRUMENT		WASTE MANAGE	
MECHANICAL		SECURITY	
SILOS 1 & 2	T.J.STONE	PROJECTS	
CHECKED	DEP		
APPROVED	G.E.PAUL		

Fernald Closure Project

FLUOR FERNALD, INC.

U.S. DEPARTMENT OF ENERGY

SILOS AND SPIT AREAS GRIDS 30 & 31B

SILOS 1 & 2 WASTEWATER TREATMENT FACILITY
LOCATION PLAN, TRUCK ROUTING PLAN AND DRAWING INDEX

94X-5500-X-05787 | 0

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INSTRUMENT & PIPING SYMBOLS

- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- PLUG VALVE
- BUTTERFLY VALVE
- STOP CHECK
- NEEDLE VALVE
- CHECK VALVE
- SLIDING GATE VALVE
- BALL CHECK VALVE
- BACKFLOW PREVENTER
- DIAPHRAGM VALVE
- PINCH VALVE
- 3 WAY VALVE
- 3 WAY BALL VALVE
- 3 WAY PLUG VALVE
- ANGLE GATE VALVE
- ANGLE GLOBE VALVE
- HUB DRAIN OR FUNNEL
- DIAPHRAGM
- DIAPHRAGM W/ POSITIONER
- PISTON
- SAFETY RELIEF VALVE
- SOLENOID
- MOTOR
- HANDWHEEL
- SELF-CONTAINED BACK PRESSURE REGULATING VALVE
- 2-WAY SOLENOID VALVE
- 3-WAY SOLENOID VALVE
- 4-WAY SOLENOID VALVE
- SIPHON TUBE
- THERMOWELL
- FLOW DIRECTION
- WELDED CONNECTION
- FLANGED CONNECTION
- SCREWED CONNECTION
- FLEXIBLE HOSE
- SOCKET WELDED PIPE CAP
- HVAC FAN
- PULSATION DAMPENER
- SNIFFER
- SHIELDED WIRE CUT & TAPE SHIELD
- AIR FILTER
- STEAM TRAP
- HOSE QUICKDISCONNECT
- BUTT WELDED PIPE CAP
- SCREWED PIPE CAP
- SOCKET WELDED PIPE CAP
- UNION
- DRAIN LEG
- EXPANSION JOINT
- EJECTOR
- STRAINER (Y TYPE)
- STRAINER (SINGLE BASKET)
- STRAINER (DOUBLE BASKET)
- STRAINER (CONE TYPE)
- MAIN OPERATING LINE
- AUXILIARY PROCESS & SERVICE LINE
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- DRESSER COUPLING
- DIRECT CONNECTION OR MECHANICAL LINK
- INTERLOCK
- MOTOR OPERATOR
- IA — INSTRUMENT AIR SUPPLY
- ELECTRICAL SIGNAL
- DATA HIWAY
- CAPILLARY
- HYDRAULIC SIGNAL LINE
- PNEUMATIC OR VACUUM SIGNAL LINE
- THERMAL INSULATION
- DIAPHRAGM SEAL
- FI — ROTAMETER
- FI — SIGHT GLASS
- LOCAL MOUNTED INSTRUMENT
- FRONT OF PANEL MOUNTED INSTRUMENT
- REAR OF PANEL MOUNTED INSTRUMENT
- POSITIVE DISPLACEMENT PUMP
- HORIZONTAL CENTRIFUGAL PUMP
- VERTICAL CENTRIFUGAL PUMP (SUMP PUMP)
- AGITATOR
- SUBMERSIBLE PUMP (SUMP PUMP)
- END SUCTION CENTRIFUGAL PUMP

LETTERS OF INSTRUMENT IDENTIFICATION

LETTER	FIRST LETTER	2ND LETTER	3RD OR 4TH LETTER
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION
A	ANALYSIS	ALARM	ALARM
B	BURNER FLAME	----	----
C	CONDUCTIVITY	CONTROLLER	CONTROLLER
D	DENSITY	DIFFERENTIAL	----
E	VOLTAGE	ELEMENT	ELEMENT
F	FLOW RATE	RATIO (FRACTION)	----
G	GAGING (DIM)	----	GLASS
H	HAND (MANUAL)	----	HIGH
I	CURRENT (ELECT)	INDICATE	INDICATE
J	POWER	SCAN	----
K	TIME	----	----
L	LEVEL	LIGHT	LOW
M	MOIST OR HUMIDITY	----	----
N	----	----	----
O	OBSERVATION	----	ORIFICE
P	PRESSURE OR VACUUM	----	POINT (TEST)
Q	QUANTITY OR EVENT	TOTALIZE	----
R	RADIOACTIVITY	RECORDER	----
S	SPEED OR FREQUENCY	SAFETY	SWITCH
T	TEMPERATURE	----	TRANSMITTER
U	USER'S CHOICE	----	MULTIFUNCTION
V	VISCOSITY	----	VENT,VALVE
W	WEIGHT OR FORCE	----	WELL
X	UNCLASSIFIED	----	UNCLASSIFIED
Y	RELAY	----	----
Z	POSITION	----	----

SPECIAL DESIGNATIONS

DESIGNATION	FUNCTION/ABBREVATION
Σ/N OR AVG	AVERAGING
Σ OR Bi	BIAS
MAX,Σ/ (TYP)	BOOST,GAIN OR ATTENUATE (INPUT,OUTPUT)
Δ OR DF	DIFFERENTIAL
÷ OR DIV	DIVIDE
√ OR SQRT,	EXTRACT SQUARE ROOT
X OR MUL	MULTIPLY
H	RAISE TO POWER
REV	REVERSING
Σ OR SUM	SUMMING
L	LOW
LL	LOW LOW
H	HIGH
HH	HIGH HIGH
HL	HIGH LOW
∫	INTEGRATE (TIME INTEGRAL)
Σ	PROPORTIONAL
Y	UNDETERMINED COMPUTING RELAY
HOA	HAND-OFF-AUTO
SS	START-STOP
●	EXISTING INSTRUMENT TO BE REUSED
●	EXISTING INSTRUMENT TO BE RELOCATED
I/P	CURRENT TO PNEUMATIC TRANSDUCER
NO_3	NITRATE
MEOH	METHANOL
RUN	RUNNING
HOP	HAND-OFF-CONTROL PANEL
O/C	OPEN-CLOSE
O/A	OFF-AUTO
O/C/A	OPEN-CLOSE-AUTO

- RPU SHARED I/O AND CONTROL
- OPERATORCONSOLE SHARED DISPLAY OR KEYBOARD FUNCTION
- AIR VENT FILTER
- MAGNETIC FLOW METER
- POSSITIVE DISPLACEMENT FLOW METER
- EQUIPMENT NUMBER
- ELECTRO-PNEUMATIC SIGNAL CONVERTER
- VENTURI TUBE
- INSULATED LINE
- S — INSULATED AND STEAM TRACED LINE
- E — INSULATED AND ELECTRIC TRACED LINE

GENERAL INSTRUMENT SYMBOLS

- FI 102 A
- LETTERS OF IDENTIFICATION
- SPECIAL DESIGNATION
- INSTRUMENT TAG NUMBER

LOOP SHEET WIRING LEGEND

- DENOTES WIRING BY SUBCONTRACTOR.
- - DENOTES WIRING BY CONTROL PANEL VENDOR

ICN1 DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.1

ICN2 DENOTES INSTRUMENT COMMUNICATIONS NETWORK NO.2

LOOP SHEET CABLE IDENTIFICATION

XX-XXX-XXX

- SEQUENTIAL NUMBER
- TYPE OF CABLE
  - M = MEASUREMENT
  - C = CONTROL
- LOOP NUMBER (030)
- PLANT/BLDG. NUMBER (01)

PIPING SPECIFICATIONS

FLOWING MEDIUM	PIPE CODE	MAT. CODE
PHOSPHORIC ACID	PAPH	TI
METHANOL	PAM	A
PROCESS WATER	TW	W,WI
STEAM	LS	A
PROCESS WASTEWATER	CE	A,M, OR L
VENT LINE	VE	A OR T
FILTRATE EFFLUENT	FF	A OR W
STORM WATER	ST	A,T,M, OR T
INSTRUMENT AIR	IA	W
POTABLE WATER	DW	W
SULFURIC ACID	AS	AI
SODIUM CARBONATE	SC	A
CONDENSATE	LC	A
VACUUM	V	
PERCHED GROUND WATER	PGW	T

EXAMPLE:

CE-2-4-100-C

- MEDIUM CODE
- NOMINAL PIPE SIZE
- MATERIAL CODE
- LINE NUMBER
- INSULATION TYPE

A - SCH. 40,A53,GR. A, SEAMLESS STEEL PIPE
AI - SCH. 80,A53,GR. A, SEAMLESS STEEL PIPE
TI - SCH. 40, 316L, STAINLESS STEEL PIPE
T - SCH. 40,304L, STAINLESS STEEL PIPE
L - FIBERGLASS REINFORCED PLASTIC
W - SCH. 80,A53,GR. A, GALVANIZED STEEL PIPE
M - DUCTILE IRON, CLASS 50
D - PVC, SCHEDULE 80
D-P - PVC, PERFORATED
Y - DUCTILE IRON, CLASS 54
ET - ELECTRIC TRACED & INSULATED
C - CONDENSATION INSULATION

ABBREVIATIONS

BTU	BRITISH THERMAL UNIT
CU FT	CUBIC FEET
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
KW	KILOWATT
LB/HR	POUNDS PER HOUR
SCFM	STD. CUBIC FT/MINUTE
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
FO	FAIL OPEN
FC	FAIL CLOSED
A/O	AIR TO OPEN
A/C	AIR TO CLOSE
I/A	INSTRUMENT AIR

SPECIAL SYMBOLS

- D — DRAIN
- V — VENT
- F — FLUSH
- S — SAMPLE
- SC — SCREEN

REV. NO.	REVISION	DATE	REV. BY	APPROVED BY
0	ISSUED CFC PER DCN. 40750-JEG-S17	1-3-05	JAL	TE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD CLOSURE PROJECT

THIS DRAWING PREPARED BY

FLUOR FERNALD, INC.

PROJECT NAME: SILOS 1 & 2 WASTEWATER PROJECT

DRAWING TITLE: PIPING & INSTRUMENTATION DIAGRAM SYMBOLS & LEGEND SHEET

APPROVALS

COGNIZANT ENG.		SAFETY ENG.	
CIVIL & STR.		MAINTENANCE	
ELECTRICAL		FIRE PROTECT.	
ENGINEER		WASTE MANAGE.	
INSTRUMENT		SECURITY	
MECHANICAL		QA	
		CONSTRUCTION	
CHECKED		SILOS PROJ. ENG.	
APPROVED			

DRAWN BY: | PROJECT NO.: | DRAWING SIZE CODE NO.: 94X-5500-N-05788 | SHEET NO.: | REV. NO.: 0

FERNALD DOE 5/30/03

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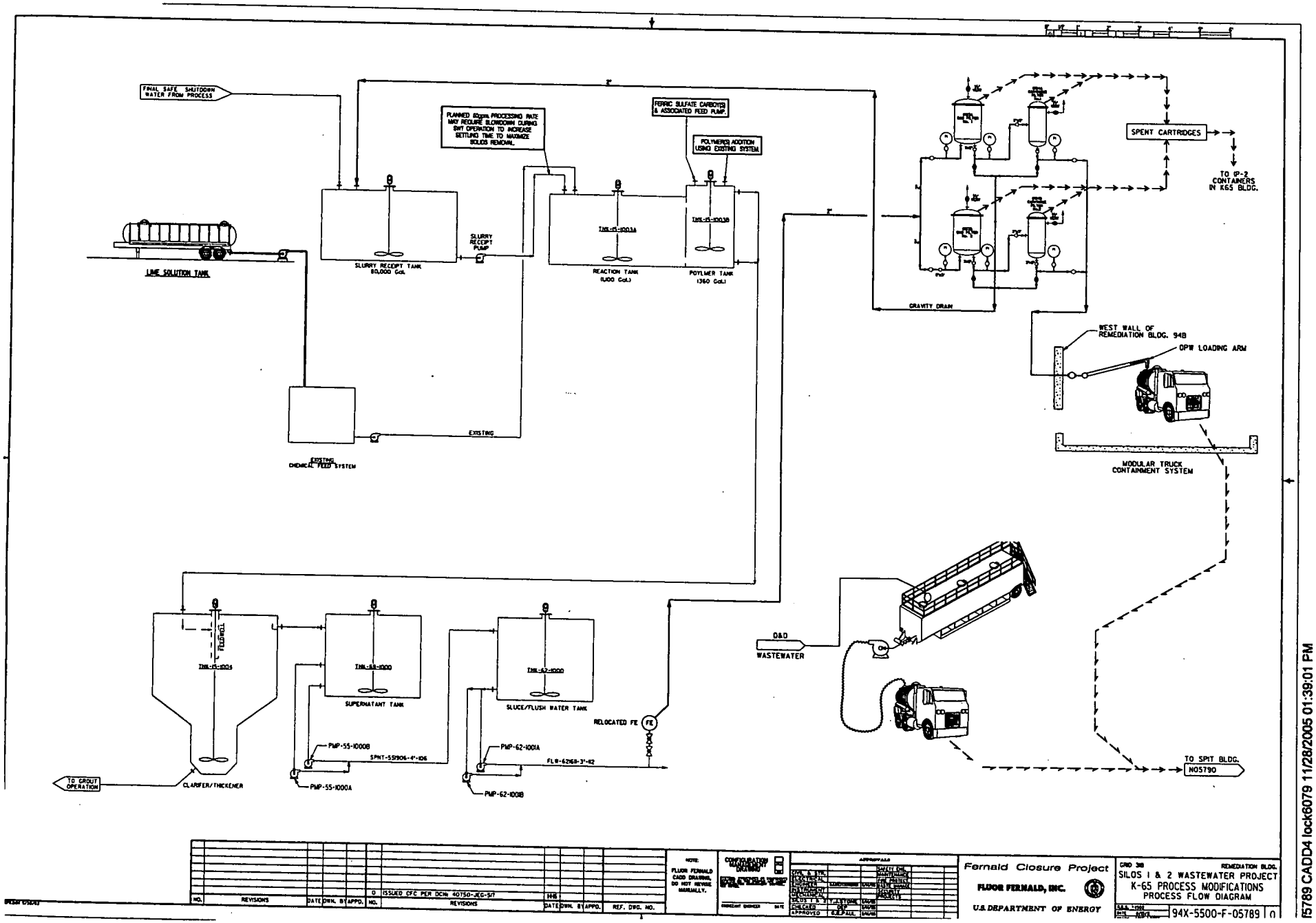

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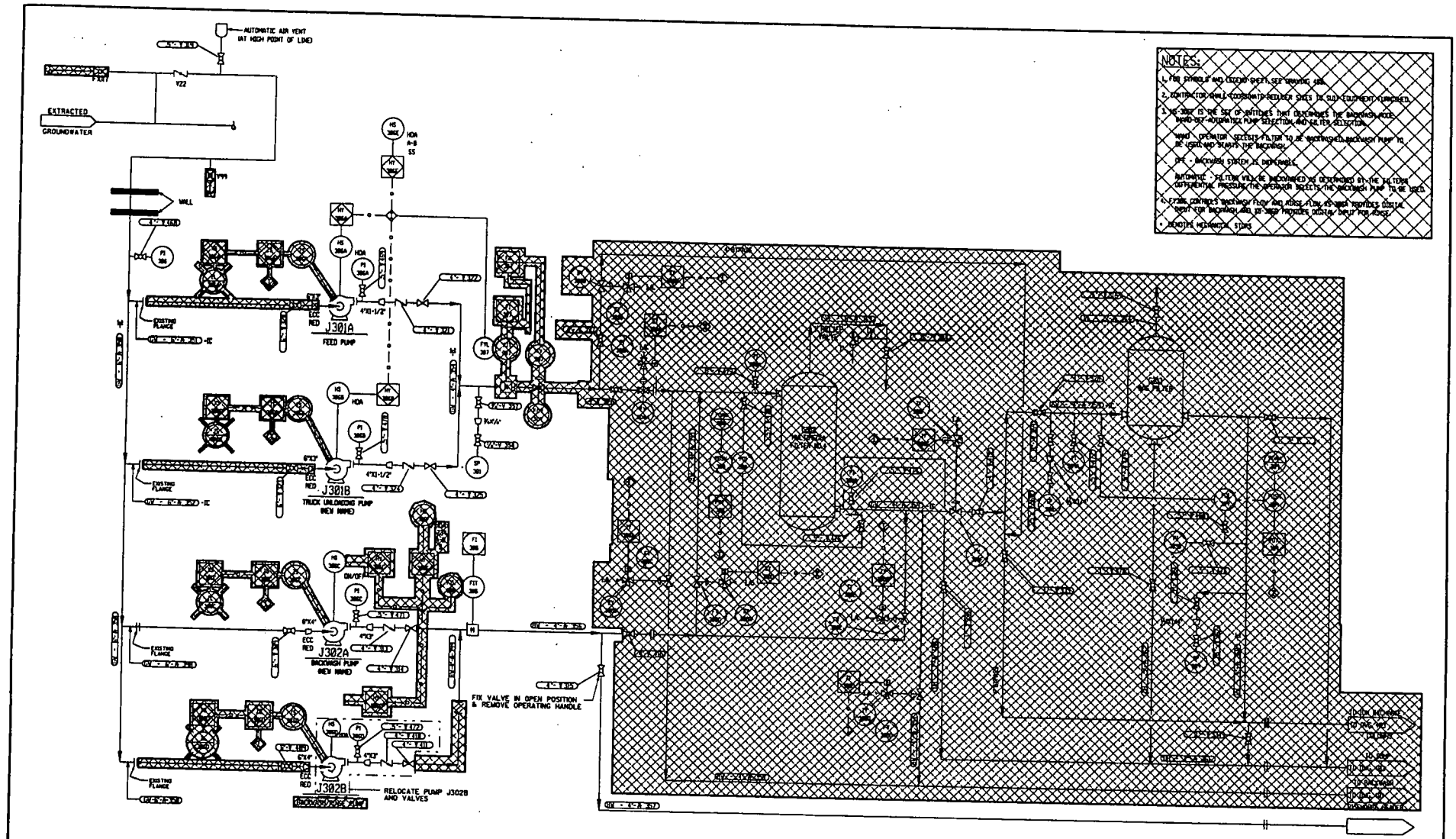


INDEX CODE				
PL. & AR.	DWG.	CL.	SCH. NO.	REV.
18X	5500	N	01285	3

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK.	DATE	APR.	DATE
3	REVISED TO SHOW DEMO AREAS PER RES 4502 SILOS 1 & 2 WASTEWATER TREATMENT FACILITY PROJECT DCN *49750-JEG-517	JAL	12-2-93				
2	ADDED CORRECTIONS TO CLOUDED AREAS, 'AS-BUILT' PER RES2686	KLL DRN	1-24-92				
1	ADDED INDEX NO., 'AS-BUILT' PER RES2399						

DRAWING STATUS	BY	DATE
PRELIMINARY		
FOR CONCUR/APPROVAL		
APPROVED		
REVISED and APPROVED		

DRAWING IS NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED AND DATED. ALL PRINTS ARE TO BE DESTROYED HAVING AN EARLIER DATE AND / OR REVISION NUMBER.

DRAWING INFORMATION	BY	DATE
DESIGN BY:		
DRAWN BY:	R.L. SIMMONS	10/13/93
CHECKED BY:	J.E. PAGE	11/01/93
REVIEWED BY:	E.W. TIEPEL	11/01/93

SCALE: NONE PLOT SCALE: 1
PLOT DATE: 01/25/94

SOUTH PLUME INTERIM TREATMENT
PIPING AND INSTRUMENTATION DIAGRAM
DEMOLITION

PROJECT LOCATION: FERNALD, OHIO
PROJECT NO. 930168

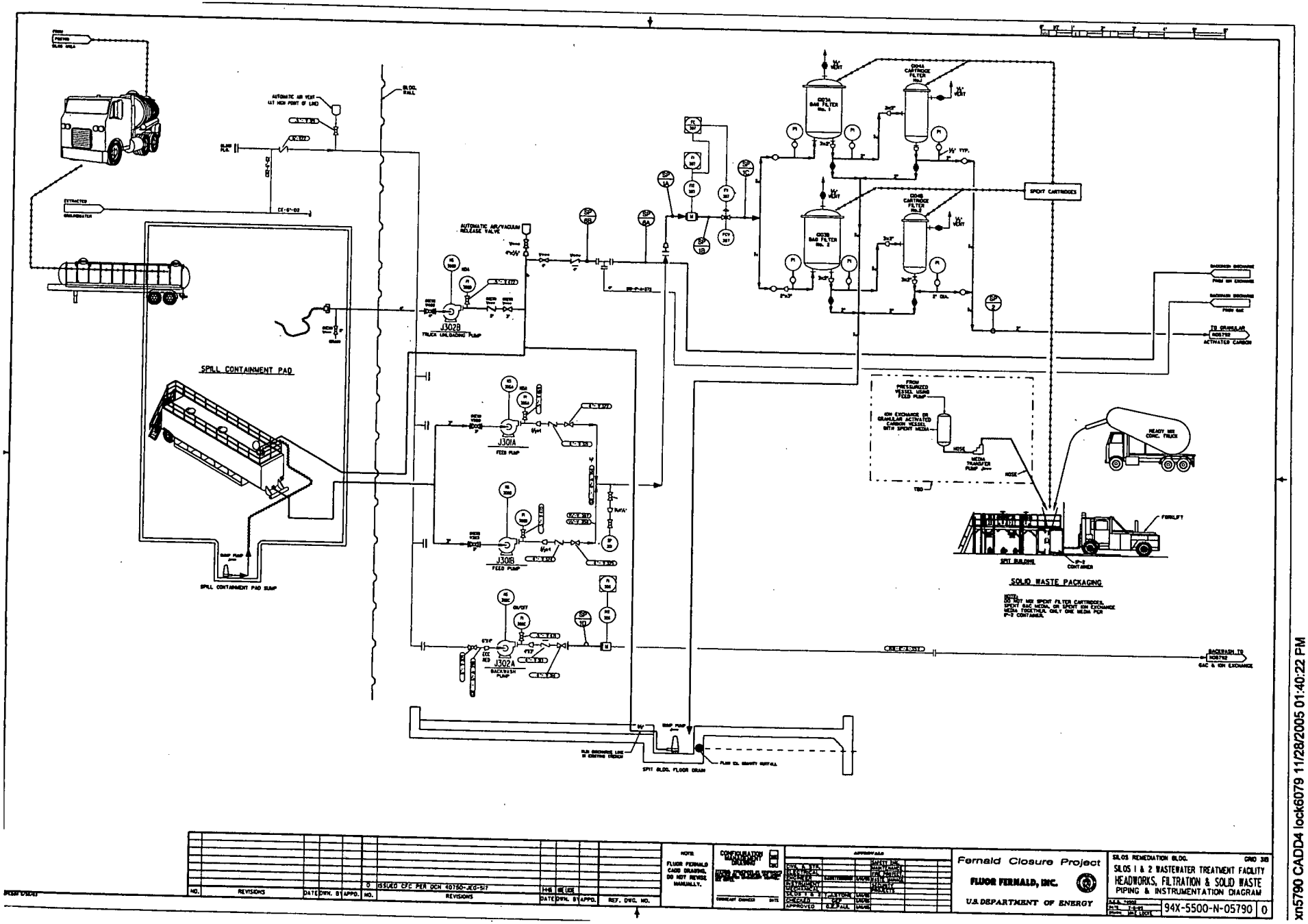
RTG RESOURCE TECHNOLOGIES GROUP, INC.
LAKEWOOD, COLORADO 80227
(303) 969-0311

CLIENT: FERMCO
FERNALD, OHIO

REVISION NO. 3
DRAWING NO. 402

; CADD4 lock6079 11/28/2005 01:50:16 PM

6969



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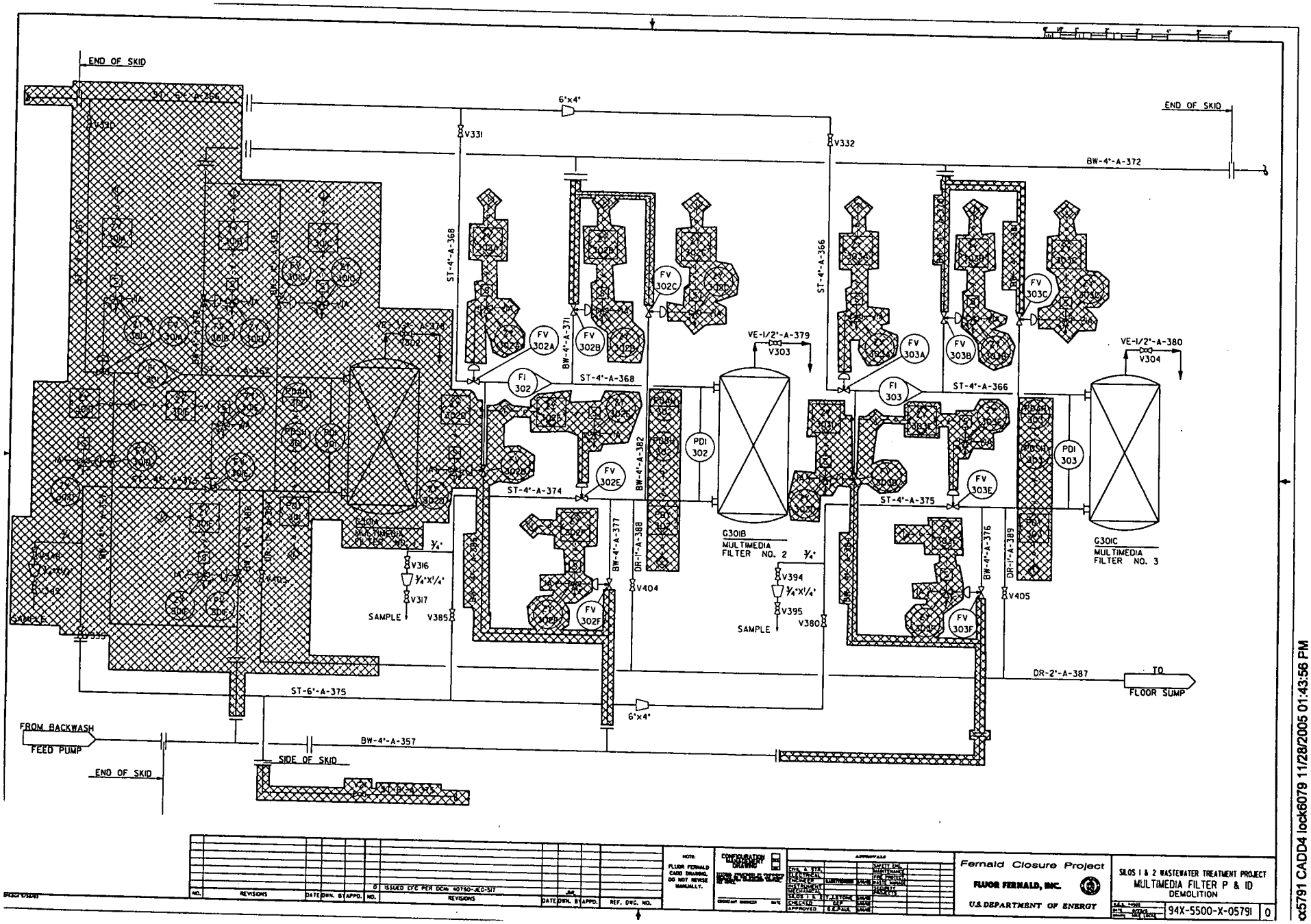


NO.	REVISIONS	DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
					0	ISSUED CFC PER DCN: 40750-JEC-517		JAK		

NOTE: FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

APPROVALS: CIVIL & STR. ELECTRICAL INSTRUMENT MECHANICAL SLOS 1 & 2 CHECKED APPROVED

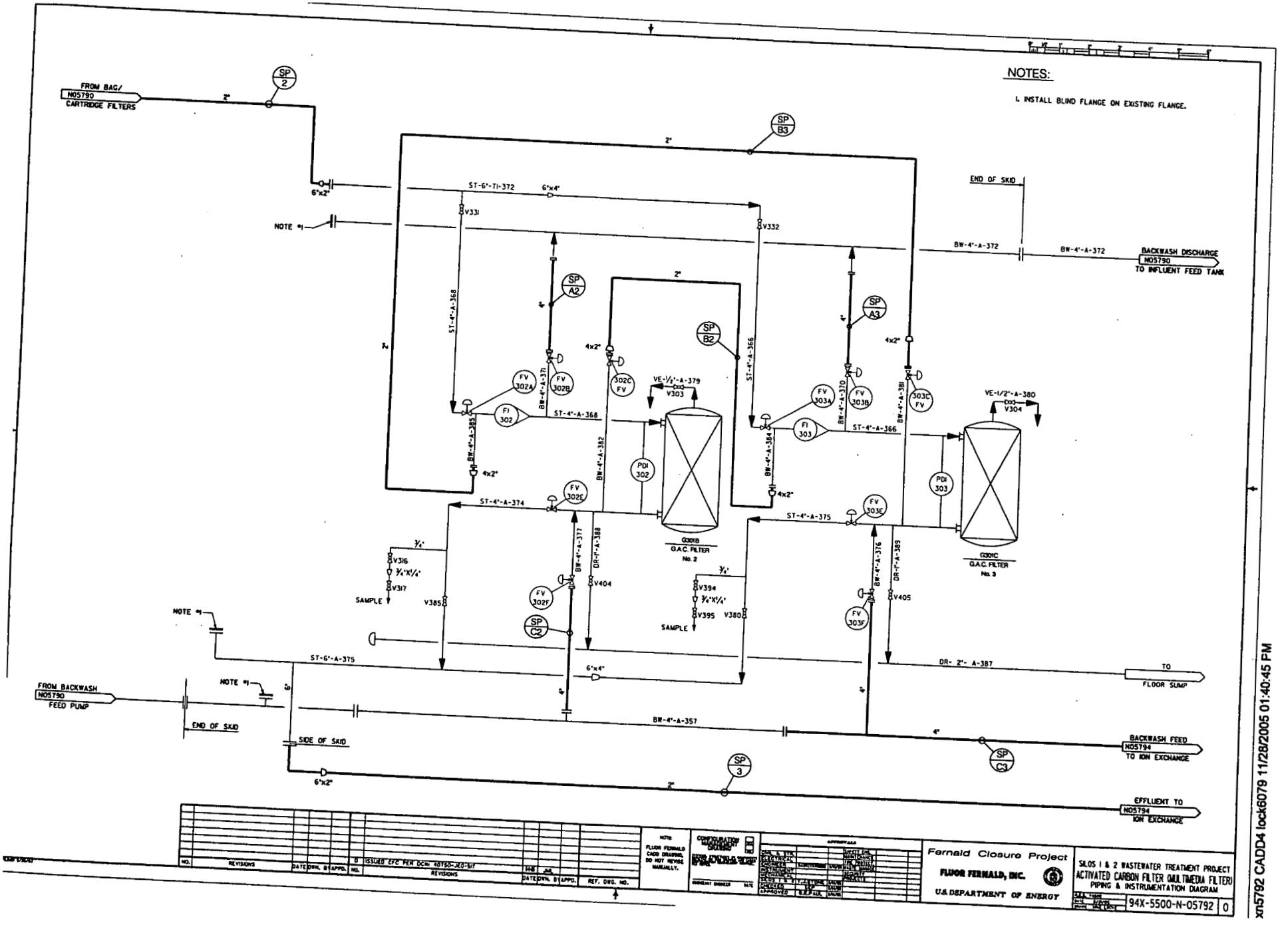
Fernald Closure Project
FLUOR FERNALD, INC.
U.S. DEPARTMENT OF ENERGY

SLOS 1 & 2 WASTEWATER TREATMENT PROJECT
MULTIMEDIA FILTER P & ID
DEMOLITION

94X-5500-X-05791 | 0

α5791 CADD4 lock6079 11/28/2005 01:43:56 PM

6069



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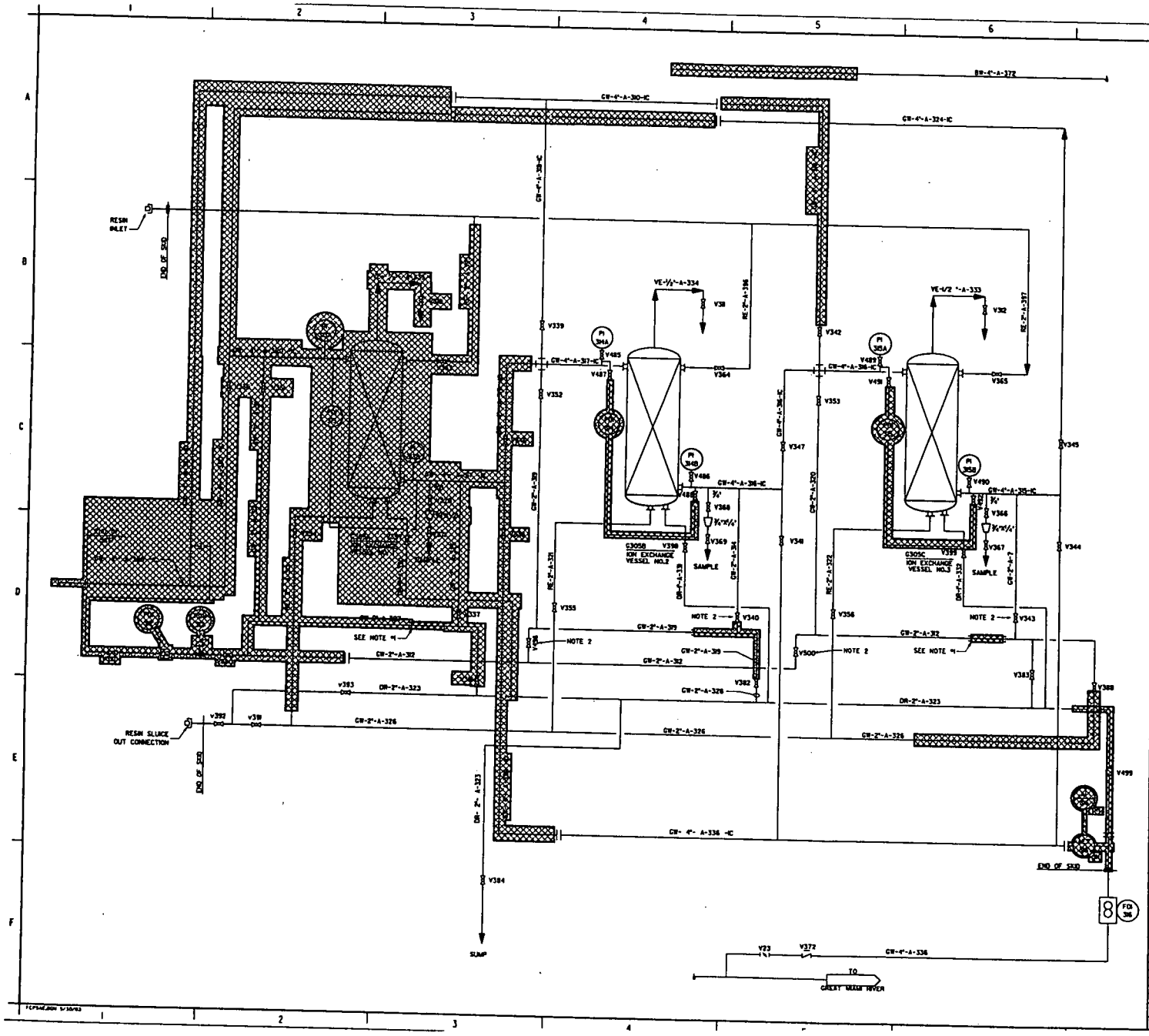

LEGEND:

PIPING, VALVES & INSTRUMENTATION TO BE REMOVED

NOTES:

1. REMOVE LENGTH OF PIPE REQUIRED TO INSTALL BACK TO BACK SOCKET WELD PIPE CAPS.
2. FIX VALVE IN OPEN POSITION AND REMOVE OPERATING HANDLE.

REV. NO.	REASON FOR REVISION PURPOSE - DESCRIPTION	DATE	REV. BY	APPR.
0	ISSUE CFC PER DCN: 40750-JEG-517	11-11-05	JML	

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD CLOSURE PROJECT

THIS DRAWING PREPARED BY
FLUOR FERNALD, INC.

PROJECT NAME
SILOS 1 & 2 WASTEWATER PROJECT

DRAWING TITLE
ION EXCHANGE
PIPING & INSTRUMENTATION DIAGRAM
DEMOLITION

APPROVALS

COGNIZANT ENG.		SAFETY ENG.	
CIVIL & STR.		MAINTENANCE	
ELECTRICAL		FIRE PROTECT.	
ENGINEER		WASTE MANAGE	
INSTRUMENT		SECURITY	
MECHANICAL		QA	
		CONSTRUCTION	
CHECKED		SILOS PROJ. ENG.	
APPROVED			

DRAWN BY: MIKE LOCKE
DES PROJECT NO.: R.E.A. #4500
PROJECT NO.:
FILENAME: 94XX5793.DGN
DRAWING SHEET CODE NO.: 94X-5500-X-05793
SHEET NO.:
REV. NO.: 0

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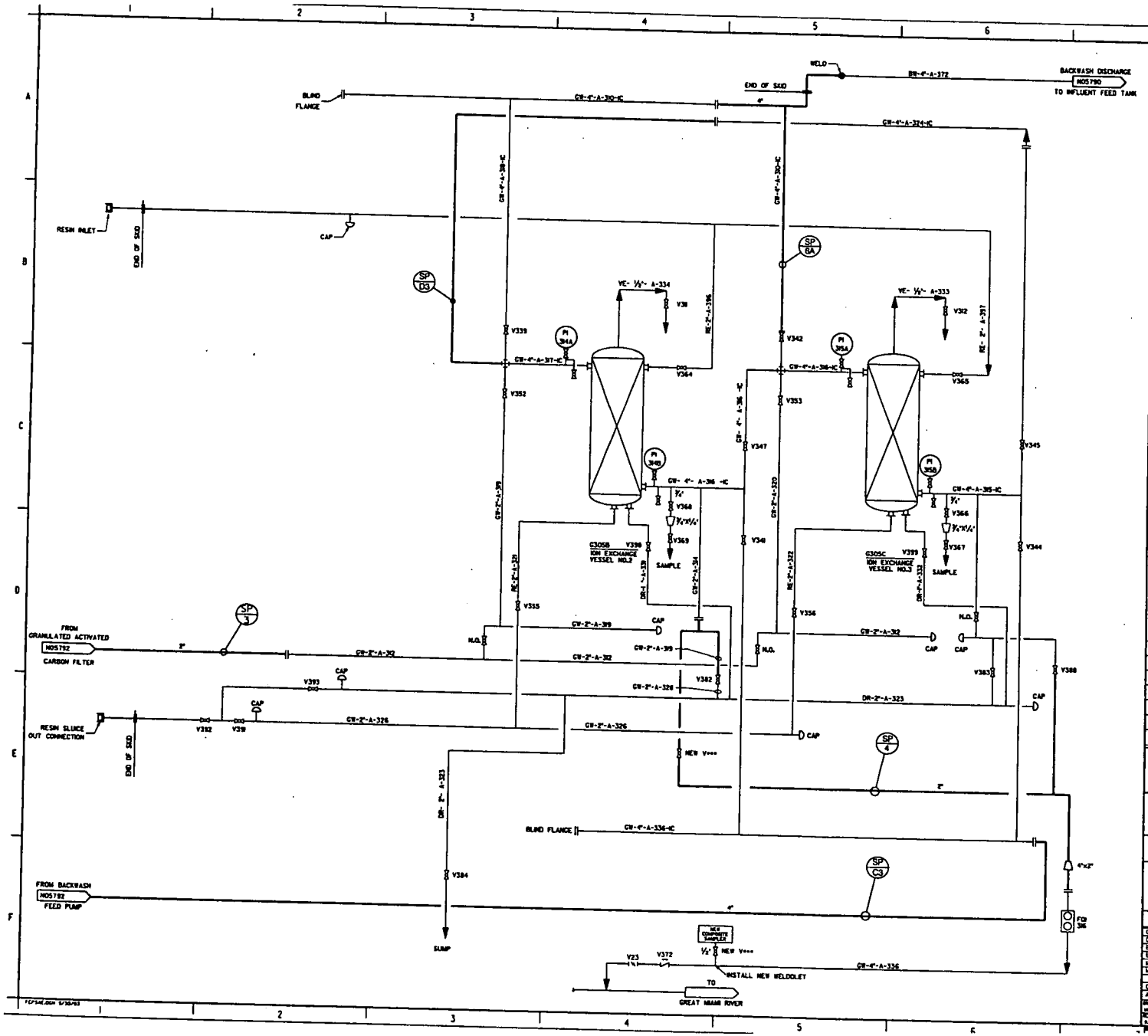

NOTES:

REV. NO.	REVISION PURPOSE - DESCRIPTION	DATE	REV. BY	APPR.
0	ISSUE CFC PER DCN 40750-JED-5/7	9-9-05	JAL	

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD CLOSURE PROJECT

THIS DRAWING PREPARED BY
FLUOR FERNALD, INC.

PROJECT NAME
SILOS 1 & 2 WASTEWATER PROJECT

DRAWING TITLE
ION EXCHANGE
PIPING & INSTRUMENTATION DIAGRAM

APPROVALS

COMZANT ENG.		SAFETY ENG.	
CIVIL & STR.		MAINTENANCE	
ELECTRICAL		FIRE PROTECT.	
ENGINEER		WASTE MANAGE	
INSTRUMENT		SECURITY	
MECHANICAL		QA	
		CONSTRUCTION	
CHECKED			
APPROVED			

DRAWN BY
MSE LIEDS
NEW PROJECT NO.
A.E.A. 94005
PROJECT NO.
FLUOR DANIEL
DRAWING SIZE CODE NO.
94X-5500-N-05794
SHEET NO.
REV. NO.
0

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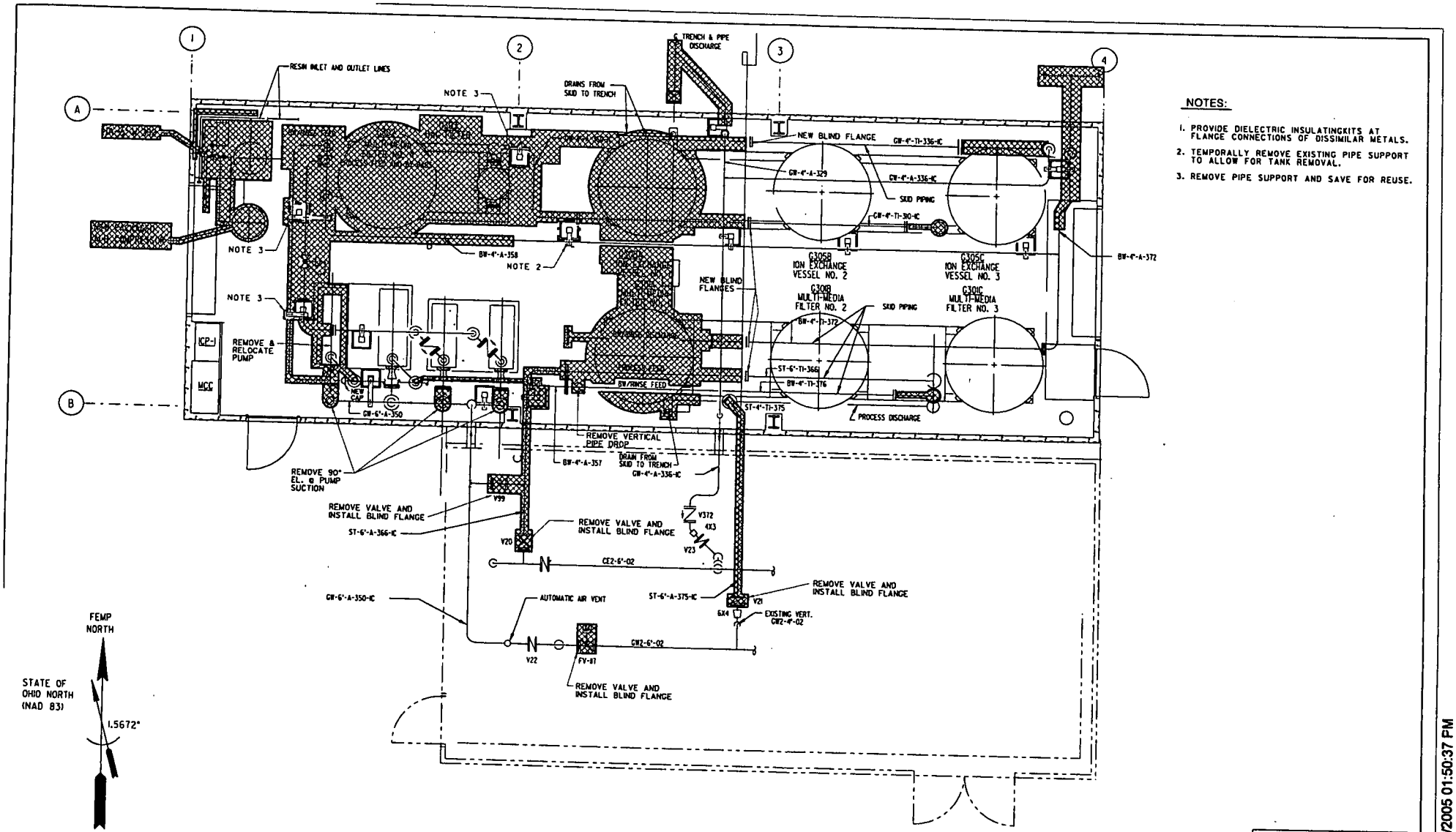
6909



NOTES:

1. PROVIDE DIELECTRIC INSULATINGKITS AT FLANGE CONNECTIONS OF DISSIMILAR METALS.
2. TEMPORALLY REMOVE EXISTING PIPE SUPPORT TO ALLOW FOR TANK REMOVAL.
3. REMOVE PIPE SUPPORT AND SAVE FOR REUSE.

REVISIONS					
6	REVISED TO SHOW DEMO AREAS PER RES 4502 SILOS 1 & 2 WASTEWATER TREATMENT FACILITY PROJECT. DCN #40750-JEG-517	JHL	11-4-95		
5	AS BUILT PER DCN 59200-001	MEF	12-8-93	RCF	
4	ADDED BW-4"-A-358 LINE PER DCN 59200-001	RSG	4-21-93	RCF	7-14-00 RCF 7-14-00
3	ADDED NEW AIR COMPRESSOR PER RES 2985 CFC	MEF	5-20-94	J. S.	6-11-94 K.C.P. 3/1/97
2	ADDED CORRECTIONS INDICATED BY CLOUDED AREAS. 'AS-BUILT' PER RES2688	R. S. DAR	5-5-95	K. K.	8-23-95 K.C.P. 5-23-95
1	ADDED INDEX NO. , 'AS-BUILT' PER RES2399				
NO.	DESCRIPTION	BY	DATE	CHK.	DATE APPR. DATE

DRAWING STATUS	BY	DATE
PRELIMINARY		
FOR COMMENT/APPROVAL		
APPROVED	E. W. TIEPEL	
REVISED and APPROVED		

DRAWING IS NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED AND DATED. ALL PRINTS ARE TO BE DESTROYED HAVING AN EARLIER DATE AND / OR REVISION NUMBER.

DRAWING INFORMATION	BY	DATE
DESIGN BY:	J.E. PAGE	8/20/93
DRAWN BY:	J.E. PAGE	12/10/93
CHECKED BY:	E.W. TIEPEL	12/16/93
REVIEWED BY:	C.A. BECK	12/16/93

SCALE: 1/8"=1'-0" PLOT SCALE: 8:3
PLOT DATE: 12/03/93

INDEX CODE				
PL. & AR.	DWG.	CL.	SER. NO.	REV.
18X	5500	P	01288	6

SOUTH PLUME TREATMENT
EQUIPMENT & PIPING PLAN
DEMOLITION

PROJECT LOCATION: FERNALD, OHIO
PROJECT NO. 93068

RESOURCE TECHNOLOGIES GROUP, INC.
LAKEWOOD, COLORADO 80227 (303) 969-8511

CLIENT: FERMCO
FERNALD, OHIO

REVISION NO. 6 DRAWING NO. 501

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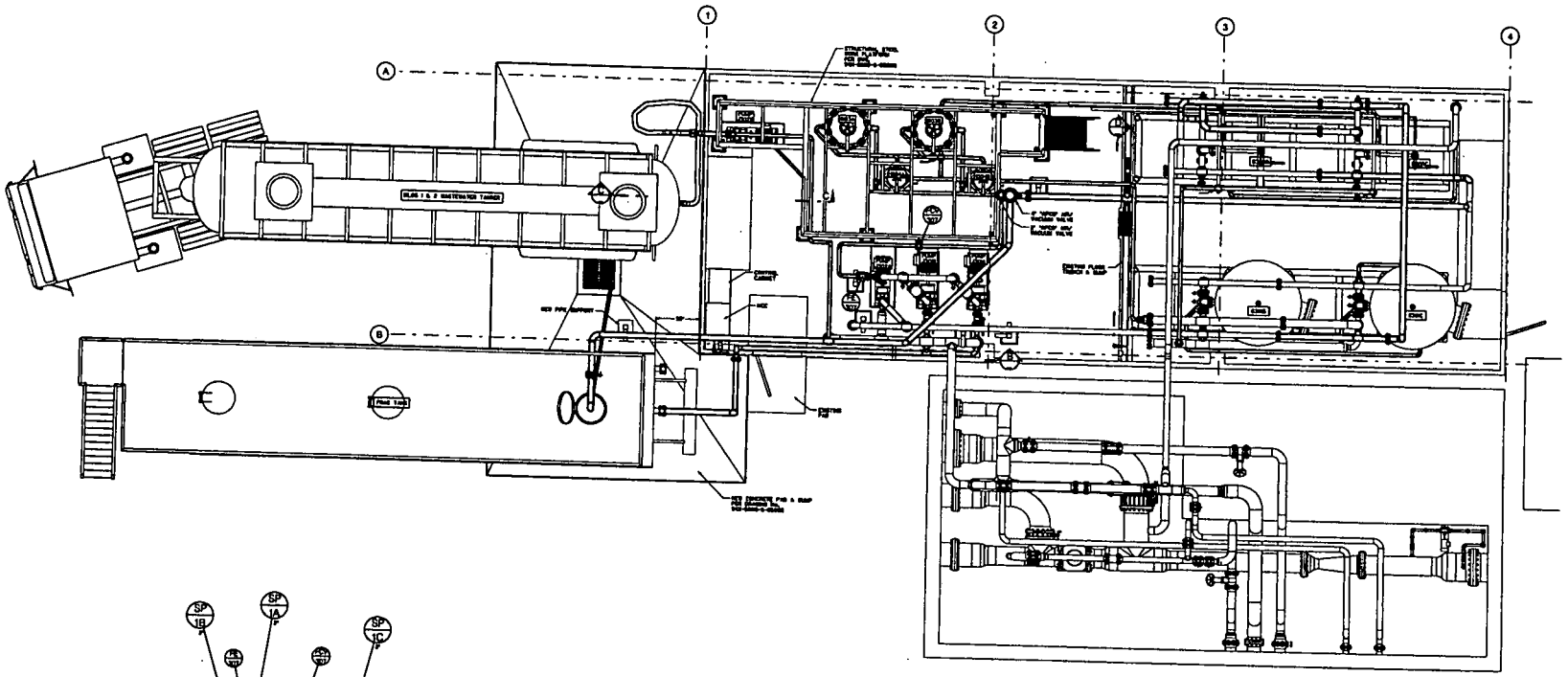

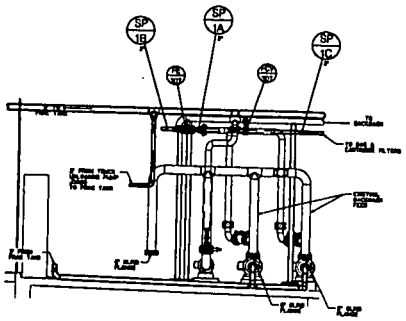

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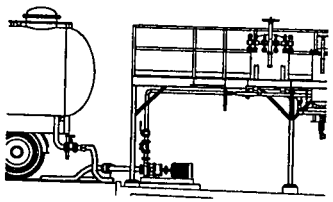

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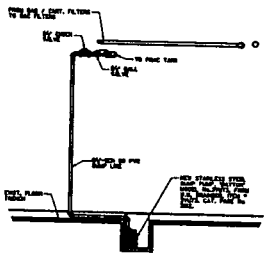

SECTION D-D

NO.	REVISIONS	DATE	DWN. BY	APPD.
0	ISSUED EFC PER DCN #40YSO-JEG-SIT			

NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.

NOTE: FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

ENGINEERING MANAGER DATE

APPROVALS

CIVIL & STR.			MARKET ENG.
MECHANICAL			INSTRUMENTATION
ELECTRICAL			PIPE ENGINEERING
CONTROLS	CONTROLS	DATE	PIPE DESIGN
ENVIRONMENT			STEEL DESIGN
CHEMICAL			PROJECT
SAFETY & ENVIRONMENTAL		DATE	SAFETY
SCHEDULE		DATE	SCHEDULE
APPROVED		DATE	

Fernald Closure Project

FLUOR FERNALD, INC.

U.S. DEPARTMENT OF ENERGY

SA.OS 1 & 2 WASTEWATER TREATMENT PROJECT

SWTP EQUIPMENT & PIPING LAYOUT

94X-5500-P-05795 | 0

p5795 CADD4 lock6079 11/28/2005 01:41:42 PM

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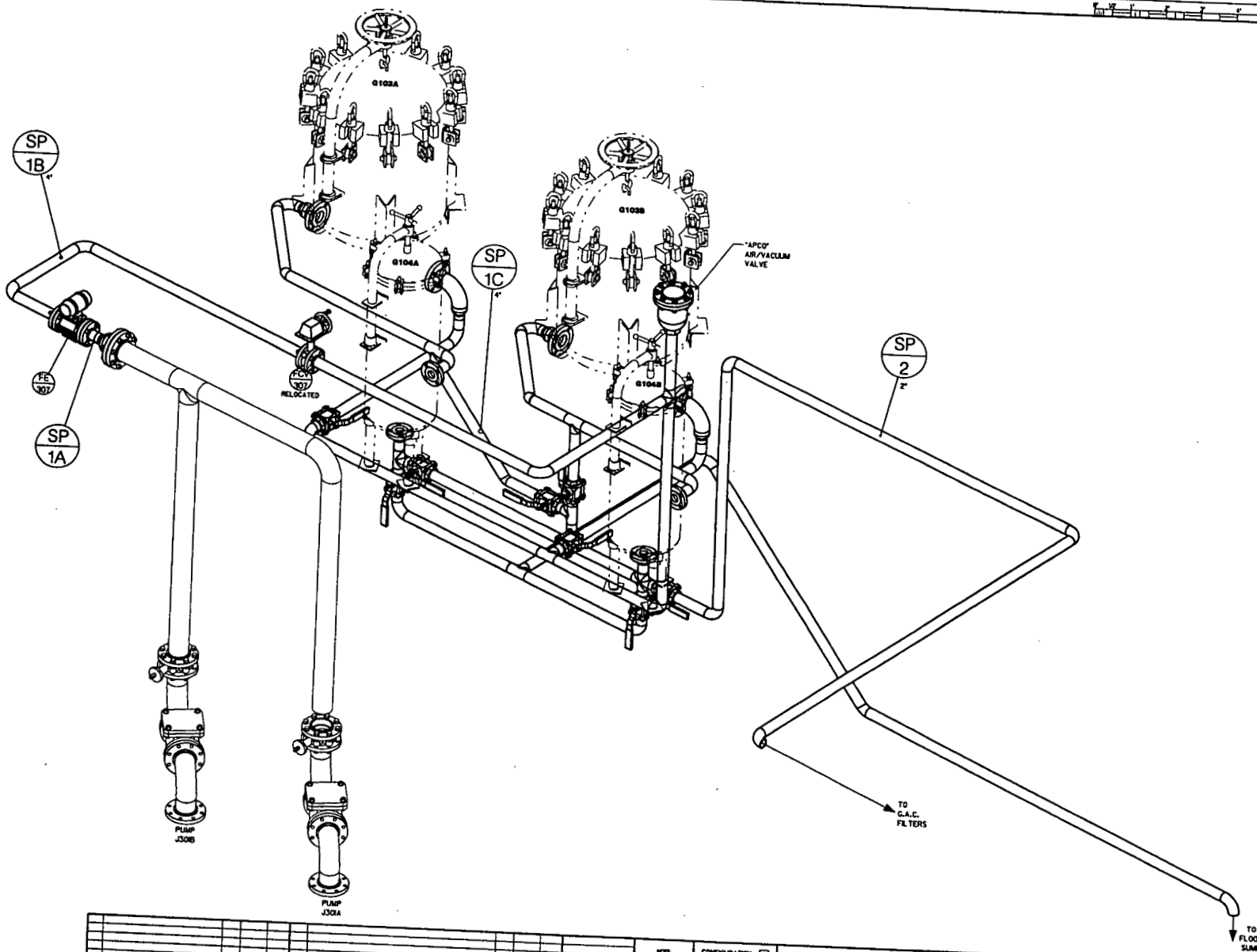


NO.	REVISIONS	DATE	DWN. BY	APPD.
0	ISSUED CFC PER DCN #40750-JEC-S/T			

NO.	REVISIONS	DATE	DWN. BY	APPD.

REF. DWG. NO.

NOTE: FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

CONCURRENT ENGINEER DATE

APPROVALS

CIVIL & STR.			SAFETY ENG.
ELECTRICAL			MAINTENANCE
ENGINEER	LUBTCHENKO	12/6/94	FIRE PROTECT.
INSTRUMENT			OPTICAL SHOP
MECHANICAL			SAFEGUARD
SEDS 1 & 2			PROJECTS
CHECKED	T-LESTORE	12/6/94	
APPROVED	SEE E-CPALA	12/6/94	

Fernald Closure Project

FLUOR FERNALD, INC.

U.S. DEPARTMENT OF ENERGY

SEDS 1 & 2 WASTEWATER TREATMENT PROJECT

BAG & CARTRIDGE FILTER PIPING ISOMETRIC

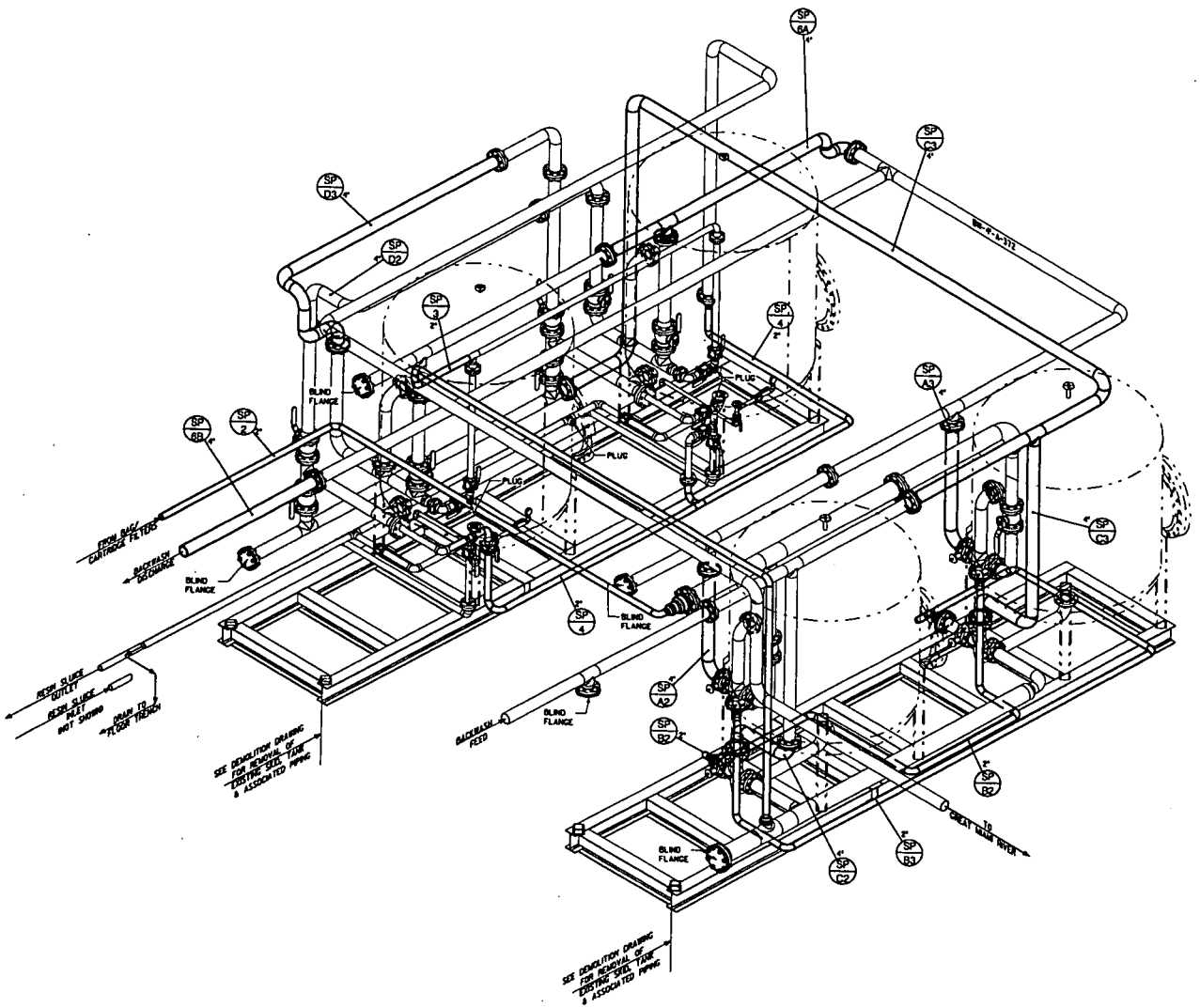
U.S.A. 1998

DATE SCALE

94X-5500-P-05796 | 0

p5796 CADD4 lock6079 11/28/2005 01:42:17 PM

6669



NO.	REVISIONS	DATE	DWN. BY	APPD.
0	ISSUED CFC PER DCN #40750-JEC-5/7			

NO.	REVISIONS	DATE	DWN. BY	APPD.

REF. DWG. NO.

NOTE
FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

APPROVALS

CIV. & STR.			SAFETY ENG.
ELECTRICAL			QUALITY ENG.
CONTROLS			ENV. PROTECT.
INSTRUMENT			SITE ENGR.
MECHANICAL			SUBCONTR.
DR.			PROJECT
CHECKED			ENGINEER
APPROVED			

Fernald Closure Project

FLUOR FERNALD, INC.

U.S. DEPARTMENT OF ENERGY

SILOS 1 & 2 WASTEWATER TREATMENT PROJECT

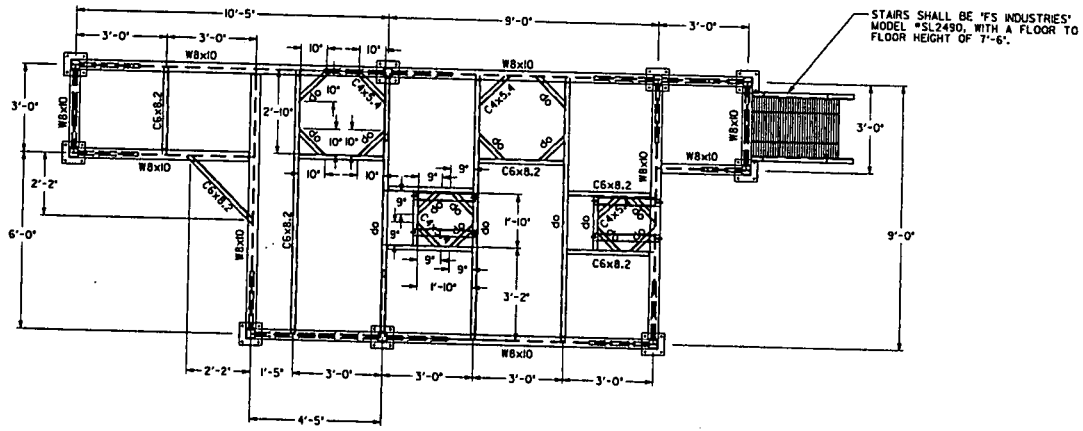
GRANULAR ACTIVATED CARBON & ION EXCHANGE PIPING ISO

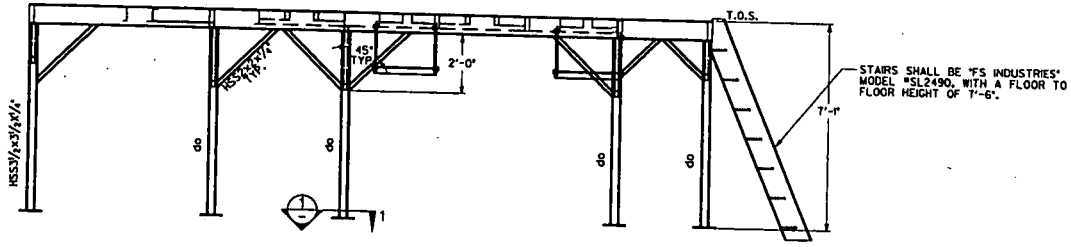
94X-5500-P-05797 | 0

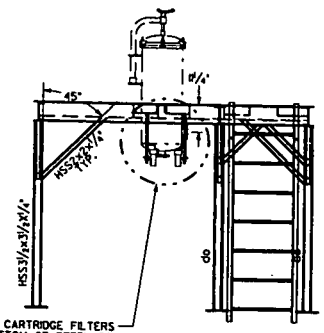
KP05797 CADD4 lock6079 11/28/2005 01:41:12 PM

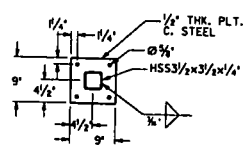
NOTES:

1. PLATES & SHAPES: ASTM A-36.
2. WELDING ELECTRODES: E70XX.
3. ALL CONNECTIONS ARE WELDED, UNLESS NOTED OTHERWISE.
4. USE 3/16" FILLET WELDS UNLESS NOTED OTHERWISE.
5. ALL WELDING SHALL BE PER AWS D1.1 LATEST EDITION.
6. ANCHOR BOLS SHALL BE "HILTI KWIK BOLTS", 1/2"x5 1/2" LG., OR APPROVED EQUAL

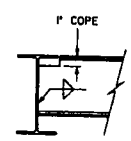








SECTION 1-1



TYPICAL CONNECTION DETAIL

NO.	REVISIONS	DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
					0	ISSUED CFC PER DCN #40750-JEG-517				

NOTE: FLUOR FERNALD CADD DRAWING, DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

APPROVALS

CIVIL & STR.		SAFETY ENG.
ELECTRICAL		MAINT. ENGR.
ENGINEER		FIRE PROTECT.
INSTRUMENT		WASTE MANAGE
MECHANICAL		SECURITY
SILOS 1 & 2	T.J. STONE	
CHECKED	DEP	
APPROVED	G.E. PALL	

Fernald Closure Project

FLUOR FERNALD, INC.

U.S. DEPARTMENT OF ENERGY

SILOS 1 & 2 WASTEWATER TREATMENT PROJECT
STRUCTURAL PLATFORM
PLAN & DETAIL

94X-5500-S-05800 | 0

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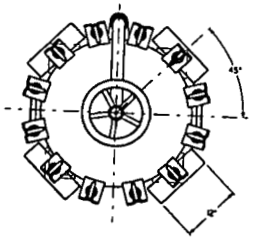
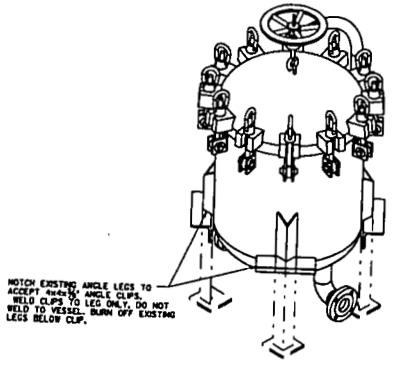
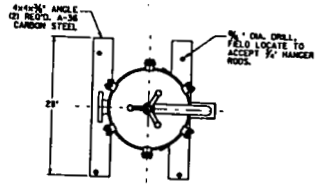
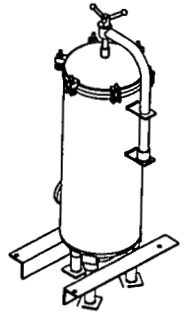
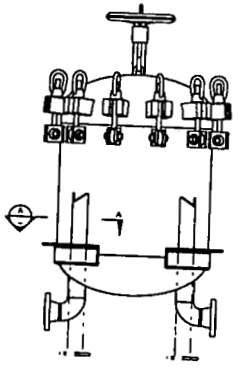
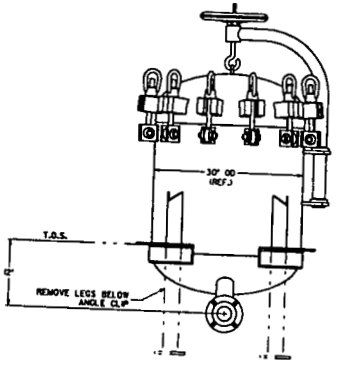




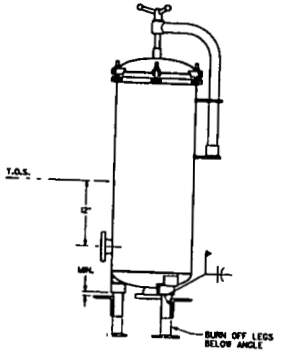


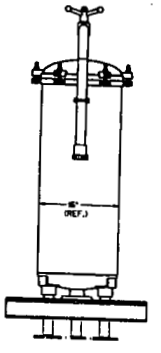




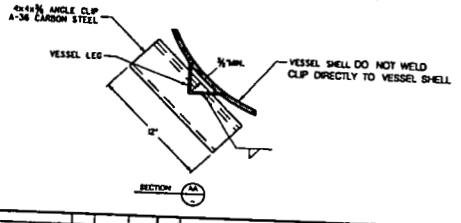


30" BAG FILTERS





16" CARTRIDGE FILTER



NO.	REVISIONS	DATE	DWN.	BY	APPD.
0	ISSUED CFC PER DCN #40750-JEC-S/T				

NO.	REVISIONS	DATE	DWN.	BY	APPD.

MOS | NE UKE

REF. DWG. NO.

NOTE: FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

CONSTRUCT ENGINEER DATE

APPROVALS

CIVIL & STR.			SAFETY ENG.
ELECTRICAL			MAINT. ENGR.
ENGINEER			FIRE MARSHAL
INSTRUMENT			FIELD MANAGER
MECHANICAL			SECURITY
NUCLEAR			ENGINEER
DESIGN T & S			
CHECKED			
APPROVED			

Fernald Closure Project

FLUOR FERNALD, INC.

U.S. DEPARTMENT OF ENERGY

SILOS 1 & 2 WASTEWATER TREATMENT PROJECT

30" BAG & 16" CART. FILTERS MODIFICATIONS PLAN & DETAILS

A/E CODE

94X-5500-M-05801 | 0

m5801 CADD4 lock6079 11/28/2005 01:39:21 PM

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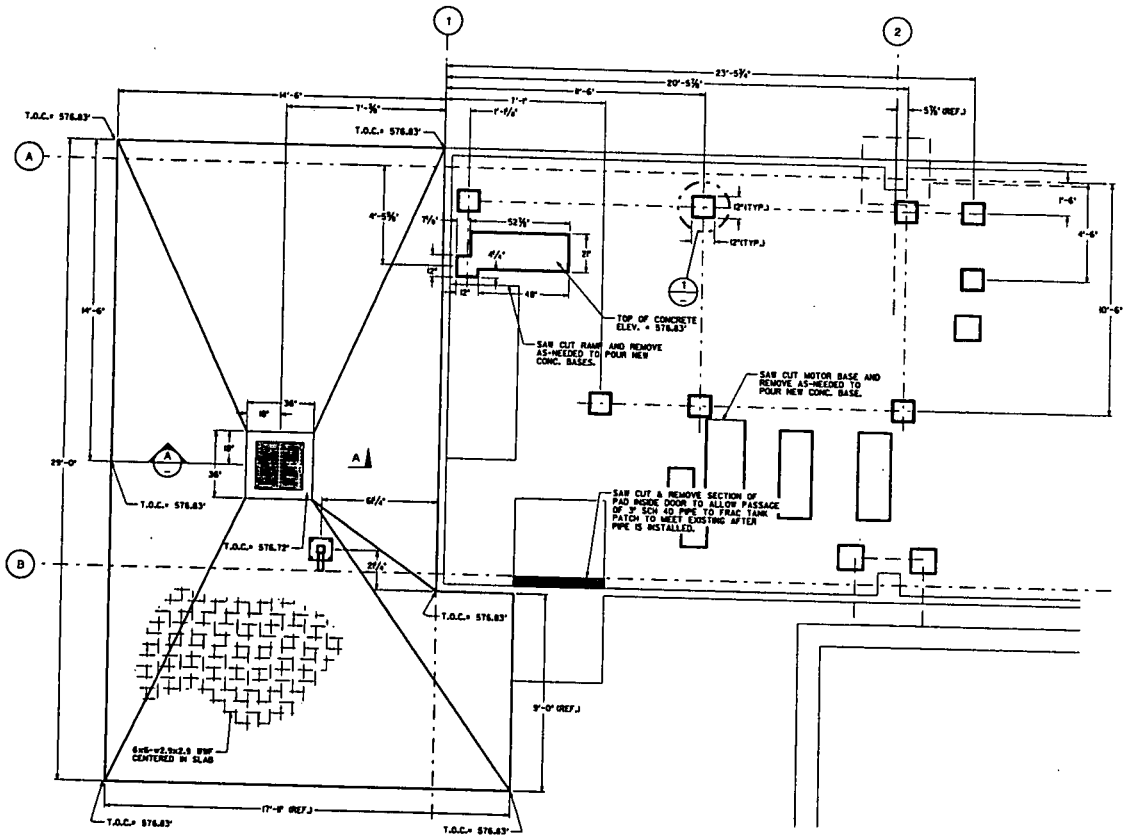
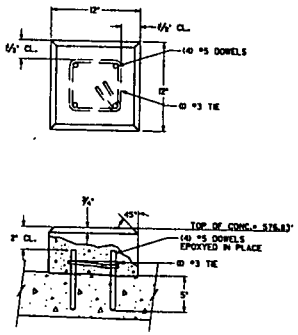
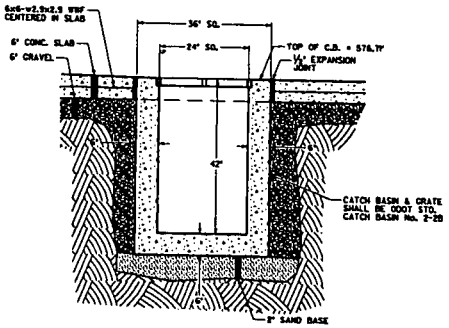


PARTIAL FLOOR PLAN



DETAIL #1



SECTION A-A

NO.	REVISIONS	DATE	DWN. BY	APPD.
0	ISSUED CFC PER DCN # 40750-JEG-517	9/05	JB	LJG

NOTE: FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

APPROVALS		
CIVIL & STR.		
ELECTRICAL		
MECHANICAL		
INSTRUMENT		
CONTROLS		
SLOS I & II	T. LISTORE	
CHECKED		
APPROVED		

Fernald Closure Project

FLUOR FERNALD, INC.

U.S. DEPARTMENT OF ENERGY

SLOS I & II WASTEWATER TREATMENT PROJECT

SPIT BLDG.

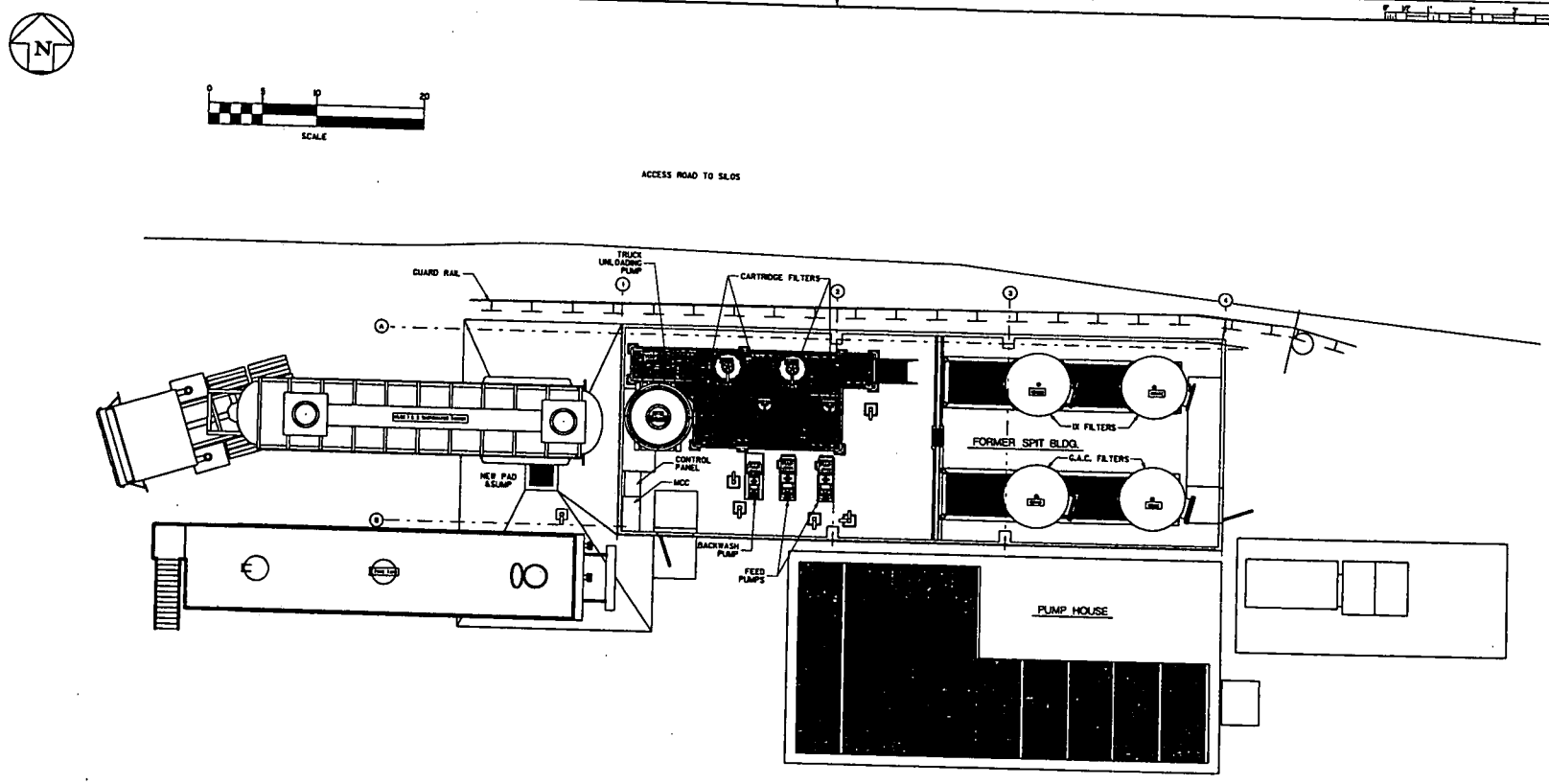
NEW CONCRETE SLAB & PIERS

PLAN, SECTIONS & DETAILS

94X-5500-S-05802 | 0

s5802 CADD4 lock6079 11/28/2005 01:42:57 PM

6069



NO.	REVISIONS	DATE	DWN. BY	APPD.
0	ISSUED CFC PER DCN #40750-JEG-517	9/05		

NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.

NOTE: FLUOR FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

CONSULTANT ENGINEER DATE

APPROVALS

CIVIL & STR.			SAFETY ENG.
ELECTRICAL			MAINTENANCE
ENGINEER			FIRE PROTECT.
INSTRUMENT			WASTE MANAGE
MECHANICAL			SECURITY
SILOS 1 & 2			PROJECTS
CHECKED			
APPROVED			

Fernald Closure Project

FLUOR FERNALD, INC.

U.S. DEPARTMENT OF ENERGY

SILOS 1 & 2 WASTEWATER TREATMENT PROJECT

GENERAL ARRANGEMENT PLAN

94X-5500-M-05803 | 0

XM5803 CADD4 lock6079 11/28/2005 01:39:45 PM

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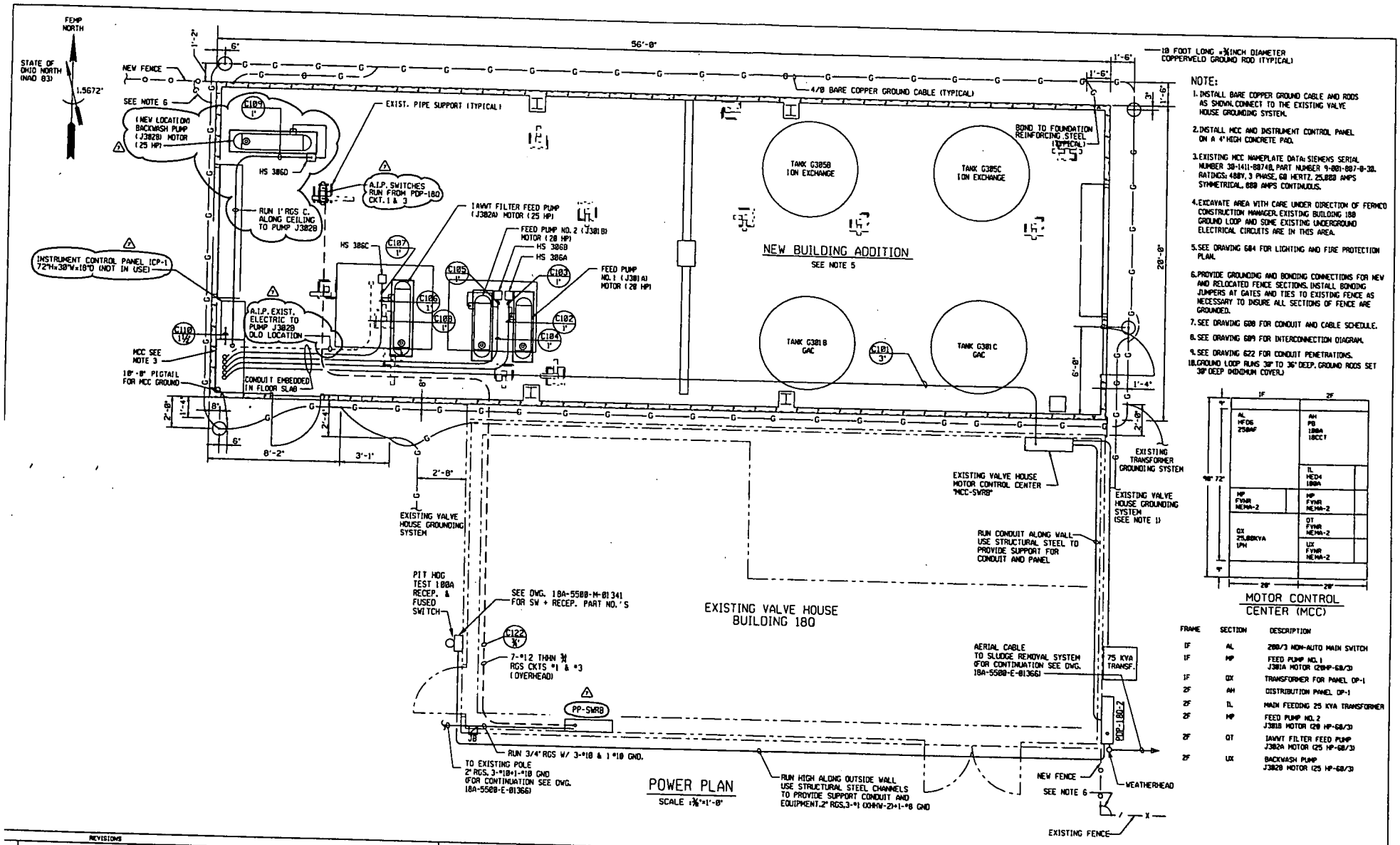

NOTE:

1. INSTALL BARE COPPER GROUND CABLE AND RODS AS SHOWN. CONNECT TO THE EXISTING VALVE HOUSE GROUNDING SYSTEM.
2. INSTALL MCC AND INSTRUMENT CONTROL PANEL ON A 4" HIGH CONCRETE PAD.
3. EXISTING MCC NAMEPLATE DATA: SIEMENS SERIAL NUMBER 38-1411-88748, PART NUMBER 9-001-807-8-38. RATINGS: 480V, 3 PHASE, 60 HERTZ, 25,000 AMPS SYMMETRICAL, 800 AMPS CONTINUOUS.
4. EXCAVATE AREA WITH CARE UNDER DIRECTION OF FERMCO CONSTRUCTION MANAGER. EXISTING BUILDING 180 GROUND LOOP AND SOME EXISTING UNDERGROUND ELECTRICAL CIRCUITS ARE IN THIS AREA.
5. SEE DRAWING 684 FOR LIGHTING AND FIRE PROTECTION PLAN.
6. PROVIDE GROUNDING AND BONDING CONNECTIONS FOR NEW AND RELOCATED FENCE SECTIONS. INSTALL BONDING JUMPERS AT GATES AND TIES TO EXISTING FENCE AS NECESSARY TO INSURE ALL SECTIONS OF FENCE ARE GROUNDED.
7. SEE DRAWING 608 FOR CONDUIT AND CABLE SCHEDULE.
8. SEE DRAWING 609 FOR INTERCONNECTION DIAGRAM.
9. SEE DRAWING 622 FOR CONDUIT PENETRATIONS.
10. GROUND LOOP RUNS 30" TO 36" DEEP. GROUND RODS SET 30" DEEP (MINIMUM COVER).

MOTOR CONTROL CENTER (MCC)

FRAME	SECTION	DESCRIPTION
1F	AL	200/3 NON-AUTO MAIN SWITCH
1F	MP	FEED PUMP NO. 1 J301A MOTOR (20HP-60/3)
1F	QX	TRANSFORMER FOR PANEL DP-1
2F	AH	DISTRIBUTION PANEL DP-1
2F	TL	MAIN FEEDING 25 KVA TRANSFORMER
2F	MP	FEED PUMP NO. 2 J301B MOTOR (20 HP-60/3)
2F	QT	IAWVT FILTER FEED PUMP J302A MOTOR (25 HP-60/3)
2F	UX	BACKWASH PUMP J302B MOTOR (25 HP-60/3)

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK.	DATE	APPR.	DATE
7	REVISED PER DCN# 40750-JEG-517 "SILOS WASTEWATER TREATMENT PROJECT"	GEP	11-11-98				
6	ADDED TRANSFORMER, AS-BUILT, PHASE I PER T.O. P-841 SITE SURVEY, SUPERCEDED S/L	LMP	10/08/98			MP	10/08/98
5	RELOCATED TRANSFORMER PANEL PER RES 3293, INCORPORATED DCN: 54180-884	LMD	5-27-98	MJK	10/08/98	MP MJK	10/08/98 6-8-98
4	ADDED CFC WORK PER RES 3293	RSD	10-28-96	C.E.P.		MP MJK	11-02-96
3	REVISED PER RES2985	MCT	5-16-96	J.E.	5-11-96	C.E.P.	5-11-96
2	ADDED CORRECTIONS IN CLOUDED AREAS, "AS-BUILT" PER RES2688	MCL DRB	5-28-96				
1	ADDED INDEX NO., "AS-BUILT" PER RES2394						

INDEX CODE				
PL. & AR.	DWG.	CL.	SCH. NO.	REV.
18X	5500	E	01295	7

DRAWING STATUS	BY	DATE
PRELIMINARY		
FOR COMMENT/APPROVAL		
APPROVED		
REVISED and APPROVED		

DRAWING IS NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED AND DATED. ALL PRINTS ARE TO BE DESTROYED HAVING AN EARLIER DATE AND / OR REVISION NUMBER.

DRAWING INFORMATION	BY	DATE
DESIGN BY:		
DRAWN BY:		
CHECKED BY:		
REVIEWED BY:		
SCALE:	PLOT SCALE:	
PLOT DATE:		

SOUTH PLUME INTERIM TREATMENT
ELECTRICAL
POWER PLAN

PROJECT LOCATION: FERNALD, OHIO
PROJECT NO. 938168

RTG RESOURCE TECHNOLOGIES GROUP, INC.
LAKEWOOD, COLORADO 80227 (303) 969-8511

CLIENT: FERMCO FERNALD, OHIO

REVISION NO. 7
DRAWING NO. 693

3 CADD4 lock6079 11/28/2005 01:46:03 PM

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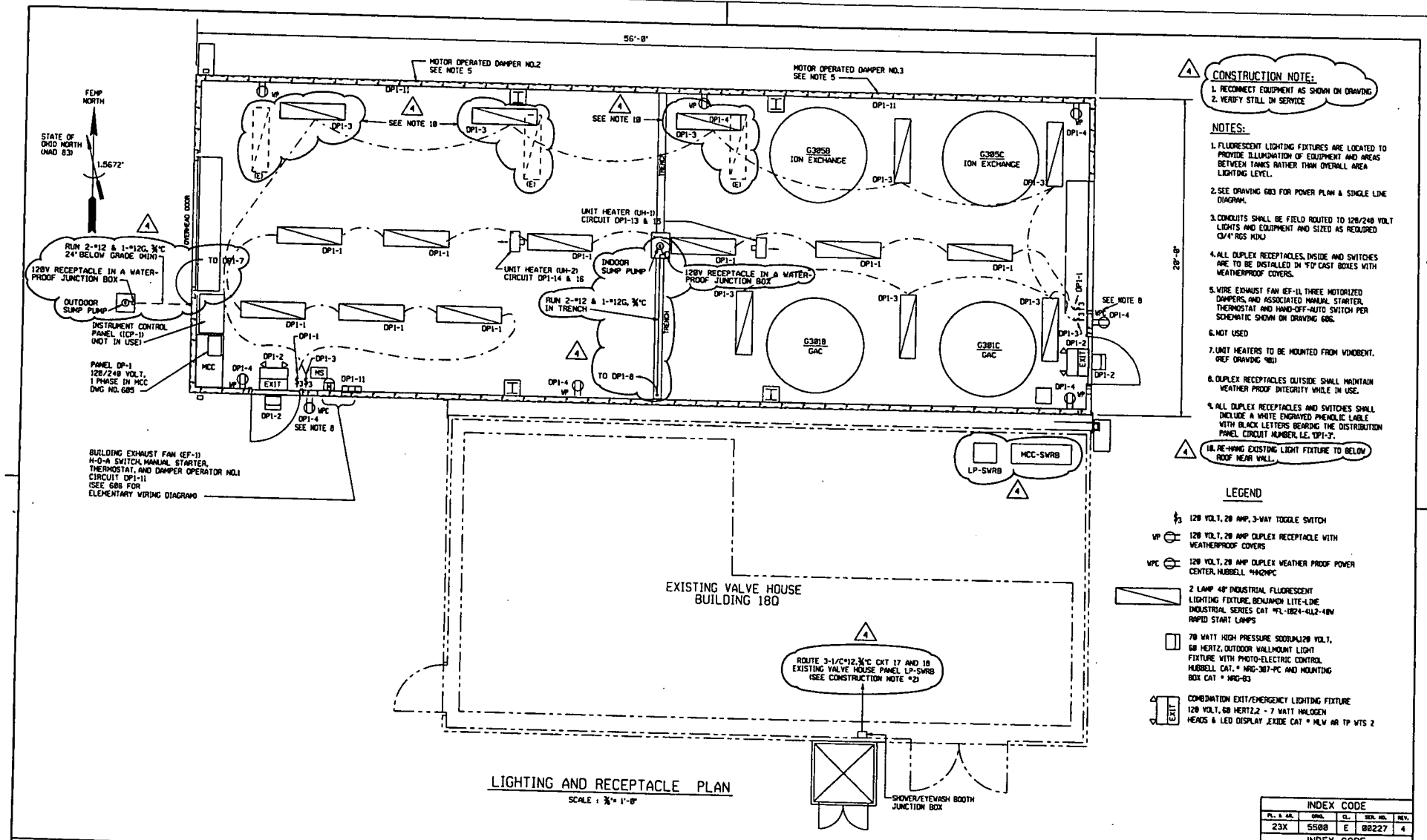

LIGHTING AND RECEPTACLE PLAN

SCALE : ¾"= 1'-0"

CONSTRUCTION NOTE:

1. RECONNECT EQUIPMENT AS SHOWN ON DRAWING
2. VERIFY STILL IN SERVICE

NOTES:

1. FLUORESCENT LIGHTING FIXTURES ARE LOCATED TO PROVIDE ILLUMINATION OF EQUIPMENT AND AREAS BETWEEN TANKS RATHER THAN OVERALL AREA LIGHTING LEVEL.
2. SEE DRAWING 603 FOR POWER PLAN & SINGLE LINE DIAGRAM.
3. CONDUITS SHALL BE FIELD ROUTED TO 120/240 VOLT LIGHTS AND EQUIPMENT AND SIZED AS REQUIRED (3/4" RGS MIN)
4. ALL DUPLEX RECEPTACLES, INSIDE AND SWITCHES ARE TO BE INSTALLED IN "FD" CAST BOXES WITH WEATHERPROOF COVERS.
5. WIRE EXHAUST FAN (EF-1), THREE MOTORIZED DAMPERS, AND ASSOCIATED MANUAL STARTER, THERMOSTAT AND HAND-OFF-AUTO SWITCH PER SCHEMATIC SHOWN ON DRAWING 606.
6. NOT USED
7. UNIT HEATERS TO BE MOUNTED FROM WINDBEAM. (REF DRAWING 981)
8. DUPLEX RECEPTACLES OUTSIDE SHALL MAINTAIN WEATHER PROOF INTEGRITY WHILE IN USE.
9. ALL DUPLEX RECEPTACLES AND SWITCHES SHALL INCLUDE A WHITE ENGRAVED PHENOLIC LABLE WITH BLACK LETTERS BEARING THE DISTRIBUTION PANEL CIRCUIT NUMBER, I.E. "DP1-3".
10. RE-HANG EXISTING LIGHT FIXTURE TO BELOW ROOF NEAR WALL.

LEGEND

- 120 VOLT, 20 AMP, 3-WAY TOGGLE SWITCH
- VP — 120 VOLT, 20 AMP DUPLEX RECEPTACLE WITH WEATHERPROOF COVERS
- WPC — 120 VOLT, 20 AMP DUPLEX WEATHER PROOF POWER CENTER, HUBBELL #1492WPC
- 2 LAMP 48" INDUSTRIAL FLUORESCENT LIGHTING FIXTURE, BENJAMIN LITE-LINE INDUSTRIAL SERIES CAT #FL-1824-4L2-48W RAPID START LAMPS
- 70 WATT HIGH PRESSURE SODIUM,120 VOLT, 60 HERTZ, OUTDOOR WALLMOUNT LIGHT FIXTURE WITH PHOTO-ELECTRIC CONTROL HUBBELL CAT.# NRG-307-PC AND MOUNTING BOX CAT # NRG-63
- EXIT — COMBINATION EXIT/EMERGENCY LIGHTING FIXTURE 120 VOLT, 60 HERTZ,2 - 7 WATT HALOGEN HEADS & LED DISPLAY ,EXIDE CAT # MLV AR TP WTS 2

INDEX CODE				
PL. & AR.	ORIG.	CL.	SER. NO.	REV.
23X	5500	E	00227	4
INDEX CODE				
PL. & AR.	ORIG.	CL.	SER. NO.	REV.
18X	5500	E	01296	4

REVISIONS					
NO.	DESCRIPTION	BY	DATE	CHK.	DATE	APPR.	DATE
4	REVISED PER DCN: 40750-517 "SILOS WASTEWATER TREATMENT PROJECT"						
	RES #4502, DCN #40750-JEG-517	KD	11-11-93				
3	ADDED INDEX CODE "23X-5500-E-00227"	H.E.B.					
2	ADDED NEW AIR COMPRESSOR AND REVISED PER RES2905 CFC	H.E.T.	5-13-93	H.E.	5-11-93	H.E.T.	5-12-93
1	ADDED INDEX NO., "AS-BUILT" PER RES2399	H.E.T.	5-13-93	H.E.	5-11-93	H.E.T.	5-11-93

DRAWING STATUS	BY	DATE
PRELIMINARY		
FOR COMMENT/APPROVAL		
APPROVED	E.W. TIEPEL	11/17/93
REVISED and APPROVED		

DRAWING IS NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED AND DATED. ALL PRINTS ARE TO BE DESTROYED HAVING AN EARLIER DATE AND / OR REVISION NUMBER.

DRAWING INFORMATION	BY	DATE
DESIGN BY	J.C. TARMAN	11/5/93
DRAWN BY	R.L. EDMONS	11/10/93
CHECKED BY	J.E. PAGE	11/10/93
REVIEWED BY	C.A. BECK	11/10/93

SCALE: ¾" = 1' PLOT SCALE: ¾" = 1'

PLOT DATE: 11/16/93

SOUTH PLUME INTERIM TREATMENT
ELECTRICAL
LIGHTING AND RECEPTACLE PLAN

PROJECT LOCATION: FERNALD, OHIO

PROJECT NO. 930168

RESOURCE TECHNOLOGIES GROUP, INC.
LAKEWOOD, COLORADO 80227
(303) 969-0511

CLIENT: FERMCO
FERNALD, OHIO

REVISION NO. 4

DRAWING NO. 604

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DISTRIBUTION PANEL DP-1

VOLTAGE : 120/240VAC, 1 PHASE, 3WIRE
MAIN BKR : 100 AMP
MOUNTING : SURFACE MOUNTED IN MCC

REMARKS : 1. * INDICATES 6MA GFCI CLASS A, ** INDICATES 30MA GFCI CLASS B
2. ALL BREAKERS SHALL BE RATED FOR 600 VOLTS.

LOCATION : SPIT BLDG. 180, SOUTHWEST CORNER 10

DIRECTORY	WATTS LOAD L1	WATTS LOAD L2	CKT NO	WIRE SIZE	BKR AMPS	BKR AMPS	WIRE SIZE	CKT NO	WATTS LOAD L1	WATTS LOAD L2	DIRECTORY
INDOOR LIGHTING	900		1	*12	20	20	*12	2	218		OUTDOOR LIGHTING & EMERG/EXIT
INDOOR LIGHTING		800	3	*12	20	20	*12	4		1440	RECEPTACLES (8)
10 FIT-387, FC-387, FCV-387, FIT-386	575		5	*12	20	20	*12	6	500		SPARE 10
10 OUTDOOR SUMP (WEST)		-	7	-	20	20	-	8		-	INDOOR SUMP 10
SPARE	-		9	-	20	60	-		-		SPARE
BUILDING EXHAUST FAN & DAMPERS		786	11	*12	20	60	-			-	
5KW UNIT HEATER *1 (UH-1)	2500		13	*10	30	30	-		-		5KW UNIT HEATER *2 (UH-2)
		2500	15	*10	30	30	*10	16		2500	
SPARE	-		17	-	20	20	*10	18	2500		SPARE
SUB-TOTALS	3975	4086	NEUTRAL BUS			3218	3940				SUB-TOTALS
	L1	L2				L1	L2				

L1 L2 100 A MAIN

TOTAL WATTS L1: = 7,193 TOTAL WATTS L2: = 8,026 TOTAL WATTS: = 15,219

10

PANEL SCHEDULE - PP-1 LOCATION : IAWWT

12 CKTS 208/120 VOLTS 3 PHASE 4WIRE
1 POLE 20 AMP. 6 BRANCHES
* 1 POLE 20 AMP. 4 BRANCHES (GFI)30ma
1 POLE 20 AMP. 2 BRANCHES (GFI) 6ma
POLE AMP. BRANCHES

MAIN BREAKER : 50 AMP
SHORT CIRCUIT RATING:10,000 AMPS RMS SYM.

DESCRIPTION	BKR SIZE	CKT	LOAD - VA A	B	C	BKR SIZE	CKT	DESCRIPTION
OZONE INJECTION SYSTEM (INTERLOCK BOX)	20	1	800			20	2	SPARE
		2	600					
RECEPTACLES (2)	20 GFI	3		360		20 GFI	4	INDOOR LIGHTS (2 - 150W HPS)
		4		670				OUTDOOR LIGHTS (3 - 70W HPS)
INSTRUMENT CONTROL PANEL	20 GFI	5			800	20 GFI	6	VENT FAN A/-101 (1/4 HP) VIA OZONE INJECTION SYSTEM INTERLOCK
		6			400			
HONEYWELL FIRE ALARM PANEL	20 GFI	7	200			20 GFI	8	INSIDE SAFETY SHOWER RECEPTACLES AND LIGHTS
		8	400					
PIPE HEAT TRACE CKT. #1	20 GFI	9		700		20 GFI	10	PIPE HEAT TRACE CKT. #2
		10		1100				
PIPE HEAT TRACE CKT. #3	20 GFI	11			800	20 GFI	12	OUTSIDE SAFETY SHOWER RECEPTACLES AND LIGHTS
		12			400			
		TOT	1800	2860	2400			

PANEL SCHEDULE : PP-SWRB 10 LOCATION: S.P.I.T. BLDG.

LOAD SERVED	ØA	ØB	ØC	RATING	100 AMP MLO		RATING	ØA	ØB	ØC	LOAD SERVED
10 SECURITY HILL SEE DWG. 28A-5500-E-00306 & 00307				150	1	2	150				480V WEST SIDE SWRB. SEE DWG 92X-5900-E-00123 10
				150	3	4	150				
				150	5	6	150				
10 SPARE				30	7	8	60				WELD REC. (EXISTING) 5
				30	9	10	60				
				30	11	12	60				
SPACE					13	14	30				SPARE
SPACE					15	16	30				SPARE 10
SPACE					17	18	30				SPARE

REMARKS:

SERVICE: 480V, 3Ø, 3W.
INTEGRATED EQUIP. S/C RATING: 14,000 RMS. SYM.

MAINS: ■ LUGS 225A □ BKR.

CONNECTED LOAD =

MTG. □ FLUSH ■ SURFACE

NOTES:

1. SEE DRAWING 604 FOR LIGHTING AND FIRE PROTECTION PLAN.
2. SEE DRAWING 603 FOR POWER PLAN AND SINGLE LINE DIAGRAM.
3. SEE DRAWING 608 FOR CONDUIT AND CABLE SCHEDULE.
4. REMOVE WIRING TO EXISTING 240V, 1 PHASE COMPRESSOR.
5. FIELD VERIFIED CONDITIONS
6. PER COMPLETED W.O. RT004393

PANEL SCHEDULE : PDP-180-2 LOCATION: S.E. CORNER 180 (OUTSIDE)

LOAD SERVED	ØA	ØB	ØC	RATING	MOCA		RATING	ØA	ØB	ØC	LOAD SERVED
10 SLUDGE REMOVAL SYS. SEE DWG. 18A-5500-E-01366				200	1	2	30				SPARE
				200	3	4	30				
				200	5	6	30				
10 SPARE				60	7	8	60				SPARE
				60	9	10	60				
				60	11	12	60				
SPARE				30	13	14	100				SPARE
				30	15	16	100				
				30	17	18	100				
SPACE					19	20	-				SPACE
					21	22	-				
					23	24	-				
SPACE					25	26	-				SPACE
					27	28	-				
					29	30	-				

SERVICE: 480V, 3Ø, 3W.
INTEGRATED EQUIP. S/C RATING: _____ RMS. SYM.

MAINS: ■ LUGS □ BKR. 400A

CONNECTED LOAD =

MTG. □ FLUSH ■ SURFACE

REVISIONS				
10	REVISED PER DCN: 48758-JEG-517 "SILOS WASTEWATER TREATMENT PROJECT"	GEP	11-11-93	
9	REVISED PANEL PDP-180-1 PER COMPLETED W.O. RT004393	GEP	12/2/93	
NO.	DESCRIPTION	BY / CHK.	DATE / APPR.	DATE

DRAWING STATUS	BY	DATE
PRELIMINARY		
FOR COMMENT/APPROVAL		
APPROVED	E.W. TIEPEL	11/17/93
REVISED and APPROVED		

DRAWING IS NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED AND DATED. ALL PRINTS ARE TO BE DESTROYED HAVING AN EARLIER DATE AND / OR REVISION NUMBER.

DRAWING INFORMATION	BY	DATE
DESIGN BY:	J.C. TARMAN	11/5/93
DRAWN BY:	R.R. RANES	11/18/93
CHECKED BY:	J.E. PAGE	11/18/93
REVIEWED BY:	C.A. BECK	11/18/93
SCALE: 1=1	PLOT SCALE: 1=1	
PLOT DATE: 11/16/93		

SOUTH PLUME INTERIM TREATMENT
ELECTRICAL
PANEL SCHEDULE - NEW BUILDING ADDITION

PROJECT LOCATION: FERNALD, OHIO PROJECT NO. 930168

RESOURCE TECHNOLOGIES GROUP, INC.
LAKEWOOD, COLORADO 80227 (303) 969-0511

CLIENT: FERMCO FERNALD, OHIO

REVISION NO. 10 DRAWING NO. 605

INDEX CODE				
PL. & AR.	ORIG.	CL.	SCH. NO.	REV.
18X	5500	E	01297	10

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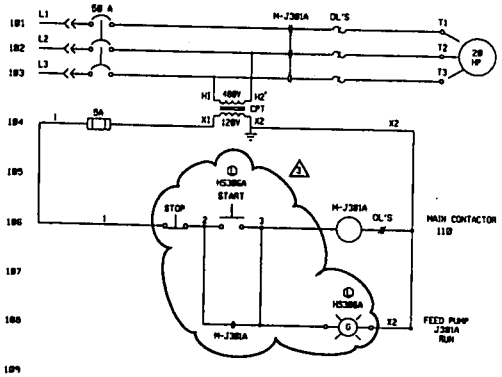
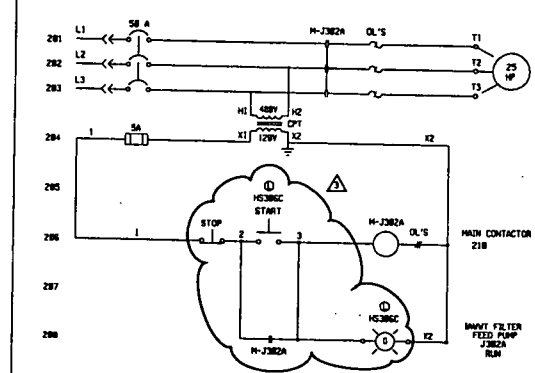
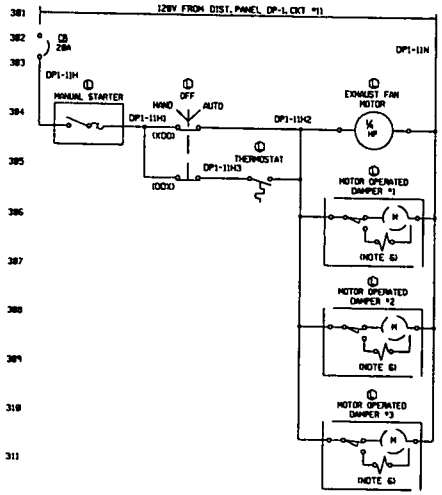
EQUIPMENT NAME : FEED PUMP NO.1
EQUIPMENT NO. : J301A
S/L DWG NO. : 603
PLAN DWG NO. : 603
PREFIX WIRE NUMBERS WITH J301A



EQUIPMENT NAME : IAWWT FILTER FEED PUMP
EQUIPMENT NO. : J302A
S/L DWG NO. : 603
PLAN DWG NO. : 603
PREFIX WIRE NUMBERS WITH J302A



EQUIPMENT NAME : EXHAUST FAN & DAMPERS
EQUIPMENT NO. : EF-1
PLAN DWG NO. : 604
DISTRIBUTION PANEL DWG. NO : 605



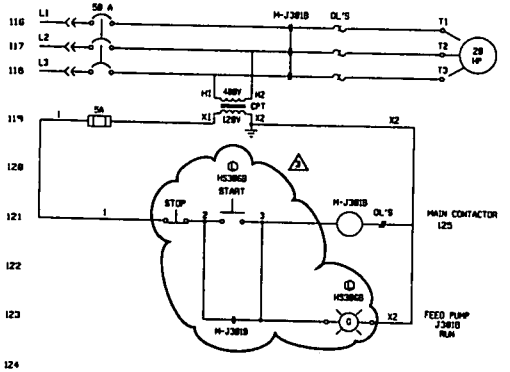
NOTES:

1. SEE DRAWING 603 FOR POWER PLAN AND S/L DIAGRAM.
2. SEE DRAWING 604 FOR LIGHTING AND FIRE PROTECTION PLAN.
3. SEE DRAWING 608 FOR CONDUIT AND CABLE
4. SEE DRAWING 609 FOR INTERCONNECTION (NOT USED)
5. SEE DRAWING 612 FOR DIGITAL I/O SCHEMATIC (NOT USED)
6. MOTOR OPERATES TO OPEN DAMPERS. INTERNAL LIMIT SWITCH STOPS MOTOR WHEN DAMPERS ARE OPEN AND SPRING CLOSES DAMPER ON LOSS OF POWER.

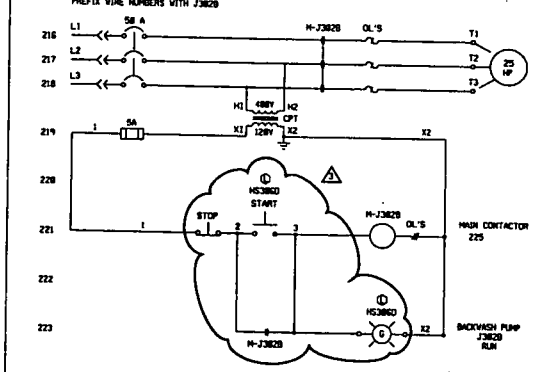
LEGEND

(L) - DENOTES A LOCALLY MOUNTED FIELD DEVICE
(I) - DENOTES A DEVICE LOCATED IN THE INSTRUMENT CONTROL PANEL (ICP-1) - (NOT USED)
— — — - DENOTES WIRING BY EQUIPMENT/PANEL SUPPLIER.

EQUIPMENT NAME : FEED PUMP NO.2
EQUIPMENT NO. : J301B
S/L DWG NO. : 603
PLAN DWG NO. : 603
PREFIX WIRE NUMBERS WITH J301B



EQUIPMENT NAME : BACKWASH PUMP
EQUIPMENT NO. : J302B
S/L DWG NO. : 603
PLAN DWG NO. : 603
PREFIX WIRE NUMBERS WITH J302B



INDEX CODE				
PL. & AR.	DWG.	CL.	SER. NO.	REV.
18X	5500	E	01298	3

REVISIONS

3	REVISED PER DCN: 48758-JEG-517 'SILOS WASTEWATER TREATMENT PROJECT'	GEP			
2	ADDED CORRECTIONS IN CLOUDED AREAS, 'AS-BUILT' PER RES2688	R.R. RANES	11-11-93	RAN	
1	ADDED INDEX NO., 'AS-BUILT' PER RES2399		8-27-93		8-23-93 GEP 8-23-93
NO.	DESCRIPTION	BY	DATE	CHK.	DHH APPL. DATE

DRAWING STATUS	BY	DATE
PRELIMINARY		
FOR CONCUR/APPROVAL		
APPROVED	E.W. TIEPEL	11/17/93
REVISED and APPROVED		

DRAWING IS NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED AND DATED. ALL PRINTS ARE TO BE DESTROYED HAVING AN EARLIER DATE AND / OR REVISION NUMBER.

DRAWING INFORMATION	BY	DATE
DESIGN BY:	J.C. TARMAN	11/5/93
DRAWN BY:	R.R. RANES	11/18/93
CHECKED BY:	J.E. PAGE	11/18/93
REVIEWED BY:	C.A. BECK	11/18/93

SCALE: [1] PLOT SCALE: [1]
PLOT DATE: 11/16/93

SOUTH PLUME INTERIM TREATMENT
ELECTRICAL
ELEMENTARY DIAGRAMS

PROJECT LOCATION: FERNALD, OHIO
PROJECT NO. 938168

RTG RESOURCE TECHNOLOGIES GROUP, INC.
LAKEWOOD, COLORADO 80227 (303) 969-8511

CLIENT: FERMCO
FERNALD, OHIO

REVISION NO. 3
DRAWING NO. 606

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CABLE SCHEDULE

CABLE NO	FROM	TO	CONDUCTOR NUMBER	SIZE		INSUL	FUNCTION	1	2	3	4	5	6	7	8	9	10	11	12	ROUTING	REF DWG	REMARKS
201C (NOT USED)	INST CONT PNL ICP-1	MULTI-MEDIA FILTER #1	32-1/C	#14		THHN	CONTROL	181	182	FC(+)	S1	138	148	142	144	146	148	185	S2	FIELD ROUTED CONDUIT	621	
								154	156	158	160	162	164	186	S3	171	173	175	177			
202C (NOT USED)	MULTI-MEDIA FILTER #1	MULTI-MEDIA FILTER #2	24-1/C	#14		THHN	CONTROL	179	181	118	GND	SPARE	SPARE	SPARE	119							
								185	S2	154	156	158	160	162	164	186	S3	171	173	FIELD ROUTED CONDUIT	621	
2 203C (NOT USED)	MULTI-MEDIA FILTER #2	MULTI-MEDIA FILTER #3	18-1/C	#14		THHN	CONTROL	175	177	179	181	118	GND	SPARE	SPARE	SPARE	FC(+)	181	119			
								181	186	S3	171	173	175	177	179	FC(+)	118	GND	SPARE	FIELD ROUTED CONDUIT	621	
								SPARE	SPARE	181	119											
204C (NOT USED)	INST CONT PNL ICP-1	MULTI-MEDIA FILTER #4	18-1/C	#14		THHN	CONTROL	119	123	FC(+)	S4	118	187	189	191	193	195	197	199	FIELD ROUTED CONDUIT	621	
								GND	SPARE	SPARE	SPARE	124	S5									
2 206C (NOT USED)	INST CONT PNL ICP-1	PRESSURE SW. PSL 385	5-1/C	#14		THHN	CONTROL	181	187	FC(+)	S7	GND										
207C (NOT USED)	INST CONT PNL ICP-1	HUMIDITY SENSOR HMC10	3-1/C	#14		THHN	CONTROL	FC(+)	S8	GND										FIELD ROUTED CONDUIT	621	
CONNECT 2361	FIT/FI-387	2 FLOW TRANSMITTER FC 387	1 TWPR	#16 2		BELDEN #8719	DISTR	386I- (+)	386I- (-)	GND										FIELD ROUTED CONDUIT	621	
2																				FIELD ROUTED CONDUIT	E85884	2
CONNECT 2381	FC-387	2 FLOW TRANSMITTER FCV-384	1 TWPR	#16 2		BELDEN #8719	DIST	387I- (+)	387I- (-)	GND												
																				FIELD ROUTED CONDUIT	E85884	2
2 2411 (NOT USED)	INST CONT PNL ICP-1	PH TRANSMITTER AE7316	3-1/C 1 TWPR	#14 #16		BELDEN #8719	DIST	316I- (+)	316I- (-)	316	118	GND										
2411 (NOT USED)	LEVEL SWITCH LSH317 IN INST CONT PNL ICP-1	SUMP LEVEL PROBES	2-1/C	#14		THHN	DIST	H	G											FIELD ROUTED CONDUIT	621	
																				FIELD ROUTED CONDUIT	621	

NOTES:

2 1. SEE DRAWING 609 FOR INTERCONNECTION DIAGRAM (NOT USED)

2. CONDUITS TO DEVICES SHALL BE FIELD ROUTED AND SIZED AS REQUIRED (3/4" RGS MIN.)

2 3. SEE DRAWING 611 AND 612 FOR DIGITAL INPUT/OUTPUT SCHEMATICS (NOT USED)

4. SEE DRAWING 617 FOR ANNUNCIATOR SCHEMATIC (NOT USED)

5. SEE DRAWING 608 FOR CONDUIT SCHEDULE.

INDEX CODE				
PL. & AR.	ORIG.	CL.	SER. NO.	REV.
18X	5500	E	01299	2

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK.	DATE	APPR.	DATE
2	REVISED PER DCN 40750-JEG-517 "SILOS WASTEWATER TREATMENT FACILITY PROJECT"						
1	ADDED INDEX NO., "AS-BUILT" PER RES2399	JCP	12-15-95				

DRAWING STATUS	BY		DATE
PRELIMINARY			
FOR COMMENT/APPROVAL			
APPROVED	E.W. TIEPEL		11/17/93
REVISED and APPROVED			

DRAWING IS NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED AND DATED. ALL PRINTS ARE TO BE DESTROYED HAVING AN EARLIER DATE AND / OR REVISION NUMBER.

DRAWING INFORMATION	BY	DATE
DESIGN BY:	J.C. TARMAN	11/5/93
DRAWN BY:	R.R. RANES	11/18/93
CHECKED BY:	J.E. PAGE	11/18/93
REVIEWED BY:	C.A. BECK	11/18/93

SCALE: 1:1 PLOT SCALE: 1:1

PLOT DATE: 11/16/93

SOUTH PLUME INTERIM TREATMENT
ELECTRICAL
CABLE SCHEDULE

PROJECT LOCATION: FERNALD, OHIO

PROJECT NO. 930168

RTG RESOURCE TECHNOLOGIES GROUP, INC.
LAKEWOOD, COLORADO 80227 (303) 969-8511

CLIENT: FERMCO
FERNALD, OHIO

REVISION NO. 2

DRAWING NO. 607

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6909 4

CABLE SCHEDULE

CABLE NO	FROM	TO	CONDUCTOR NUMBER	CONDUCTOR SIZE		INSUL	FUNCTION	WIRE TERMINATIONS 1	2	3	4	5	6	7	8	9	10	11	12	ROUTING	REF DWG	REMARKS
101P	VALVE HOUSE EXIST. MCC NEW 200 AMP TRIP CKT BKR	BUILDING ADDITION MCC CUBICLE NO 1A	3-1/C 1/C	250KCMIL *4 GND		THHN	480V FEEDER	L1-A	L1-B	L1-C	GND									C101	603	
102P	BUILDING ADDITION MCC CUBICLE 1E	FEED PUMP NO.1 (J301A) MOTOR	3-1/C 1/C	*8 *10 GND		THHN	MOTOR POWER	J301A -T1	J301A -T2	J301A -T3	GND									C102	603	
102C1	BUILDING ADDITION MCC CUBICLE 1E	FEED PUMP NO.1 (J301A) S-S-L SWITCH (HS306A)	5-1/C	*14		THHN	CONTROL	J301A -1	J301A -2	J301A -3	GND	J301A -X2								C102, TEE, C103	603	
102C2 (NOT USED)	BUILDING ADDITION MCC CUBICLE 1E	INSTRUMENT CONTROL PANEL	5-1/C	*14		THHN	PLC I/O	J301A -1	J301A -X2	J301A -3	J301A -5	SPARE								C110	603	
103P	BUILDING ADDITION MCC CUBICLE 1G	FEED PUMP NO.2 (J301B) MOTOR	3-1/C 1/C	*8 *10 GND		THHN	MOTOR POWER	J301B -T1	J301B -T2	J301B -T3	GND									C104	603	
103C1	BUILDING ADDITION MCC CUBICLE 1G	FEED PUMP NO.1 (J301B) S-S-L SWITCH (HS306B)	5-1/C	*14		THHN	CONTROL	J301B -1	J301B -2	J301B -3	GND	J301B -X2								C104, TEE, C105	603	
103C2 (NOT USED)	BUILDING ADDITION MCC CUBICLE 1G	INSTRUMENT CONTROL PANEL	5-1/C	*14		THHN	PLC I/O	J301B -1	J301B -X2	J301B -3	J301B -5	SPARE								C110	603	
104P	BUILDING ADDITION MCC CUBICLE 1J	IAWWT FILTER FEED PUMP(J302A) MOTOR	3-1/C 1/C	*8 *10 GND		THHN	MOTOR POWER	J302A -T1	J302A -T2	J302A -T3	GND									C106	603	
104C1	BUILDING ADDITION MCC CUBICLE 1J	IAWWT FILTER FEED PUMP(J302A) S-S-L SWITCH (HS306C)	5-1/C	*14		THHN	CONTROL	J302A -1	J302A -2	J302A -3	GND	J302A -X2								C106, TEE, C107	603	
104C2 (NOT USED)	BUILDING ADDITION MCC CUBICLE 1J	INSTRUMENT CONTROL PANEL	5-1/C	*14		THHN	PLC I/O	J302A -1	J302A -X2	J302A -3	J302A -5	SPARE								C110	603	
105P	BUILDING ADDITION MCC CUBICLE 1L	BACKWASH PUMP (J302B) MOTOR	3-1/C 1/C	*8 *10 GND		THHN	MOTOR POWER	J302B -T1	J302B -T2	J302B -T3	GND									C108	603	
105C1	BUILDING ADDITION MCC CUBICLE 1L	BACKWASH PUMP (J302B) S-S-L SWITCH (HS306D)	5-1/C	*14		THHN	CONTROL	J302B -1	J302B -2	J302B -3	GND	J302B -X2								C108, TEE, C109	603	
105C2 (NOT USED)	BUILDING ADDITION MCC CUBICLE 1L	INSTRUMENT CONTROL PANEL	5-1/C	*14		THHN	PLC I/O	J302B -1	J302B -X2	J302B -3	J302B -5	SPARE								C110	603	
106P	DISTRIBUTION PANEL DP-1 IN MCC, CKT *5	FIT-307, FC-307 FCV-307, FIT-306	3-1/C	*12		THHN	120V POWER	DP1-5H	DP1-5N	GND										C110	603	
109P (NOT USED)	DISTRIBUTION PANEL DP-1 IN MCC, CKT *8	DESICCANT AIR DRYER	3-1/C	*12		THHN	120V POWER	DP1-6H	DP1-6N	GND												
110P	DISTRIBUTION PANEL DP-1 IN MCC, CKT *13 & *15	UNIT HEATER *1 (UH-1)	2-1/C 1/C	*10 *12 GND		THHN	240V POWER	DP1-13H	DP1-15H	GND										FIELD ROUTED CONDUIT	604	
111P	DISTRIBUTION PANEL DP-1 IN MCC, CKT *14 & *16	UNIT HEATER *2 (UH-2)	2-1/C 1/C	*10 *12 GND		THHN	240V POWER	DP1-14H	DP1-16H	GND										FIELD ROUTED CONDUIT	604	
114P	DISTRIBUTION PANEL DP-1 IN MCC, CKT *11	BUILDING EXHAUST FAN	3-1/C	*12		THHN	120V POWER	DP1-11H	DP1-11N	GND										FIELD ROUTED CONDUIT	604	
115P	DISTRIBUTION PANEL DP-1 IN MCC, CKT *17	SHOWER/EYE WASH BOOTH	3-1/C	*10		THHN	120V POWER	DP1-17H	DP1-17N	GND										FIELD ROUTED CONDUIT	604	SEE 120V ELEM.DIAG. ON DWG.606

NOTES:

1. SEE DRAWING 609 FOR INTERCONNECTION DIAGRAM.
2. SEE DRAWING 612 FOR DIGITAL INPUT/OUTPUT SCHEMATICS. SHEET 3 OF 3.
3. SEE DRAWING 605 FOR CABLES ORIGINATING IN DISTRIBUTION PANEL DP-1.
4. SEE DRAWING 603 FOR FEEDER AND MOTOR POWER CABLES.

LEGEND:
S-S-L STOP-START-LIGHT

CONDUIT SCHEDULE

CONDUIT NO	FROM	TO	COND SIZE	CONTAINS CABLE(S)	REMARKS
C101	EXISTING MCC IN VALVE HOUSE	BUILDING ADDITION MCC	3"	101P	OUT OF EXIST. BUILD. BURIED
C102	MCC	FEED PUMP NO.1 (J301A) MOTOR	1"	102P, 102C1	BURIED
C103	TEE IN C102	FEED PUMP NO.1 (J301A) S-S-L SWITCH (HS306A)	¾"	102C1	ON PUMP PAD
C104	MCC	FEED PUMP NO.2 (J301B) MOTOR	1"	103P, 103C1	BURIED
C105	TEE IN C104	FEED PUMP NO.2 (J301B) S-S-L SWITCH (HS306B)	¾"	103C1	ON PUMP PAD
C106	MCC	IAWWT FILTER FEED PUMP(J302A) MOTOR	1"	104P, 104C1	BURIED
C107	TEE IN C106	IAWWT FILTER FEED PUMP(J302A) S-S-L SWITCH (HS306C)	¾"	104C1	ON PUMP PAD
C108	MCC	BACKWASH PUMP (J302B) MOTOR	1"	105P, 105C1	BUILDING STEEL
C109	TEE IN C108	BACKWASH PUMP (J302B) S-S-L SWITCH (HS306D)	¾"	105C1	ON PUMP PAD
C110	DP1	FIT-307, FIT-306 FC-307, FCV-307	1½"	106P	BETWEEN PANELS
C111 (NOT USED)	INSTRUMENT CONTROL PANEL	MULTI-MEDIA FILTER *1	1"	201C	BURIED
C112 (NOT USED)	MULTI-MEDIA FILTER *1	MULTI-MEDIA FILTER *2	1"	202C	ON SKID

CONDUIT SCHEDULE

CONDUIT NO	FROM	TO	COND SIZE	CONTAINS CABLE(S)	REMARKS
C113	FIT/FI-307	FC-307	1"	236I	FIELD ROUTE
C114	FC-307	FCV-307	1"	238I	FIELD ROUTE
C115 (NOT USED)	MCC	EAST END LIGHTS	1"	AS REQUIRED	
C116 (NOT USED)	DIST. CONTROL PANEL ICP-1	PSL305	1"	206C	ON WALL
C117 (NOT USED)	DIST. CONTROL PANEL ICP-1	MAH318	1"	207C	ON WALL
C118 (NOT USED)	DIST. CONTROL PANEL ICP-1	FT306	1"	236I	ON WALL
C119 (NOT USED)	DIST. CONTROL PANEL ICP-1	FT307	1"	236I	ON WALL
C120 (NOT USED)	DIST. CONTROL PANEL ICP-1	AET316	1"	240I	BURIED
C121 (NOT USED)	DIST. CONTROL PANEL ICP-1	LSH317	1"	241I	ON WALL
C122 (NOT USED)	DIST. PANEL PDP-180-1	AIR COMPRESSORS 'A&B'	¾"	AS REQUIRED	ON WALL

INDEX CODE				
PL. & AR.	GRC.	CL.	SER. NO.	REV.
18X	5500	E	01300	4

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK.	DATE	APPR.	DATE
4	REVISED PER DCN 40758-JEG-517 'SILOS WASTEWATER TREATMENT PROJECT'	A.E.P.	11-11-96				
3	REMOVED CABLE *1 BBP & ADDED CONDUIT *C122 PER RES2985 CFC	A.E.P.	11-11-96	J.S.	11-14-96	A.E.P.	11-14-96
2	ADDED CORRECTION IN CLOUDED AREAS, 'AS-BUILT' PER RES2688	A.E.P.	11-27-95				
1	ADDED INDEX NO. , 'AS-BUILT' PER RES2399						

DRAWING STATUS	BY	DATE
PRELIMINARY		
FOR COMMENT/APPROVAL		
APPROVED	E.W. TIEPEL	11/17/93
REVISED and APPROVED		

DRAWING IS NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED AND DATED. ALL PRINTS ARE TO BE DESTROYED HAVING AN EARLIER DATE AND / OR REVISION NUMBER.

DRAWING INFORMATION	BY	DATE
DESIGN BY:	J.C. TARMAN	11/5/93
DRAWN BY:	R.R. RANES	11/18/93
CHECKED BY:	J.E. PAGE	11/18/93
REVIEWED BY:	C.A. BECK	11/18/93

SCALE: 1=1 PLOT SCALE: 1=1
PLOT DATE: 11/16/93

SOUTH PLUME INTERIM TREATMENT
ELECTRICAL
CONDUIT AND CABLE SCHEDULE

PROJECT LOCATION: FERNALD, OHIO
PROJECT NO. 930168

RESOURCE TECHNOLOGIES GROUP, INC.
LAKEWOOD, COLORADO 80227 (303) 969-8511

CLIENT: FERMCO
FERNALD, OHIO

REVISION NO. 4
DRAWING NO. 608

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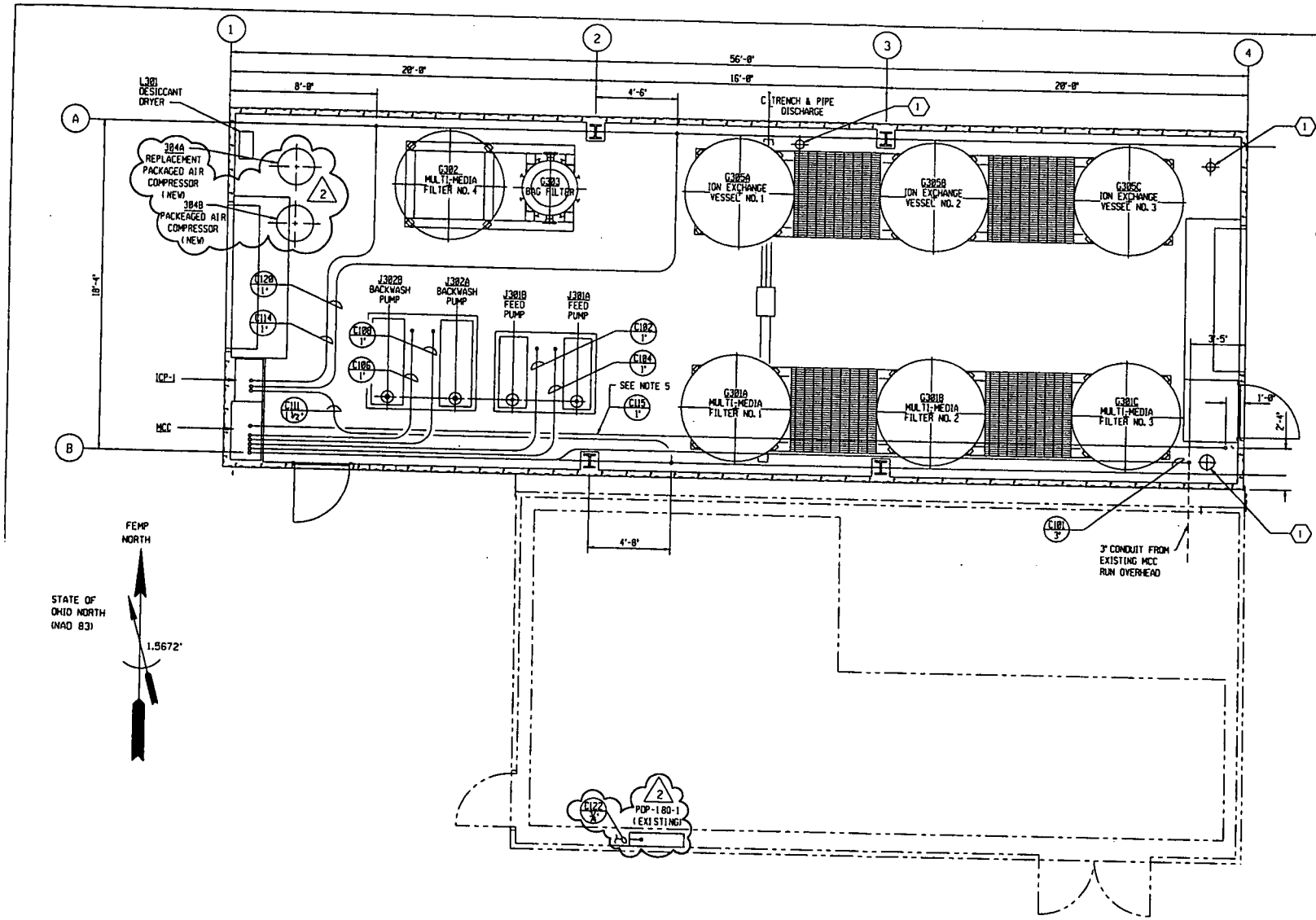
609



NOTES:

1. FOR PIPE SLEEVE LOCATIONS SEE DWG. 301.
2. FOR STRUCTURAL INFORMATION SEE DWG. 801.
3. CONDUIT TO BE FIELD ROUTED BY ELECT. CONTRACTOR. THIS DWG. FOR REF. ONLY, SHOWS POINT TO POINT CONNECTIONS ONLY.
4. FLOOR PENETRATIONS FOR CONDUIT SHALL BE LOCATED AS DIMENSIONED FOR EQUIPMENT CLEARENCE.
5. FOR FIELD ROUTING OF LIGHTING CIRCUITS.

INDEX CODE				
PL. & AR.	ORIG.	CL.	SER. NO.	REV.
18X	5500	E	01311	2

REVISIONS

NO.	DESCRIPTION	BY	DATE	CHK.	DATE	APPR.	DATE
2	REVISED PER RES2985 CFC	MET	9-10-96	J.B.	9-11-96	C.E.P.	9-11-96
1	ADDED INDEX NO., 'AS-BUILT' PER RES2399						

DRAWING STATUS	BY	DATE
PRELIMINARY		
FOR COMMENT/APPROVAL		
APPROVED		
REVISED and APPROVED		

DRAWING IS NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED AND DATED. ALL PRINTS ARE TO BE DESTROYED HAVING AN EARLIER DATE AND / OR REVISION NUMBER.

DRAWING INFORMATION	BY	DATE
DESIGN BY:		
DRAWN BY:		
CHECKED BY:		
REVIEWED BY:		
SCALE:	PLOT SCALE:	
PLOT DATE:		

SOUTH PLUME INTERIM TREATMENT
CONDUIT
PENETRATION PLAN

PROJECT LOCATION: FERNALD, OHIO — PROJECT NO. 930168

RTG RESOURCE TECHNOLOGIES GROUP, INC.
LAKEWOOD, COLORADO 80227 (303) 969-0511

CLIENT: FERMCO FERNALD, OHIO — REVISION NO. 2 — DRAWING NO. 622

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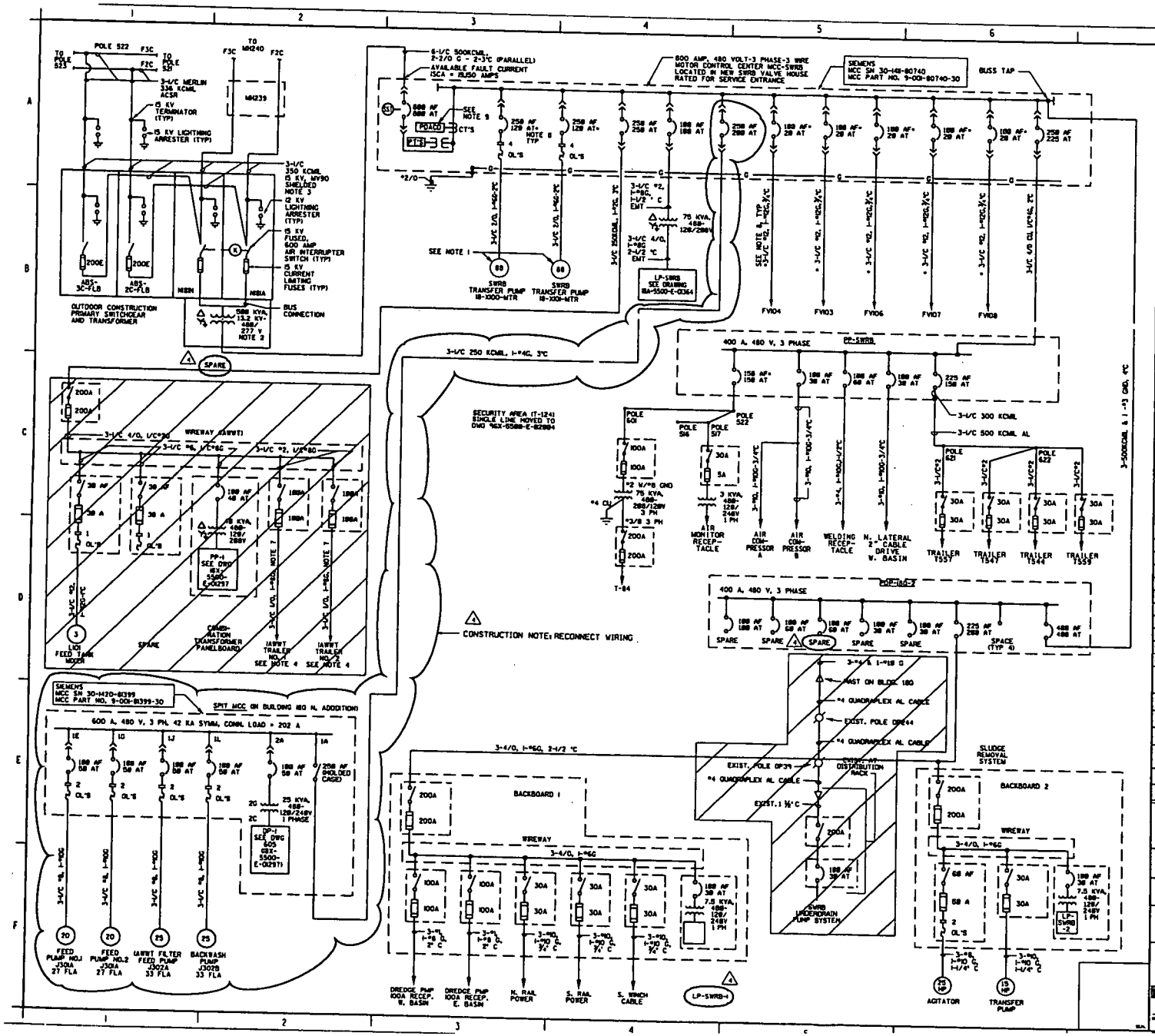

NOTES

1. MULTI-CONDUCTOR POWER & CONTROL CABLE FURNISHED CONNECTED TO PUMP BY PUMP MANUFACTURER.
2. DRY TYPE CAST RESIN VENTILATED DISTRIBUTION TRANSFORMER
3. CABLE IN UNDERGROUND OR POLE MOUNTED CONDUIT, OR INTERNAL TO SWITCHGEAR
4. SEE 95X-5900-E-00007 FOR POWER & LIGHTING PLAN.
5. SEE 18X-5500-E-01295 FOR MCC ELEVATION.
6. SEE 18X-5500-E-01297 FOR PANEL SCHEDULE.
7. BOTH FEEDERS IN 1-2"C TO TRAILER PULLBOX #1.
8. * REPRESENTS ANTICIPATED VALUES WHICH COULD NOT BE FIELD VERIFIED.
9. POWER DATA ACQUISTION & CONTROL DEVICE - DISPLAYS PHASE CURRENT & VOLTAGE, KILOWATT DEMAND & KILOWATTHOURS.

INDEX CODE				
PL. & AR.	DWG.	CL.	SER. NO.	REV.
18A	5900	E	01407	4

REF DWG NO.	DRAWING TITLE
96X-5900-E-00358	13.2KV SINGLE LINE DIAGRAM
95X-5900-E-00239	SOUTH FIELD EXTRACTION SYSTEM PANEL SCHEDULES
92X-5900-E-00381	SOUTHERN WASTE UNITS PANEL SCHEDULES
95X-5900-E-00007	POWER & LIGHTING - ELECTRICAL
18X-5500-E-01295	SOUTH PLUME INTERIM TREATMENT POWER PLAN AND ONE LINE DIAGRAM
18X-5500-E-01297	SOUTH PLUME INTERIM TREATMENT PANEL SCHEDULE
44H-5500-E-00409	TRAILER T-65 RELOCATION, ELECT., HONEYWELL & TELE. SERVICE INSTALLATION PLAN
96X-5900-E-02004	ELECTRICAL - 480 VAC SINGLE LINE DIAGRAM
44A-5500-E-00473	T-84 ELECTRICAL PLAN

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	PM	APPROVED
4	REVISED PER DCN: 48758-JEO-517 SILOS WASTEWATER TREATMENT PROJECT	5/11/98 GFP		
3	INCORPORATED WORK COMPLETED FOR DCN: 4369-001	8/08/02 RHL	8/14/02 JEO,GFP	
2	INCORPORATED WORK COMPLETED FOR DCN: 1791-004 AND 1791-007	3/14/02 RHL	3/14/02 JEO,GFP	
1	REVISED PER RES #4001, ADDED INDEX CODE, NEW AERIAL ELECTRIC TO RELOCATED TRAILER T-65 PER DCN NO. 4114-003	JEO/TEO GFP	5/15/00 5/6/00	
0	AS-BUILT, PHASE I PER T.O. P-041	JLC 10/01/99	PF 10/01/99	TPF 10/01/99

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS I & T GROUP
CINCINNATI, OHIO

PROJECT NAME
MASTER SITEWIDE 480 VOLT SINGLE LINE DIAGRAM

DRAWING TITLE
ELECTRICAL
480 VAC SINGLE LINE DIAGRAM
SUBSTATION N10-1 & SWRB SERVICES

CONFIGURATION MANAGEMENT DRAWING

TASK ORDER NO. P-041	OPTIONAL NO.	SCALE NONE	
		DRAWN BY T.P. FERRELL	DATE 08/04/99
JOB NO. 3941	PRF PROJECT NO.	SCHEDULE LEAD J.L. COOPER	DATE 10/01/99
		CHECKED BY J.L. COOPER	DATE 10/01/99
DRAWING INDEX CODE NO. 96X-5900-E-01012		SHEET NO. E0010	REV. NO. 4

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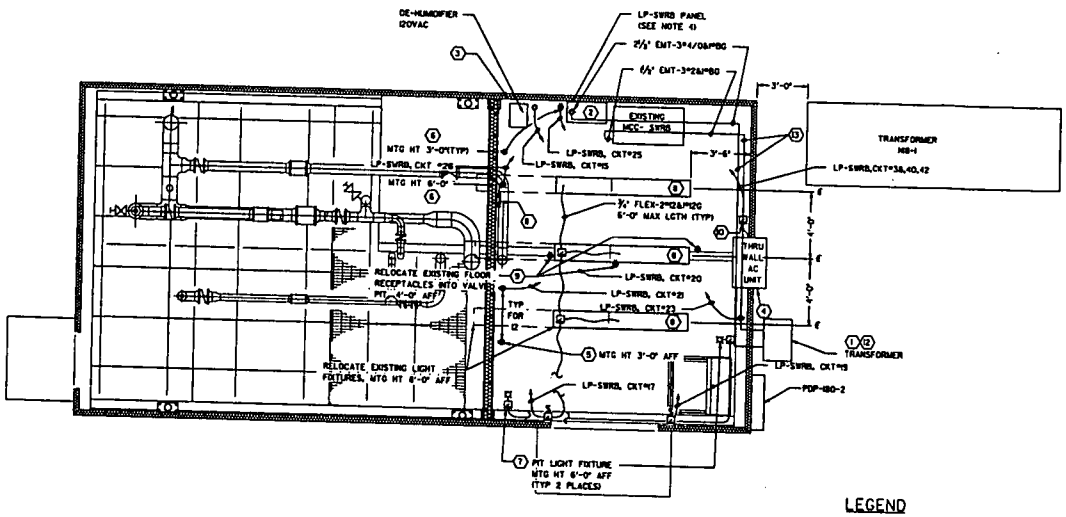

OFFICE WIRE PLAN

GENERAL NOTES:

1. CHANGE TRIP ON EXISTING MCC BREAKER FOR LP-SWRB TO 100A.
2. ALL CONDUIT AND WIRE SHALL BE 3/4" EMT-2 #12 & #12G UNLESS NOTED OTHERWISE.
3. MAINTAIN EXISTING MOUNTING HEIGHT AFTER RELOCATING LIGHT FIXTURES.
4. THE EXISTING SWRB PANELBOARD WILL BE REPLACED WITH A NEW 225A, 208/120VAC, 3 ϕ PANELBOARD. THE ASSOCIATED TRANSFORMER WILL ALSO BE REPLACED WITH A LARGER 75KVA, 208/120VAC, 3 PHASE MODEL.

MATERIAL LIST:

1. TRANSFORMER, 75KVA, 3ϕ, 480/208/120VAC, GENERAL PURPOSE, FLOOR MOUNT, TWO WINDING, TYPE L SQUARE "D" MODEL #4428 OR APPROVED EQUAL.
2. PANELBOARD, 225A MAIN BREAKER, 42 CIRCUIT, 208/120VAC, 3 PHASE, 4 WIRE, WITH BOX NUMBER SQUARE SQ, NEMA 12 ENCLOSURE, INTERIOR TRIM KIT MODEL NUMBER SQUARE SQTR, WITH GND BARS MODEL NUMBER PK3BGTA, MAIN BREAKER ADAPTER KIT MODEL NUMBER HOOO3225KAMA, SQUARE "D" MODEL NUMBER HOOO442L225C4, OR APPROVED EQUAL.
3. DE-HUMIDIFIER, 120VAC, 1ϕ, MCMASTER-CARR MODEL NUMBER 2176K21 OR APPROVED EQUAL.
4. AIR-CONDITIONER, THRU THE WALL TYPE, 208VAC, 3ϕ, MCMASTER-CARR MODEL NUMBER 1843K75 OR APPROVED EQUAL.
5. MULTI-OUTLET RACEWAY, PREWIRED, 6'-0" LGTH, 12 OUTLETS, 20A, 120VAC, DUPLEX RECEPTACLES, BUILT-IN ISOLATED GROUND, VOLTAGE SURGE SUPPRESSION, IVORY COLOR, MOUNT 3'-0" AFF, MCMASTER-CARR MODEL NUMBER 2W607, OR WIREMOLD MODEL NUMBER V20GB606, OR APPROVED EQUAL.
6. RECEPTACLE, 20A, 120VAC, NEMA 5-20R, SURFACE MOUNT IN FUSE BOX, 3'-0" AFF.
7. LIGHT FIXTURE, WALL PACK, 50W, 120VAC, HIGH PRESSURE SODIUM LAMP, VAPOR TIGHT, WALL MOUNT IN PIT AREA, 6'-0" AFF.
8. EXISTING LIGHT FIXTURES, RELOCATE THREE EACH EQUALLY SPACED WITHIN DIMENSIONS OF NEW CONTROL ROOM AS SHOWN ON DRAWING.
9. EXISTING COMPUTER FLOOR RECEPTACLES, REMOVE FROM CONTROL ROOM AREA, RELOCATE TO CEILING OF BASEMENT DIRECTLY BELOW CONTROL ROOM AS SHOWN ON PLAN. RECEPTICALS SHALL BE GFCI PROTECTED.
10. BOX TO CORD CONNECTOR, TYPE SO CABLE, 3"HO & 1"HOG
11. EMERGENCY LIGHT FIXTURE, 120VAC, 1ϕ, W/8' TYPE SB CORD, MTG HT 7'-8" NEAR RECEPTACLE (FLUSH HT IN NEW WALL).
12. INSTALLED ON A 2" PRECASTED CONCRETE PAD. INSTALL RAIN SHIELDS ON EXISTING TRANSFORMER AND MAINTAIN 8" SPACING MFROM WALL.
13. INSTALL CONDUIT HIGH ALONG WALL.

LEGEND

- BATTERY POWERED EMERGENCY LIGHT
- HIGH PRESSURE SODIUM WALL MOUNT LIGHT FIXTURE
- 220VAC RECEPTACLE
- EXISTING FLORESCENT LIGHT FIXTURE
- DUPLEX RECEPTACLE
- S S.P.S.T. SWITCH
- CLOSED JUNCTION BOX

EXISTING SWRB PANEL

PANELBOARD LP-SWRB
LOCATION CONTROL ROOM NEAR EXIT WALL
VOLTAGE: 208/120V, 3 PHASE, 4 WIRE
MOUNTING: FLOOR / SURFACE / CLOSED
COVER: DOOR WITH LOCK / DOOR WITHOUT LOCK
BUSSING: BUSSING ONLY / MAIN BREAKER 225 AMP. TOP / BOTTOM
NEUTRAL: 100% / 100%
TOTAL LOAD 31,7VAA
LOAD PHASE A 9,9VAA
ALL BRANCH BREAKERS 20 AMP. UNLESS NOTED. BREAKER INTERRUPTING CAPACITY 10K SYM. AMPS

DESCRIPTION	LOAD	NO.	A	B	C	NO.	LOAD	DESCRIPTION	A	B	C
CONTROL ROOM LIGHTING	270	1				2	180	SAMPLE REFRIGERATOR	270		
EXTERIOR ROOM LIGHTING	270	3				4	270	SAMPLE PUMP		270	
EXPOSED PIPE	360	5				6	180	TRANSFER PUMP (CONTROLS MCC-3PRB)	270		
RECEPTACLES, NORTHWEST WALL	540	7	180			8	1500	HEAT TRACE			1500
UNIT HEATER	1000	9		1500		10	1000	UNIT HEATER	1500		
UNIT HEATER	1000	11			1500	12	1000	UNIT HEATER		1500	
LEVEL METER	180	13				14	1000	COMPRESSOR, MECHANICAL			1000
WATER HEATER	1500	15				16	180	SPA 17	1000		
SAFETY SHOWER HEATER	2000	17	180	180		18	240	LIGHTS, SAFETY SHOWER		1200	
AIR CONDITIONER	1200	19				20	1200	NEW RECEPTACLES	1200		
AIR CONDITIONER	1200	21				22	540	NEW RECEPTACLES		1200	
		23				24				1200	
		25				26					
		27				28					
		29				30					

TO BE REMOVED
(SEE NOTE 4)

NEW SWRB PANEL

PANELBOARD LP-SWRB
LOCATION CONTROL ROOM NEAR EXIT WALL
VOLTAGE: 208/120V, 3 PHASE, 4 WIRE / 480/277V, 3 PHASE, 4 WIRE / 240V, 3 PHASE, 3 WIRE
MOUNTING: FLOOR / SURFACE / CLOSED
COVER: DOOR WITH LOCK / DOOR WITHOUT LOCK
BUSSING: LOAD ONLY / MAIN BREAKER 225 AMP. TOP / BOTTOM
NEUTRAL: 100% / 200%
TOTAL LOAD 42,12VAA
LOAD PHASE C 16,12VAA
LOAD PHASE B 13,8VAA
LOAD PHASE A 14,2VAA
ALL BRANCH BREAKERS 20 AMP. UNLESS NOTED. BREAKER INTERRUPTING CAPACITY 10K SYM. AMPS

DESCRIPTION	LOAD	NO.	A	B	C	NO.	LOAD	DESCRIPTION	A	B	C
PROCESS CONTROL ROOM LIGHTING	720	1				2	180	SAMPLE REFRIGERATOR		270	
PROCESS CONTROL ROOM LIGHTING	720	3				4	270	SAMPLE PUMP	270		
EXPOSED PIPE	360	5	180	180		6	180	TRANSFER PUMP (CONTROLS MCC-3PRB)		270	
RECEPTACLES, S.E. WALL	540	7				8	1500	HEAT TRACE	1500		
LEVEL METER	180	9				10	1000	COMPRESSOR, MECHANICAL		1000	
WATER HEATER	1500	11				12					
SAFETY SHOWER HEATER	2000	13	180			14					
WASHWATER RECEPTACLE	480	15		180		16	180	SPA 17	1000		
CONTROL ROOM LIGHTING	360	17		180	180	18	240	LIGHTS, SAFETY SHOWER		1200	
PIT LIGHTING	360	19			180	20	180	PIT RECEPTACLE	360		
COMPRESSOR RECEPTACLE	1200	21				22					
COMPRESSOR RECEPTACLE	1200	23				24	1500	PORTABLE HEATER		1500	
COMPRESSOR RECEPTACLE	1200	25				26	300	EMERGENCY LIGHT	1500		
		27				28					
UNIT HEATER	1000	29				30					
UNIT HEATER	1000	31				32					
UNIT HEATER	1000	33				34					
UNIT HEATER	1000	35				36					
		37				38	7000	AIR CONDITIONER, ROOM UNIT	7000		
		39				40	7000	AIR CONDITIONER, ROOM UNIT		7000	
		41				42	7000	AIR CONDITIONER, ROOM UNIT			7000

(1) TRANSFORMER, DRY-TYPE DISTRIBUTION, GENERAL PURPOSE, 75 KVA, 480V DELTA-208Y-120VAC, 3ϕ, 4 WIRE, TYPE CT-3, FULL CAPACITY TAPS 2 ABOVE AND 2 BELOW WESTINGHOUSE MODEL # V48K29T75J OR APPROVED EQUAL. (SEE NOTE 4)

NO.	REVISIONS	DATE	DWN. BY	APPD.
3	"AS BUILT" PER DCN 54700-003	8/8/98	MLF	DJ
2	RELOCATED TRANSFORMER PER RES #5839	1/98	LRD	JS/DJ
1	MODIFIED PER DCN 54700-003	12/98	JSS	JS/DJ
0	CFC PER RES3489	9/98	JSS	JS/DJ

NOTE: FLOOR DAMEL FERNALD CADD DRAWING. DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

APPROVALS: CIVIL & STR. / ELECTRICAL / ENGINEER / INSTRUMENT / MECHANICAL / CHECKED / APPROVED

Fernald Environmental Management Project
FLUOR DANIEL FERNALD
U.S. DEPARTMENT OF ENERGY

AREWRP — BLDG. 180
UPGRADE SWRB VALVE HOUSE
ELECTRICAL
LAYOUT AND PANEL SCHEDULE
SCALE: NONE
DATE: 12/24/98
18A-5500-E-01364 | 3

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