HWMA/RCRA Closure Plan for the VES-SFE-20 Hot Waste Tank System at the INEEL Idaho National Technology and Engineering Center

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1. INTRODUCTION

This Hazardous Waste Management Act (HWMA)/Resource Conservation and Recovery Act (RCRA) closure plan has been prepared for the Vessel (VES) Storage Facility Exterior (SFE)-20 radioactive waste storage tank system (hereafter known as VES-SFE-20) located at the Idaho Nuclear Technology and Engineering Center (INTEC) at the Idaho National Engineering and Environmental Laboratory (INEEL). This plan presents the HWMA/RCRA, Idaho Administrative Procedures Act (IDAPA) 58.01.05.009 [40 CFR 265, Subpart G] closure requirements and methods for achieving the requisite closure.

This Closure Plan is consistent with the commitments made under the Superfund Record of Decision (ROD) issued in September 1999, for Operable Unit 3-13, Group 7, which requires the removal of the SFE-20 tank contents, the tank, vault and associated structures, i.e., the tank system. Both the remedy required under that ROD and the closure of the tank system under the Closure Plan are protective of human health and the environment and will prevent future releases of hazardous constituents and radionuclides into the environment. Closure activities for the SFE-20 will be completed consistent with the OU 3-13 ROD. Following completion of closure of the SFE-20 system, DOE will submit a closure certification to DEQ identifying the system as closed.

2. FACILITY DESCRIPTION

2.1 Site Description

The INEEL is controlled by the DOE and encompasses approximately 2,315 km^2 (894 mi^2) on the eastern Snake River Plain in southeast Idaho. Formerly named the National Reactor Testing Station, the INEEL was established as a site where the DOE could safely build, test, and operate various types of nuclear facilities. The hydrology of the INEEL has been extensively described in previous HWMA/RCRA closure plans, permit applications, and CERCLA documents, such as the *Comprehensive Remedial Investigation (RI)/Feasibility Study (FS), Part A, RI/Baseline Risk Assessment (BRA) Report for the Idaho Chemical Processing Plan OU 3-13* (DOE-ID 1997); therefore, a detailed discussion is not provided in this plan.

The VES-SFE-20 tank is located approximately 20 feet beneath the Chemical Processing Plant (CPP)-642 building, which is part of the CPP-603 Facility. Building CPP-642 is located just east of the CPP-603 facility. See in Figure 1 of Appendix A for the location of VES-SFE-20 and the CPP-603 facility in the INTEC.

2.2 VES-SFE-20 Tank System Description and History

Although the VES-SFE-20 system is more broadly defined under the OU 3-13 ROD, for purposes of this closure plan, the VES-SFE-20 system includes the VES-SFE-20 tank, tank contents, related piping and equipment, and tank vault actively managing hazardous waste. See Figures 2 through 5 in Appendix A.

The VES-SFE-20 hot waste tank system, including the CPP-642 pump house, was constructed in 1957 to collect low-level liquid wastes from the south basin area of CPP-603 and the Fuel Receiving and Storage Facility. Floor drains in the receiving area, decontamination pad, and fuel examination and Cutting Facility (FECF) collected decontamination solutions, liquids from shipping casks, and other hot waste liquids. Liquid wastes flowed by gravity through underground lines to the VES-SFE-20 tank.

2.3 Estimate of Maximum Inventory

The maximum inventory of waste that could be present in the SFE-VES-20 tank system at any one time during operation has been estimated as follows:

The design capacity of the tank was approximately 640-gallons. As per the *Radiological Characterization and Decision Analysis for the SFE-20 Waste Tank and Vault*, completed in 1984, the tank contained approximately 55 gallons of sediment and 400 gallons of liquid (1,514 liters), both of which are hazardous waste. The specific contaminants of concern are described in Section 3.1. Additional hazardous constituents of concern related to this system may be identified following characterization, as described in Section 4.1.

During an entry in June 2002, DOE lowered a video camera into the tank to determine the volume of standing liquid and solids, it was discovered that no standing liquids remain in the tank and that the volume of solids is now estimated to be approximately 30 gallons.

3. SYSTEM BOUNDARIES

Portions of the VES-SFE-20 system that will be closed under this closure plan are depicted in Figures 2 through 5 of Appendix A, including the VES-SFE-20 tank, tank contents, associated ancillary piping, equipment, instrumentation, and tank vault.

The tank contents will be characterized, as described in Section 4.1 (as modified), and removed as part of the closure actions outlined in this plan and taken to an appropriate treatment, storage, or disposal facility (TSDF). The tank, the tank vault, and associated piping and equipment will then be excavated and removed, in a timely manner, and managed, in accordance with the remedial action objectives outlined in the OU 3-13 ROD and the Remedial Design/Remedial Action Work Plan. Removal activities of the tank, tank vault, ancillary equipment, and ancillary piping will be implemented under the approved Remedial Design/Remedial Action Work Plan.

3.1 Contaminants of Concern

Potential hazardous contaminants of concern identified in the Work Plan (CWP, August, 2000) include: Cadmium, Chromium, Acetone, Methylene Chloride, 1,1,1-Trichloroethane, Tetrachlorothene, and Formaldehyde. The presence of these contaminants and all related underlying hazardous constituents will be verified during the characterization of the tank contents, described in Section 4.1 (as modified). If, following approval of an adequate sampling report of the tank contents, DEQ determines no hazardous constituents of concern are detected at levels that trigger hazardous waste regulations, then the tank will be considered free of hazardous

waste. DOE may submit a request to DEQ to modify the closure plan for no further action for purposes of HWMA/RCRA closure. Follow-on remedial activities will continue according to the OU 3-13 ROD.

4. CLOSURE PERFORMANCE STANDARDS

The VES-SFE-20 Tank System will be closed in a manner that:

- Minimizes the need for further maintenance.

- Eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere.

- Removes or renders the VES-SFE-20 tank, vault, and ancillary equipment and piping clean closed, for purposes of release from HWMA/RCRA requirements.

These closure performance standards will be met by:

- Properly characterizing the waste within the tank for all contaminants of concern and, if applicable, associated underlying hazardous constituents, as described in Section 4.1. A sample characterization report documenting sample results identifying constituents of concern will be submitted to DEQ for review and approval in accordance with Section 4.1.1 and the closure schedule in Section 7.

- Following removal of the tank from the vault during Phase I remedial design (RD)/remedial action (RA) implementation, the tank contents will be sampled. Upon completing characterization of the tank contents, the tank and tank contents will be transported to an appropriate TSDF under the OU 3-13 ROD. (Removal and transporting procedures must be documented in the Closure Certification.)

- Following waste removal and excavation of the tank, ancillary piping and equipment, and tank vault under the OU 3-13 ROD, DOE must submit a closure certification affirming that all tank waste, tank, tank vault, and ancillary equipment and piping removal, management, sampling, transportation, and disposal activities have been properly completed as required by this closure plan. This certification will be submitted to DEQ when all closure activities under this plan and excavation/removal activities for the VES-SFE-20 system under the CERCLA OU 3-13 ROD, are completed.

This closure plan assumes that clean closure is achievable for the VES-SFE-20 tank system as defined for purposes of this plan. If clean closure is found to be unachievable after all waste, tank system, and soil remediation activities are completed in accordance with this plan, DOE will modify the approved closure plan, in accordance with Section 8.

This is a HWMA/RCRA Closure Plan which addresses only the hazardous constituents within the unit. DOE is responsible for implementing the appropriate measures to address any radiological concerns associated with this unit during closure activities.

4.1. Closure Methods

4.1.1. Sample Characterization Report Requirements

Within 120 days of completion of the sample characterization activities, as outlined in Section 4.1.2 (as modified), DOE will submit a Sample Characterization Report (refer to Section 7). Sample results, and identification of contaminants of concern will be submitted to DEQ in the Sample Characterization Report.

DEQ will either approve or disapprove the characterization report for the VES-SFE-20 waste. If the report is approved, the report will be incorporated into the closure plan, as per Section 8 of this plan. If the report is disapproved, DEQ may require additional sampling that may result in modification of the approved plan. (Reasons for disapproval may include high detection limits in sample analysis, quality assurance sample failure during analysis, flagged data, etc.)

4.1.2 Solid Waste Characterization

Approximately 30 gallons of solids remain in the tank.The original closure plan has been modified to present two alternatives for sampling the tank contents, sampling through the 2-in. vent line of the SFE-20 tank and conducting a manned entry into the tank vault to manually obtain representative samples of the tank contents. Both vent line sampling and a manned entry were attempted but were unsuccessful. The February 21, 2003, manned entry was discontinued due to worker safety and radiological concerns. The modified approach for characterizing the tank contents involves accelerating the remedial action as described in the RD/RA Work Plan implementation schedule for Phase 1. Phase I remediation includes removing the tank from the vault, placing it in a safe storage configuration, and sampling the tank contents.

DOE shall submit a sampling plan to DEQ according to the revised schedule in Section 7. The analytical procedures outlined in Section 5.1 and 5.2 must be incorporated into the revised sampling plan.

The revised sampling plan shall include, at a minimum:

- A description of how representative samples will be collected from the tank.
- A description of how Quality Assurance/Quality Control samples will be collected according to the criteria in the current version of the Quality Assurance Project Plan for Waste Area Groups (1, 2, 3, 4, 5, 6, 7, 10) and Inactive Sites (Draft) specifically addressing the SFE-20 tank system.

4.2 RCRA/CERCLA Integration Activities

4.2.1 Tank System Removal

The VES-SFE-20 tank, tank contents, ancillary piping and equipment, and tank vault will be excavated and removed as part of the Group 7-SFE-20 Hot Waste Tank System remedial action outlined in the OU 3-13 ROD. The Phase I RD/RA activities identified in the Draft RD/RA Work Plan for the VES-SFE-20 Hot Waste Tank System will include removing the tank and its contents sampling the tank contents; removing piping and asbestos within the excavation area, tank vault, access tunnel, pump pit, and Building CPP-642; and removing loose surface contamination and any liquid from the vault floor and pump pit. The tank and tank contents will be placed in a transportation vessel for shipment off-Site to an approved treatment and storage facility or placed in a staging area for completion of characterization activities. Phase II of the RD/RA implementation involves removing and disposing of the remaining piping, asbestos-containing material, components, structures, and contaminated soil in the INEEL CERCLA Disposal Facility (ICDF). Contaminated soils will be excavated, sampled, and managed according to the Waste Management Plan included in the RD/RA Work Plan. These activities are to be completed under the CERCLA OU 3-13 ROD and will be documented in the Closure Certification as required in Section 6 of this plan, to satisfy the HWMA/RCRA closure requirements, upon completion.

4.2.2 Soils Strategy

Based on the information reviewed by DEQ, it appears that releases to the soil from the VES-SFE-20 tank system may have occurred. Typically, HWMA/RCRA closure of a tank system requires investigation and removal of contaminated soils. It appears that releases, which may have resulted in soil contamination, were the result of operations which occurred prior to HWMA/RCRA applicability (actual operation of the VES-SFE-20 tank was from 1957-1976). However, it will be necessary to perform sampling and analysis for the purpose of determining presence or extent of contamination specific to hazardous constituents in the soil immediately surrounding the tank system components subject to this plan. Response actions associated with such historical releases will be addressed via the OU 3-13 Group 7 remedial action. Following completion of soil remedial action, hazardous constituents of concern associated with the VES-SFE-20 tank system must be either verified not to be present, or below acceptable risk levels. Such verification must be documented in the closure certification.

5. SAMPLING ACTIVITIES

The following identifies methods and QA/QC procedures required for sampling activities outlined in this plan.

5.1. Analytical Methods

Table 1 lists the analytical methods that will be used to determine the contents of the SFE-20 Hot Waste Tank System and concentrations of hazardous constituents of concern for initial

characterization of wastes, for proper waste management, for the waste generated during closure activities, and for verification sampling of soils following removal activities. Other approved methods may be substituted if they are equivalent or superior and must be identified in the closure certification. The revised sampling plan will also identify the appropriate methods for analyzing samples of the tank contents.

Table 1 Analytical methods for tank solids sample analysis.

Analysis	Method
Volatile Organic Compounds (VOCs)	SW-846 8260 B
Semivolatile Organic Compounds (SVOCs)	SW-846 8270 C
Metals (TCLP)	SW-846 1311, 3010A, 7760A, 6010B, 7470A

5.2. Sample Handling

Based on process knowledge of the VES-SFE-20 system, samples will be handled as mixed waste. Sampling personnel will collect samples in appropriate sample containers using appropriate personal protection equipment (PPE). The appropriate containers and preservatives are specified in Table 2. The appropriate containers and preservatives will also be specified in the revised sampling plan.

Table 2. Requirements for analytical methods for solid samples.

Parameter	Sample Type	Container Type	Preservative	Holding Time
VOCs	Grab	Glass Jar with Teflon-lined Lid 40-ml	Cool to 4°C	14 Days
SVOCs	Grab	Glass or polyethylene Bottle, 120-mL	Cool to 4°C	Collection to extraction – 7 days Extraction to analysis – 40 days
Metals (TCLP)	Grab	Glass or Plastic Bottle, 110 g in 250-mL bottle	Cool to 4°C	180 days, Hg – Collection to extraction – 28 days; Extraction to analysis – 28 days

5.3. QA/QC Samples

Quality Assurance (QA)/ Quality Control (QC) samples will be collected according to the criteria in the current version of the Quality Assurance Project Plan for Waste Area Groups 1, 2,

3, 4, 5, 6, 7, 10 and Inactive Sites (DOE-ID-10587), as referenced in the CWP (http://ar.inel.gov/ar/owa/getimage 2?F PAGE=1&F DOC=DOE/ID-10587&F REV=06). The project specific field sampling report for the SFE-20 will outline site specific information pertaining to QA/QC procedures to be used in sampling of the SFE-20 tank. The revised field sampling plan will be subject to DEQ review and approval prior to sampling of the tank contents.

5.4. Waste Management

The VES-SFE-20 tank and waste contained in the VES-SFE-20 tank will be removed packaged, managed, and disposed as part of CERCLA removal activities under the OU 3-13 ROD and according to the Waste Management Plan included in the VES-SFE-20 RD/RA Work Plan which will meet applicable or relevant and appropriate requirements (ARARs) including HWMA/RCRA regulations.

Hazardous waste generated may include wipes, gloves, filters, personal protective equipment, and rinse water. To the extent possible, process equipment will be decontaminated and re-used at the INEEL. If this is not possible, the equipment will be disposed of appropriately.

6. Certification of Completion of Closure

Closure Activities will be monitored and reviewed by an independent registered professional engineer (PE) in the state of Idaho. Following successful completion of closure activities, the PE will certify that closure was performed in accordance with the methods described in the approved plan. The PE will observe, as necessary, characterization activities and sample data, waste removal, and waste management activities. The PE will also review the closure logbook, observe tank system removal and verification sampling of soils. Any minor anomalies to the closure plan must be documented in the closure certification as well.

Information regarding waste management during closure activities, including hazardous waste determinations and manifests, will be provided by DOE to the independent PE to support closure certification.

7. Closure Schedule

The following identifies the closure schedule that will be initiated following public notice and receipt of the approved closure plan modification from the Idaho Department of Environmental Quality (IDEQ). This schedule reflects the time required for conducting closure activities and submitting information to the PE for the closure certification. The projected activities and schedule for closure are shown in Table 3.

Table 3. Closure Schedule

Activity	**Day Completed**
IDEQ approval of the Closure Plan modification	Day 0
Submit revised Sampling Plan for Tank Contents	June 18, 2004
DEQ review and approve Sampling Plan	September 30, 2004
Complete tank sampling	December 31, 2005
Submit sample report to DEQ	April 30, 2006
Receive approval from DEQ on the sample report	May 30, 2006
Excavate and remove the VES-SFE-20 Hot Waste Tank, tank contents, ancillary equipment, ancillary piping, tank vault, and contaminated soils, and transport wastes to the appropriate treatment, storage, or disposal facility	In accordance with the CERCLA OU 3-13 ROD schedule which shall be outlined in the Title I (30%) Remedial Design, received July 19, 2002, and the combined Title II (90%) Design and Remedial Action Work Plan
Submit Closure Certification to DEQ for review and approval	60 days following excavation and removal of the tank system and any associated soils contaminated above acceptable risk levels

Closure of the SFE-VES-20 Hot Waste Tank will require longer than the 180 day timeframe as required in IDAPA 58.01.05.009 [40 CFR §265.112] due to radiological concerns associated with this unit and the integration of HWMA/RCRA closure activities with the VES-SFE-20 Hot Waste Tank System remediation. By way of approving this plan the DEQ and the public have granted an extension to complete closure with the provision that DOE submits a sampling plan and sample report for characterizing the waste within the tank and a notification that waste within the VES-SFE-20 system has been removed appropriately, according to the above modified schedule. Following removal or treatment of wastes within the system, the tank, ancillary equipment and piping, tank vault, and contaminated soils will be excavated and removed under the CERCLA OU 3-13 ROD. A schedule date for completion of these activities shall be outlined in the "Remedial Design/Remedial Action Work Plan for the VES-SFE-20 Hot Waste Tank System (Draft)" (DOE/ID-11048) under the CERCLA OU 3-13 ROD.

8. Closure Plan Amendments

IDAPA 58.01.05.009 [40 CFR §265.112(c)] will be followed to implement changes to the approved closure plan. Should unexpected events during closure activities require modification of the approved closure plan, the closure plan will be amended within thirty (30) days of the unexpected event. A written request detailing the proposed changes to the plan and the rationale for those changes, and a copy of the amended closure plan shall be submitted for approval. Minor changes which are equivalent to, or which do not compromise the closure requirements and performance standards identified in the approved closure plan, may be made without prior approval by IDEQ. Minor changes and modifications to this closure plan will be identified in the documentation supporting the independent professional engineer's certification.

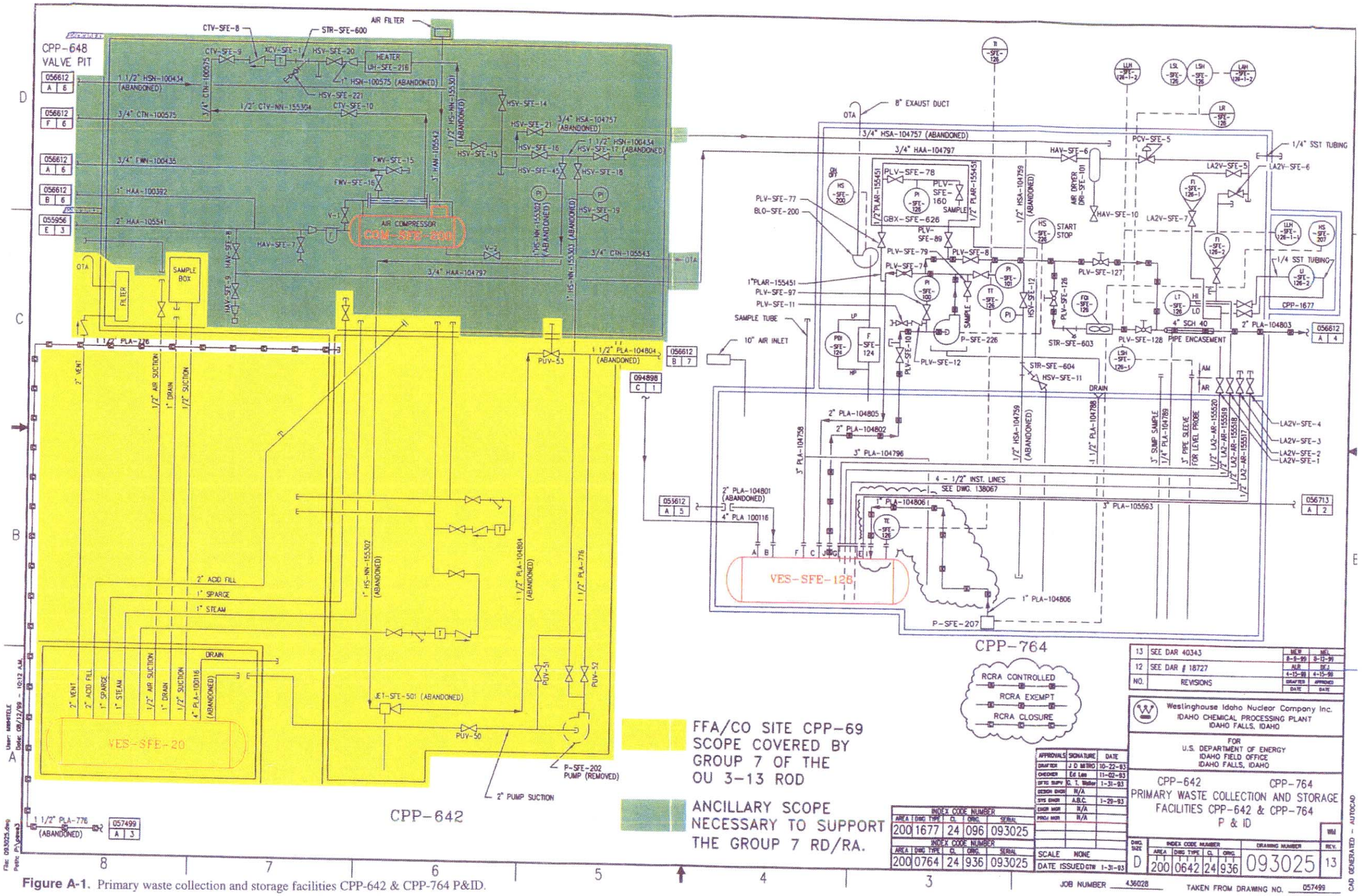

Figure A-1. Primary waste collection and storage facilities CPP-642 & CPP-764 P&ID.

FIGURE 3

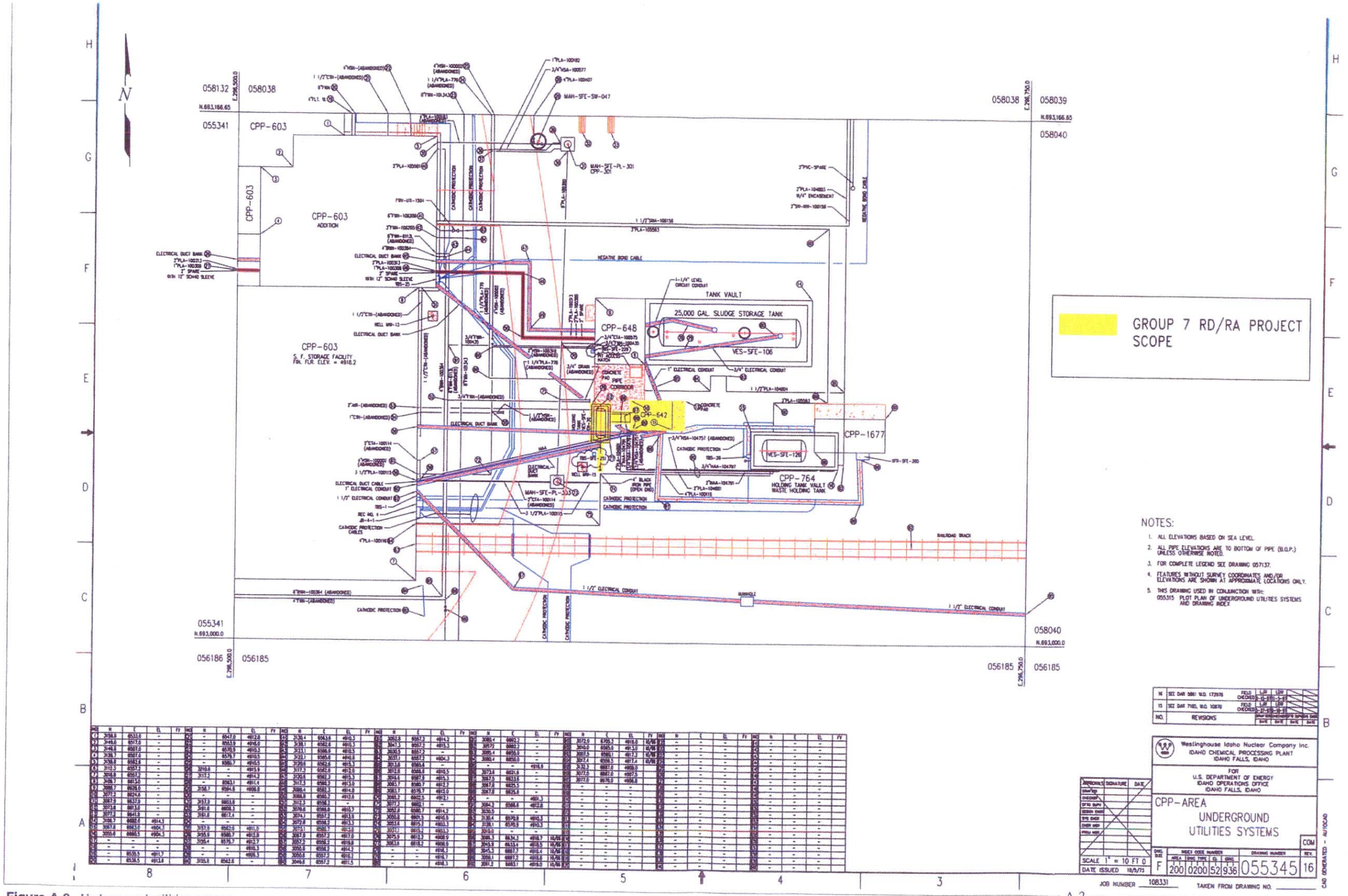

Figure A-2. Underground utilities systems.

FIGURE 4

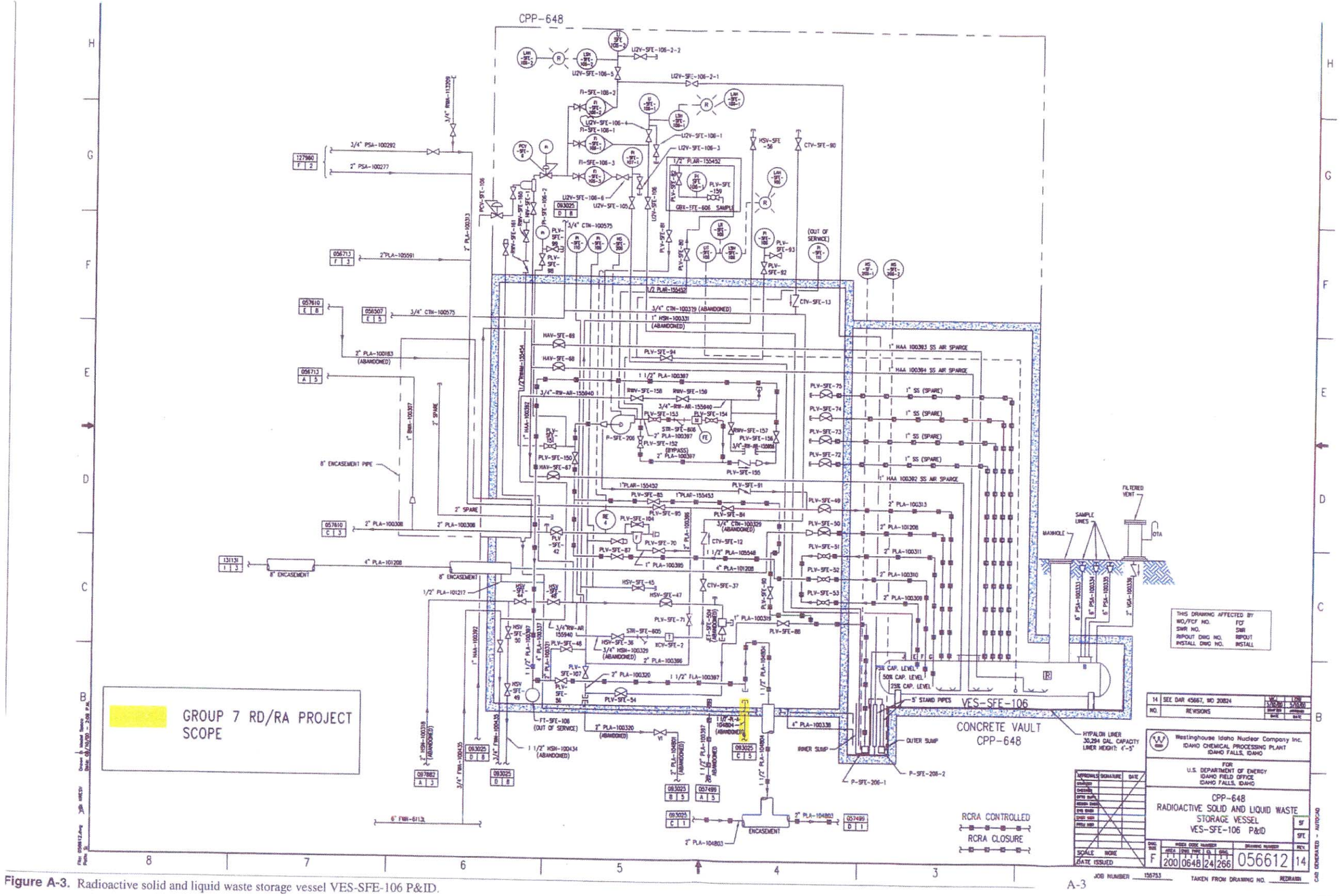

Figure A-3. Radioactive solid and liquid waste storage vessel VES-SFE-106 P&ID.

A-3

FIGURE 5