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Engineering Design File

Voluntary Consent Order Tank System INTEC-080 – INTEC Tank Farm Auxiliary High-Level Waste Tank System Characterization

Idaho National Engineering and Environmental Laboratory

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ENGINEERING DESIGN FILE

1. Title: Voluntary Consent Order Tank System INTEC-080 – INTEC Tank Farm Auxiliary High-Level Waste Tank System Characterization

2. Project File No.: INTEC-080

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4. Summary:

This Engineering Design File (EDF) for the INTEC Tank Farm Auxiliary High-Level Waste Tank System (VCO Tank System INTEC-080) at the Idaho Nuclear Technology Engineering Center (INTEC) has been prepared to satisfy a milestone in the Voluntary Consent Order (IDEQ 2000) for the SITE-TANK-005 Action Plan.

This EDF includes a brief system description of the INTEC Tank Farm Auxiliary High-Level Waste Tank System and the associated hazardous waste determination documentation for the four waste tanks. Additional technical details regarding this system can be found in the system identification package (INEEL 2001).

Table 1 provides a summary of the tanks included in this EDF and the recommended future actions.

5. Review (R) and Approval (A) and Acceptance (Ac) Signatures:
(See next page for all other signatures.)

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(Name and Mail Stop)

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Characterization EDF Approvals System INTEC-080

	Review or Approval	Typed Name/Organization	Signature	Date
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Section 4 Author (Waste Generator Services)	R	R. A. Willson/3240	*I verify that the hazardous waste determination contained in Section 4 is true, accurate, and complete to the best of my knowledge.*	9/3/02
Independent Reviewer	R	J. K. Foster/3521	*I verify that the document is true, accurate, and complete to the best of my knowledge.*	8/28/02
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Requestor (Work Package Manager)	A	W. M. Heileson/3521	*I verify that based on my inquiry of the person who prepared the document, or those directly responsible for gathering the information, the document is true, accurate, and complete to the best of my knowledge.*	8/28/02
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VCO SITE-TANK-005 EA-IDEQ Interface	A	D. P. Hutchison/3521	*I verify that the document is true, accurate, and complete to the best of my knowledge.*	9/4/02
VCO SITE-TANK-005 Project Manager	A	R. R. Piscitella/3521	*I verify that based on my inquiry of the person who prepared the document, or those directly responsible for gathering the information, the document is true, accurate, and complete to the best of my knowledge.*	9/4/02

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1. INTRODUCTION AND PURPOSE

This Engineering Design File (EDF) for the Idaho Nuclear Technology and Engineering Center (INTEC) Tank Farm Auxiliary High-Level Waste Tank System (VCO System INTEC-080) has been prepared to satisfy a milestone in the Voluntary Consent Order (VCO) (IDEQ 2000) for the SITE-TANK-005 Action Plan.

This EDF includes a brief system description of the INTEC Tank Farm Auxiliary High-Level Waste Tank System and the associated hazardous waste determinations (HWDs). Additional technical details regarding this system can be found in the INTEC-080 system identification package (INEEL 2001).

2. BRIEF SYSTEM DESCRIPTION

The following information contained in this section is based on the system identification package (INEEL 2001) and the simplified flow schematic located in Appendix A.

The INTEC-080 system is located at the INTEC Tank Farm Facility (TFF) and includes four underground storage tanks (VES-WM-103, 98CPP01397; VES-WM-104, 98CPP01398; VES-WM-105, 98CPP01399; and VES-WM-106, 98CPP01400). They were constructed in 1954 and were designed to hold the first-cycle waste from the Submarine Intermediate Reactor (SIR) and the Submarine Thermal Reactor (STR) fuel reprocessing activities (DOE 1999).

Table 1. Summary Table for the INTEC Tank Farm Auxiliary High-Level Waste Tank System (VCO System INTEC-080).

Inventory Number	Tank Information	Approach	Conclusions and *Recommended Actions*
98CPP01397	**Facility Tank #:** VES-WM-103 **Description:** 30,000-gal TFF Tank **Operational Status:** INACTIVE WASTE **Regulated Status:** RCRA (I)	HWD	Some or all of the waste in this unit is RCRA hazardous. The waste codes are F001, F002, F005, and U134. *Action: Submit a proposed schedule of further milestones and a description of proposed interim actions.*
98CPP01398	**Facility Tank #:** VES-WM-104 **Description:** 30,000-gal TFF Tank **Operational Status:** INACTIVE WASTE **Regulated Status:** RCRA (I)	HWD	Some or all of the waste in this unit is RCRA hazardous. The waste codes are F001, F002, F005, and U134. *Action: Submit a proposed schedule of further milestones and a description of proposed interim actions.*
98CPP01399	**Facility Tank #:** VES-WM-105 **Description:** 30,000-gal TFF Tank **Operational Status:** INACTIVE WASTE **Regulated Status:** RCRA (I)	HWD	Some or all of the waste in this unit is RCRA hazardous. The waste codes are F001, F002, F005, and U134. *Action: Submit a proposed schedule of further milestones and a description of proposed interim actions.*

Table 1. (continued.)

Inventory Number	Tank Information	Approach	Conclusions and *Recommended Actions*
98CPP01400	**Facility Tank #:** VES-WM-106 **Description:** 30,000-gal TFF Tank **Operational Status:** INACTIVE WASTE **Regulated Status:** RCRA (I)	HWD	The waste in this unit is not RCRA hazardous. The potential for release is high; however, the soil is addressed under the Federal Facility Agreement and Consent Order (DOE-ID 1991). *Action: Move to Appendix C of the VCO.*
Ancillary Equipment and Piping			Ancillary equipment and piping associated with the system that have been found to be hazardous are identified in Appendix A. *Action: Submit a proposed schedule of further milestones and a description of proposed interim actions for the ancillary equipment and piping identified.*

3. JUSTIFICATION FOR HAZARDOUS WASTE DETERMINATION OR VERIFICATION OF EMPTY DECISION

All four of the INTEC-080 system tanks (VES-WM-103, VES-WM-104, VES-WM-105, and VES-WM-106) are inactive waste tanks, which require a hazardous waste determination.

4. HAZARDOUS WASTE DETERMINATION

This section is the HWD for the INTEC Tank Farm Auxiliary High-Level Waste Tank System (VCO System INTEC-080).

4.1 30,000-gal Tank Farm Facility Tanks (VES-WM-103, 98CPP01397; VES-WM-104, 98CPP01398; VES-WM-105, 98CPP01399; and VES-WM-106, 98CPP01400)

These four inactive 30,000-gal underground storage tanks were connected to the E-Cell in CPP-601 and were designed to hold the first-cycle waste from the SIR and the STR fuel reprocessing activities (DOE 1999). VES-WM-103 and VES-WM-106 also stored E-Cell decontamination solutions.[a] After fuel reprocessing activities ceased, with the exception of VES-WM-106, the 30,000-gal tanks provided temporary storage for process equipment waste evaporator (PEWE) condensate.[a] This was a one-time occurrence in September/October of 1982. A review of drawings (Idaho National Engineering and Environmental Laboratory [INEEL] Reference Drawings 057500, Rev 1; 090381, Rev 0; 091498, Rev 0) verify the E-Cell feed lines (1” PWA-15, 1” PWA-17, 1”PWA-19, and 1” PWA-21) were cut and capped prior to Calendar Year (CY) 1990. All four tanks were emptied to their heels in CY 1990. Tanks VES-WM-103, -104, and -106 currently contain estimated volumes of approximately 13,700, 2,200, and 14,500 gal, respectively. Tank VES-WM-105 has less than 1,500 gal. As noted, these volumes are

a. Machovec, Dave C., INEL, to A. J. Matule, INEL, August 29, 1990, “Tank Farm Tank Size,” DCM-08-90.

estimates. Tank level instrumentation was installed in the 1950s and may not be as precise as desired. Tank volumes will be verified by another method prior to the removal of the contents. This volume is attributed to valve leaks in the steam jet lines that inadvertently allowed nonhazardous steam condensate to slowly drain into the tanks and mix with the tank heel. Level indicator data logs show a slow volume increase in the contents of tanks. In 1998, the steam valves for the feeds to the steam jets were tightened and the main valve was replaced. Data logs of the level indicators show no increase in volumes since that time. The steam line for the steam jets in these tanks were further isolated in September 2001with a blind flange.

4.1.1 First-Cycle Extraction Waste and E-Cell Decontamination Solutions (VES-WM-103 and VES-WM-106 only)

During the late 1950s through December 1965, the four 30,000-gal tanks received and stored first-cycle extraction waste until it was transferred to other tank farm tanks while waiting calcination into a solid waste form. From August 1966 through September 1970, VES-WM-103 and VES-WM-106 also received liquid waste generated during decontamination of E-Cell. Both the first-cycle extraction waste and E-Cell decontamination solution originated from CPP-601.

The four tanks were emptied by June 1974. By January 1975, all four tanks had also been flushed with water. Since both the first-cycle extraction waste and the E-Cell decontamination solutions were received and removed, and the contents flushed from these tanks prior to the implementation of Resource Conservation and Recovery Act (RCRA) regulations, neither waste stream was subject to RCRA regulations. Consequently, all piping from CPP-601 that was used to convey these waste streams to the 30,000-gal tanks are also not subject to RCRA regulations.

4.1.2 PEWE Process Condensate and Steam Condensate

4.1.2.1 Is the Material a Solid Waste?

The PEWE condensate that was received by VES-WM-103, VES-WM-104, and VES-WM-105 was returned to the PEWE system. Since it was discharged to a waste treatment system, the condensate met the definition of a solid waste as specified in 40 CFR 261.2.

As previously mentioned, all four tanks were emptied to their heels in CY 1990; since then, all of the tanks except VES-WM-105 slowly received steam condensate generated from valve leaks in the steam jet lines for these tanks. The steam supply was isolated in September 2001. Since the steam condensate will be managed as waste, it meets the definition of a solid waste as specified in 40 CFR 261.2.

4.1.2.2 Is it Exempt?

No, the PEWE condensate and steam condensate do not qualify for any of the exemptions specified in 40 CFR 261.4.

4.1.2.3 Is it Listed?

As discussed above, VES-WM-103, VES-WM-104 and VES-WM-105 provided temporary storage for PEWE condensate from September/October 1982 to February 1983. The only other waste managed in the tanks after the implementation of RCRA in 1980 was steam condensate from leaking steam jets.

The four listed HWNs applicable to waste managed in the PEWE liquid waste system are F001, F002, F005, and U134. Although the PEWE overheads condensate that was discharged to VES-WM-103,

VES-WM-104, and VES-WM-105 was returned to the PEWE system, these tanks never underwent RCRA closure; consequently, the contents of these tanks (i.e., tank heel and steam condensate [if applicable]) are listed waste based on the Mixture Rule [40 CFR 261.3(A)(2)(iii-iv)]. Nothing from the steam condensate that leaked to these tanks would have added listed HWNs. Therefore, the listed HWNs that are applicable to VES-WM-103, VES-WM-104, and VES-WM-105are F001, F002, F005, and U134.

4.1.2.4 Is it Characteristic?

The overheads condensate received by the three tanks was generated from PEWE operations. During operation of the PEWE, some of the nitric acid used during evaporation exits the evaporator vessel as overheads. Process overheads enter the Liquid Effluent Treatment and Disposal (LET&D) facility, where nitric acid is recovered from the overheads and reused in the PEWE system. The condensate received by the three tanks was derived from PEWE overheads that were generated prior to the existence of the LET&D. Since the process overheads were still saturated with nitric acid when they condensed, process knowledge indicates that the corrosivity characteristic HWN D002 would have applied; however, no information could be identified that provided acceptable process knowledge regarding applicable characteristic toxicity HWNs that would have applied to the condensate that was stored in VES-WM-103, VES-WM-104, and VES-WM-105 from 1982 to 1983. By February 1983, the PEWE condensate in VES-WM-103, VES-WM-104, and VES-WM-105 was transferred from the tanks to the PEWE feed tank (VES-WL-102; included in the *HWMA/RCRA Part A Permit Application for the Idaho National Engineering and Environmental Laboratory* [INEEL] [DOE-ID 2000a]).

In CY 1990, water was added to provide enough solution to sample and the tanks were sampled for total carbon, pH, and RCRA metals, and emptied to their heels via steam jets. Those sampling results, which were used as process knowledge for this Characterization EDF, indicated that the waste in these tanks were not corrosive and did not contain concentrations of toxic metals above the RCRA regulatory levels. Analyses to determine concentration levels of pesticides and organics were not conducted on any of these four tanks since neither pesticides nor organic constituents were expected to be present in the waste.

Since CY 1990, all of the tanks except for VES-WM-105 inadvertently received substantial volumes of steam condensate due to valve leaks in the steam branch lines. As a result, the tank heels were continually diluted until the tanks were physically isolated from the steam header. Since the only waste addition to the tanks since they had been emptied to their heels was steam condensate, the sampling results can still be used for process knowledge. However, instead of being representative of the current tank contents, the sample results are conservative since they are now indicative of the highest toxic metal and total organic concentrations that the tank liquids could potentially exhibit. The sample results obtained prior to the inadvertent dilution with steam condensate had indicated that the contents of the tanks were nonhazardous per RCRA regulations for toxicity characteristic metals; therefore, impermissible dilution had not occurred since the regulatory status of the contents of the tanks were not altered.

For VES-WM-105, which did not receive any steam condensate, current instrumentation indicates that this tank is still empty (except for its heel). The sample results are assumed to be representative of the current contents of the tank and will be used as process knowledge. Therefore, as previously stated, the heel in this tank does not have any characteristic HWNs associated with it.

Additional information supporting both the characteristic and listed HWD is provided in WDDF VCO-INTEC-080 (see Appendix B).

4.2 Hazardous Piping and Ancillary Equipment

Since three of the 30,000-gal tanks were determined to be hazardous waste storage units, the system boundaries were reevaluated to ensure that piping and ancillary equipment associated with these tanks that were used to facilitate the receipt and conveyance hazardous waste are identified.

Based on the reevaluation, four heat exchangers (HE-WM-303, HE-WM-304, HE-WM-305, and HE-WM-306) that were initially designated on Schematic P-ST005-INTEC-080 as excluded from the VCO System are now included in the system boundaries. The heat exchangers were designed to cool vessel off-gas (VOG) and to condense entrained liquids in the VOG. The condensed liquid then gravity drains back into the vessel from which the VOG originated. No other system boundary changes occurred.

A schematic, based on the reevaluated system boundaries, is included in Appendix A and shows the vessels, piping, and ancillary equipment recommended for further VCO activities.

5. VERIFICATION OF EMPTY

This section is not applicable for the INTEC-080 system.

6. POTENTIAL FOR RELEASE

Tank VES-WM-106 (98CPP01400) is a nonhazardous waste tank with a potential for release. A potential for release exists because the tank contains several thousand gallons of steam condensate. The tank is direct buried and does not have secondary containment or leak detection. The soils around this tank are being addressed under the Comprehensive Environmental Response, Compensation, and Liability Act Operable Unit 3-14 Remedial Investigation/Feasibility Study Work Plan (DOE-ID 2000b).

7. CONCLUSIONS AND RECOMMENDATIONS

Three of the four 30,000-gal TFF tank systems (VES-WM-103, 98CPP01397; VES-WM-104, 98CPP01398; and VES-WM-105, 98CPP01399), which include associated outlet piping and ancillary equipment (HE-WM-303, HE-WM-304, HE-WM-305), have been and are currently being used for storage of RCRA waste. These tanks will require further VCO milestones and evaluation for any necessary interim actions. Within 90 days following State approval of this EDF, the U.S. Department of Energy will submit a proposed schedule for further milestones and a description of the proposed actions for these units.

The fourth 30,000-gal tank (VES-WM-106; 98CPP01400) did not receive any RCRA waste and has been determined to be nonhazardous per RCRA regulations and is recommended for movement to Appendix C of the VCO – Covered Matters that are Closed.

8. REFERENCES

40 CFR 261, 2002, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations,* Office of the Federal Register, March 13, 2002.

DOE, 1999, *Idaho High-Level Waste & Facilities Disposition Draft Environmental Impact Statement*, DOE/EIS-0287D, December 1999.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, U.S. Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency, Region 10, and State of Idaho Department of Health and Welfare, Administrative Docket No. 1088-06-120, December 9, 1991.

DOE-ID, 2000a, *HWMA/RCRA Part A Permit Application for the Idaho National Engineering and Environmental Laboratory,* Volume 1, "Bechtel BWXT Idaho, LLC," DOE/ID-10213, Complete Revision, January 2000.

DOE-ID, 2000b, *Remedial Design/Remedial Action Work Plan for Group 1 Tank Farm Interim Action*, DOE/ID-10772, Revision 0, September 2000.

IDEQ, 2000, B. R. Monson, IDEQ, to D. N. Rasch, DOE-ID, Enclosure: "Consent Order Action Plan," Idaho Code §39-4413, June 14, 2000. (Consent Order Action Plan updated April 30, 2002.)

INEEL, 2001, *Voluntary Consent Order SITE-TANK-005 System Identification,* "INTEC Tank Farm Auxiliary High-Level Waste Tank System (INTEC-080)," INEEL/EXT-2000-00037, Book 1-INTEC, Volume XI, Section 1, Revision 1, September 2001.

9. DRAWINGS

057500, INEEL Reference Drawing, *CPP Tank Farm Primary Waste Collection & Storage Facilities Flowsheet 3 of 6*, Revision 1, July 1984.

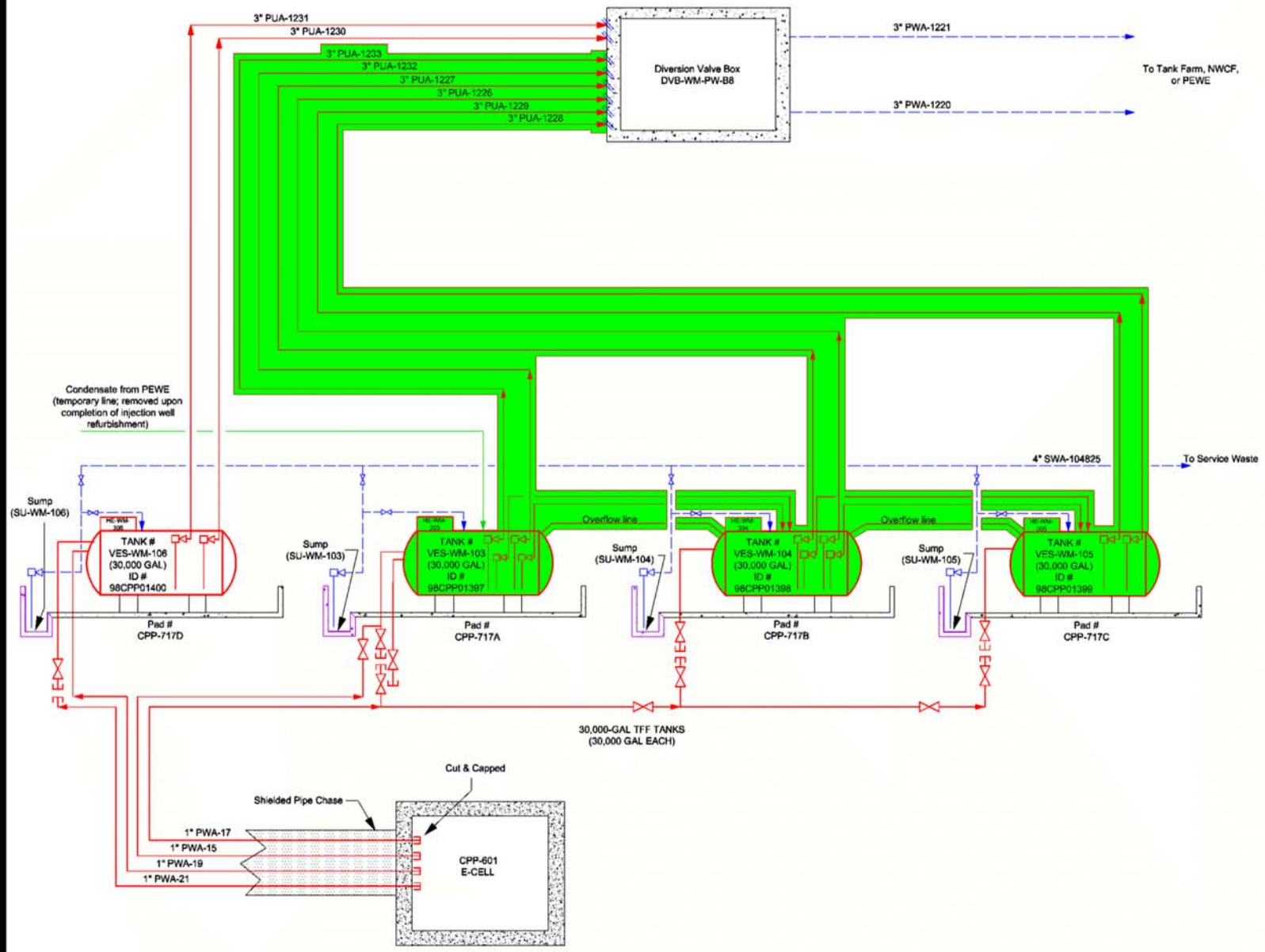
090381, INEEL Reference Drawing, *CPP-601 E-Cell Flowsheet Sheet 3 of 5*, Revision 0, July 1989.

091498, INEEL Reference Drawing, *CPP-601 N-Cell P&ID*, Revision 0, July 1989.

Appendix A—System Identification Schematic

See the attached Schematic CEDF-ST005-INTEC-080.

PLACEHOLDER FOR SCHEMATIC CEDF-ST005-080



LEGEND

- BUILDINGS
- VCO UNITS
- LINES AND COMPONENTS INCLUDED IN THE VCO SYSTEM
- LINES INCLUDED IN SEPARATE SITE-TANK-005 SYSTEM
- UNITS AND COMPONENTS EXCLUDED FROM THE VCO SYSTEM
- LINES EXCLUDED FROM THE VCO SYSTEM
- UNITS INCLUDED IN SITE-TANK-006 VCO ACTION PLAN
- REMOVED EQUIPMENT
- UNITS, COMPONENTS, OR LINES NEEDING FOLLOW-ON ACTIONS

NWCF: NEW WASTE CALCINING FACILITY
PEWE: PROCESS EQUIPMENT WASTE EVAPORATOR

VCO UNITS

98CPP01397
98CPP01398
98CPP01399
98CPP01400

REFERENCE DRAWINGS

056203, REVISION 26
057500, REVISION 11
057503, REVISION 20
090381, REVISION 9
091498, REVISION 15
092471, REVISION 1

REFERENCE DOCUMENTS

HULL ET AL. 1999
INEL 1986

NOTES

THE SUMPS ASSOCIATED WITH EACH OF THE 30,000-GAL TFF TANKS ARE INCLUDED IN THE SITE-TANK-006 VCO ACTION PLAN. THE SUMPS HAVE NEVER BEEN USED AND ARE INOPERABLE.

THIS SCHEMATIC DOES NOT REPRESENT THE SPATIAL LOCATION OF THE TANKS. THE TANKS ARE ORIENTED IN A NORTH-SOUTH DIRECTION WITH VES-WM-103 FURTHEST TO THE EAST AND VES-WM-106 FURTHEST TO THE WEST.

ADDITIONAL EQUIPMENT INCLUDED IN THIS SCHEMATIC ARE THE FOUR HEAT EXCHANGERS.

REVISIONS

REV	DESCRIPTION	DATE	INIT
1	UPDATED TO REVISION 1 FOR CONSISTENCY WITH DOCUMENT	8/28/02	JDH

VOLUNTARY CONSENT ORDER PROGRAM

THIS SCHEMATIC IS PROVIDED AS A SUPPLEMENT TO THE VOLUNTARY CONSENT ORDER PROGRAM'S SYSTEM IDENTIFICATION EFFORT. THIS SCHEMATIC IS NOT INTENDED TO BE USED AS A PIPING AND INSTRUMENTATION DIAGRAM NOR IS IT MANAGED BY INEEL CONFIGURATION CONTROL. THIS SCHEMATIC IS FOR VCO PROGRAM USE ONLY.

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER
TANK FARM AUXILIARY HIGH-LEVEL WASTE TANK SYSTEM (INTEC-080)
HIGH-LEVEL WASTE FLOW SCHEMATIC

SCHEMATIC NUMBER: CEDF-ST005-INTEC-080
REVISION: 1
SCALE: NONE
DATE: 05/08/02

Appendix B—Hazardous Waste Determination Supporting Documentation

See the attached WDDF, VCO-INTEC-080.

435.39
03/03/2000
Rev. 04

INEEL WASTE DETERMINATION & DISPOSITION FORM (WDDF)

General Instructions:

Waste Stream Name: INTEC Tank Farm Auxiliary High-Level Waste Tank System **Material Profile Number:** _____

WDDF Number (Optional): VCO-INTEC-080 Charge #: _____

Waste Stream Contacts

Contact:	Name	E-Mail	Phone	Pager	MS	Contact:	Name	E-Mail	Phone	Pager	MS
Generator:	Frank S. Ward	fsw2	6-3010	5432	5111	Technical Specialist:	Likuo Chi	chil	6-7945	9382	5117
Facility Rep.:	Richard A. Willson	rw8	6-9641	4090	5117	Independent Reviewer:	Jack Weisgerber	welsjl	6-5412	5206	5117

SECTION I: PROCESS KNOWLEDGE EVALUATION (Completed by the generator with assistance from the Facility Representative)

1. Waste Generation Location: Facility: INEEL Building/Room: CPP-072 Area: INTEC If applicable: Container #: NA Type/size: NA

2. Process and Waste Description: (Attachment Included: ☒ Yes ☐ No)

This WDDF is applicable to VES-WM-103, VES-WM-104, VES-WM-105, and VES-WM-106. These inactive 30,000-gal underground storage tanks were connected to the E-cell in CPP-601 and designed to hold the first-cycle waste from the Submarine Intermediate Reactor (SIR) and the Submarine Thermal Reactor (STR) fuel reprocessing activities and, for VES-WM-103 and VES-WM-106, E-cell decontamination solutions. With the exception of VES-WM-106, after fuel reprocessing activities ceased, these tanks provided temporary storage for process equipment waste (PEW) condensate, which is associated with the INTEC liquid waste management system (ILWMS). Although the first-cycle waste and the E-cell decontamination solutions are discussed for applicability of listed hazardous waste numbers (HWNs), both were received and removed from the tanks prior to the implementation of RCRA regulations; therefore, they were not subject to RCRA regulations.

APPLICABLE LISTED HWNs: Although the PEW condensate discharged to VES-WM-103, -104, and -105 was returned to the PEW system, these tanks never underwent RCRA closure; consequently, the contents of these tanks are listed waste based on the mixture rule [40 CFR 261.3(A)(2)(iii-iv)]. A study of past INTEC liquid waste management practices determined that four listed HWNs are applicable to the contents of the tanks that had received PEW condensate: **F001, F002, F005, and U134.**

First-cycle extraction consisted of four extraction columns and an evaporator. The aqueous dissolver product solution from the dissolution of SIR and STR fuel was fed to the first of the four extraction columns where it was contacted with an organic extractant consisting of a 5-10% solution of tributyl phosphate (TBP) in a refined kerosene diluent. In the second extraction column, the uranium-bearing organic solution was then contacted with a scrub solution to remove additional contaminants from the organic phase. This organic phase was fed to the third extraction column, where a dilute nitric acid solution was used to strip the uranium from the uranium-bearing organic solution back into the aqueous phase. This aqueous phase then entered the fourth extraction column, where it was washed with kerosene diluent to remove residual TBP or TBP degradation products before concentrating the uranium-bearing aqueous solution via evaporation. The overall first-cycle extraction process required the addition of the following chemicals: TBP, kerosene, and nitric acid. None of these chemicals is listed constituents; therefore, the waste produced from the first-cycle extraction of SIR and STR fuels would not have had any listed HWNs associated with it.

A typical decontamination cycle in E Cell used a strong caustic solution followed by a corrosive solution and/or chelating agents. During fuel dissolution and extraction process operations, several decontamination solutions were used including water; 2-6 M nitric acid; potassium permanganate in 2 M nitric acid; Turco 4521 (ammonium oxalate, oxalic acid, amorphous silica, citric acid, and 2-mercaptobenzothiazole); Turco 4502 (potassium hydroxide, potassium permanganate, potassium chromate, and hexavalent chromium); oxalic acid in 0.2 M citric acid; sodium hydroxide in 0.15 M tartaric acid; Turco 4324 (ammonium bicarbonate, sodium hexametaphosphate, octylphenoxypoly [ethyleneoxy]ethanol, n-octylphenoxypoly [ethyleneoxy]ethanol; and sodium carboxymethyl cellulose); 1 M oxalic acid; 0.5 M citric acid; oxalic acid in 0.5 M nitric acid; 0.5 M ammonium hydroxide; sodium hydroxide in 0.5 g/L EDTA (0.0017 M) solution; Turco alkaline rust remover (sodium hydroxide, kerosene triethanolamine, diethanolamine, and sodium gluconate); sodium fluoride; and hydrofluoric acid in 2 M nitric acid. Based on this list of decontamination solutions, the only decontamination solution that was potentially a listed waste was the hydrofluoric acid (HF), which would "carry" a U134 HWN if disposed as a commercial chemical product. However, since the HF decontamination solution was not a pure HF solution (it was comprised of HF in 2.0 M nitric acid), the U134 HWN does not apply to the HF decontamination solution. However, as previously specified, the U134 HWN did apply to the PEW condensate that was received by VES-WM-103, VES-WM-104, and VES-WM-105.

APPLICABLE CHARACTERISTIC HWNs: By February 1983, all four tanks had been emptied to their heels. In CY 1990, these tanks were filled with water; sampled for total carbon, pH, and RCRA metals; and emptied to their heels via steam jets. The sampling results, which were to be used as process knowledge to preclude additional sampling, indicated that the waste in these tanks were not corrosive and did not contain concentrations of toxic metals above the RCRA regulatory levels. Analyses to determine concentration levels of pesticides and organics were not conducted on any of these tanks since neither pesticides nor organic constituents were expected to be present in the waste at concentration above the RCRA treatment standards.

Since CY 1990, all of the tanks except VES-WM-105 inadvertently received substantial volumes of steam condensate due to valve leaks in the steam branch lines. As a result, the tank heels were continually diluted until the tanks were physically isolated from the steam header. Since the only waste addition to the tanks since they had been emptied was steam condensate, the sampling results will still be used for process knowledge. However, instead of being representative of the current tank contents, the sample results are now indicative of the highest toxic metal and total organic carbon concentrations that the tank liquids could potentially exhibit. The sample results obtained prior to the inadvertent dilution with steam condensate had indicated that the contents of the tanks were nonhazardous per RCRA regulations for toxicity characteristic metals; therefore, impermissible dilution had not occurred since the regulatory status of the contents of the tanks were not altered.

Although the sample data from CY 1990 do not reflect the current contents of these tanks, the sample data combined with process knowledge of the inputs to the tanks support a hazardous waste determination that the contents of tanks VES-WM-103, VES-WM-104, and VES-WM-105 are a RCRA listed waste but not a RCRA characteristic waste. The contents of tank VES-WM-106 is neither a RCRA listed nor a RCRA characteristic waste.

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INEEL WASTE DETERMINATION & DISPOSITION FORM (WDDF)

Waste Stream Name: INTEC Tank Farm Auxiliary High-Level Waste Tank System **Material Profile Number:** _____

3. Were any waste minimization activities a part of this process: ☐ Yes ☒ No (If Yes, provide description or reference.)
NA

4. Generation Status: ☐ Anticipated ☒ Existing ☐ Routine operations ☐ Cleanup/Stabilization Activities ☒ One Time Only ☐ On-going ☐ Secondary

5. Other generation information:

6. Physical Description (check all that apply): Color: clear ☐ Solid ☐ Organic Liquid ☒ Aqueous Liquid ☐ Sludge ☐ Aerosol ☐ Gas Cylinder ☐ Multi-Layered

7. Sources used for process evaluation (e.g. MSDS, operational logs, procedures, analyses): personal interviews, procedures, process knowledge, analytical data, Operation Logs and ICPP Monthly Reports, INTEC Tank Farm Listed Code guidance documents (CLT-18-99, INEEL/EXT-98-01213 rev. 3), *Voluntary Consent Order SITE-TANK-005 System Identification* (INEEL/EXT-2000-00037)

8. Waste Characteristics: Note: The waste characteristics may not be known at time of initial determination. If required for treatment or characterization, those parameters will be identified at a later date.

Liquids		Solids		All	
a. pH (aqueous only): ☐ < 2 ☐ ≥ 12.5 ☒ > 2 or < 12.5 Exact	Method: Process Knowledge (PK) ☐ NA	h. Asbestos:	☐ Yes ☐ No ☒ NA	n. PCBs: If Yes, provide concentrations (actual & source) in composition table.	☐ Yes ☒ No ☐ NA
		If yes, is it friable?	☐ Yes ☐ No ☒ NA	PCBs Bulk Product? (40 CFR 761.62)?	☐ Yes ☐ No ☒ NA
b. Flash Point: None ☐ NA	Method: PK	i. Pyrophoric (Water Reactive)	☐ Yes ☐ No ☒ NA	o. Sulfide ≥ 500 mg/kg	☐ Yes ☒ No ☐ NA
c. Total suspended solids <1%	☒ Yes ☐ No ☐ NA	j. Flammable Solid	☐ Yes ☐ No ☒ NA	p. Cyanide ≥ 250 mg/kg	☐ Yes ☒ No ☐ NA
d. Is total organic carbon <1%	☒ Yes ☐ No ☐ NA			q. Oxidizer	☐ Yes ☒ No ☐ NA
e. Fuming Acid/Acid Gases	☐ Yes ☒ No ☐ NA	k. Free liquids: If Yes, quantity volume %	☐ Yes ☐ No ☒ NA	r. Treatment Residue	☐ Yes ☒ No ☐ NA
f. Pyrophoric (Air Reactive)	☐ Yes ☒ No ☐ NA	l. RCRA Debris (>60 mm) (≥ 50% by visual inspection) or	☐ Yes ☐ No ☒ NA	s. Explosive	☐ Yes ☒ No ☐ NA
		non-RCRA Rubble	☐ Yes ☐ No ☒ NA	t. Radioactive	☒ Yes ☐ No ☐ NA
g. Water Reactive	☐ Yes ☒ No ☐ NA	m. Pyrophoric (Air Reactive)	☐ Yes ☐ No ☒ NA	u. Halogens (Cl, F, Br)	☐ Yes ☒ No ☐ NA

11. Waste Composition: (Must total 100%). Attachment Included: ☐ Yes ☒ No ☐ NA

Constituent	CAS No.	Analysis or PK	Range (If constituent is <1%, use mg/kg or mg/L, otherwise report in %) From	To	Units	Used as a Solvent? (Y/N)	Comments
Raw water from flushing & sampling event and steam condensate	7732-18-5	PK	100	100	vol%	N	

12. Radioisotopes: Are radioisotopes present? ☒ **Yes,** If Yes, refer to attachment ☐ **No,** If No, include signed form 435.02 **No attachment is included. The scope of this waste determination is limited to RCRA regulations only. Radiological characteristics will be assessed and identified during actual disposition of this waste. See Additional Narrative Information.**

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INEEL WASTE DETERMINATION & DISPOSITION FORM (WDDF)

Waste Stream Name: INTEC Tank Farm Auxiliary High-Level Waste Tank System **Material Profile Number:** _____

SECTION II: PROBABLE WASTE TYPE: (Completed by the Facility Representative and used to assign waste technical specialist and for appropriate management until final waste determination is made.)				
Based on evaluation of the process and available data the waste type indicated is (check all that apply):				
☐ Hazardous Only	☒ Mixed	☐ Radioactive Only	☐ Conditional Industrial	☐ Used Oil
☐ Material Exchange	☐ Lab Pack	☐ Non-conditional Industrial	☐ TSCA	☐ Other – Describe:
☐ Recyclable: ☐ Non Radioactive Lead (>99+ % Lead) ☐ Lead Batteries ☐ Silver ☐ RCRA Scrap metal ☐ Other - Describe:				
Indicated Waste Codes: F001, F002, F005, U134 **(Does not apply to VES-WM-106 liquid, which is radioactive only)**				

CERTIFICATION

I certify that the information in Section I of this form and the applicable attachments are fully disclosed. A good faith effort has been put forward to acquire and verify the information. Willful or deliberate omissions have not been made, and all known and suspected hazards have, to the best of my knowledge, been identified. The WGS Facility Representative, based on information provided, has assigned a probable waste type in Section II.

Frank S. Ward Generator Name Typed/Printed	F S Ward Signature	5/8/02 Date
Richard A. Willson WGS Facility Representative Name Typed/Printed	[signature] WGS Facility Representative Signature	05/08/02 Date

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INEEL WASTE DETERMINATION & DISPOSITION FORM (WDDF)

SECTION III WASTE DETERMINATION AND DISPOSITION (Completed by the WGS Technical Specialist)

A. Waste Determination

1. Is this a solid waste (per 40 CFR 261.2)? ☒ Yes ☐ No (If No, attach regulatory citation)

2. Is this a Hazardous Waste (per 40 CFR 261.3)? ☒ Yes ☐ No

3. Is waste excluded from regulation under 40 CFR 261.4? ☐ Yes ☒ No If Yes, Regulatory citation:

4. Is waste subject to 40 CFR 268 regulations? ☒ Yes ☐ No If Yes, is the waste a: ☒ Waste Water or ☐ Non Wastewater.
Is there a specified method of treatment? ☐ Yes ☒ No If Yes, list the specified method:

5. Is waste listed in Subpart D of 40 CFR 261? ☒ Yes ☐ No (If Yes, provide waste codes, regulated hazardous constituent(s), and an explanation of determination.)
Attachment Included: ☐ Yes ☒ No Codes: F001 (carbon tetrachloride, 1,1,1-trichloroethane, and trichloroethylene), F002, (1,1,1-trichloroethane, trichloroethylene, and tetrachloroethylene), F005 (benzene, carbon disulfide, pyridine, toluene), and U134 (hydrofluoric acid). Does not apply to VES-WM-106, which is radioactive only.

6. Is waste characteristic per Subpart C of 40 CFR 261? ☐ Yes ☒ No (If Yes, provide waste codes, regulatory subcategory, and an explanation of determination.)
Attachment Included: ☐ Yes ☒ No Codes: None. (Reference: Sample log summaries)

7. If hazardous, is the waste excluded for recycling in accordance with 40 CFR 261.2(e)(1)? ☐ Yes ☒ No If Yes, regulatory Citation:

8. Is the waste mixed or low level? ☒ Yes ☐ No (If Yes, include attachment with isotopic information.) **No attachment is included. The scope of this waste determination is limited to RCRA regulations only. Radiological characteristics will be assessed and identified during actual disposition of this waste. See Additional Narrative Information.**

9. Is waste TSCA regulated for either of the following? PCBs: ☐ Yes ☒ No Asbestos: ☐ Yes ☒ No

B. Evaluation of Underlying Hazardous Constituents (UHCs)

Does the waste require evaluation in accordance with 40 CFR 268.48? ☐ Yes ☒ No (If Yes, identify UHCs.) UHCs: NA
Attachment Included: ☐ Yes ☒ No

C. Disposition and Data Gap Evaluation: (Attachment Included: ☐ Yes ☒ No)

1. Proposed Disposition (storage, treatment, disposal pathway): Evaporation (PEW), fractionation, calcination | STP ID (mixed only): None

2. Will this waste be treated in a <90 storage area? ☐ Yes ☒ No (If Yes, attach plan.) (Mixed and Hazardous Only)

3. Is the information provided adequate for complete waste determination, management, transportation, treatment, and disposal of waste? ☒ Yes ☐ No If No, identify additional information or analysis required.

D. Verification requirements: (Attachments Included: ☐ Yes ☒ No)

1. Will verification be performed on this waste? ☐ Yes ☒ No If Yes, describe the verification to be performed. Contents sampled in 1990. Only addition to tanks have been steam condensate from leaking valves in the steam branch lines to the transfer jets.

At Initial Storage Location: ☐ Yes ☒ No | Immediately Prior to Shipment: ☐ Yes ☒ No

2. What is the verification frequency? None.

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INEEL WASTE DETERMINATION & DISPOSITION FORM (WDDF)

E. Packaging and Transportation Requirements (to be completed by P&T): Complete this section only if wastes are to be transported.		
1. Is waste a DOT Regulated Hazardous Material? ☐ Yes ☒ No If Yes:	DOT Primary Hazard:	DOT Subsidiary Hazard:
2. Recommended Packaging:		
3. Probable Basic Description (PSN, Hazard Class, DOT ID #. PG):		
4. Other information (special shipping conditions, etc.):		
5. If containers are already generated, are they packaged correctly for the DOT hazard class? ☐ Yes ☐ No If No, list container required.		

NA for liquids discharged to the PEW system		NA
Packaging & Transportation Name Typed/Printed	Packaging & Transportation Signature	Date

Summary of Waste Determination:	☐ Hazardous (see codes listed above)	☒ Mixed Low-Level (see codes listed above)	☒ Low-Level (VES-WM-106 only)	☐ Conditional Industrial	☐ Other (describe)

CERTIFICATIONS

I certify that the information in Section III of this form and the applicable attachments are fully disclosed and accurate. A good faith effort has been put forward to acquire and verify the information. Willful or deliberate omissions have not been made, and all known and suspected hazards have, to the best of my knowledge, been identified.

Likuo Chi WGS Technical Specialist Name Typed/Printed	WGS Technical Specialist Signature	5-8-02 Date
Jack Weisgerber WGS Independent Reviewer Name Typed/Printed	WGS Independent Reviewer Signature	5/8/02 Date
NA Low Level Waste Hazardous Waste Determination Review Name Typed/Printed	Low Level Waste Hazardous Waste Determination Review Signature	Date

Additional Narrative Information (As Needed):

The purpose of this WDDF is to document a hazardous/nonhazardous determination for waste that has been/or is contained in specific tanks and/or components listed on the Voluntary Consent Order (VCO). It is not intended to serve as a disposal or disposition form; therefore, specific isotopes have not been identified for radioactive wastes.

Appendix C—Verification of Empty Table

Appendix C is not applicable to this system.

COMMENT RESOLUTIONS

FOR

REVISION 1 OF EDF-2614

412.13
11/26/2001
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DOCUMENT MANAGEMENT CONTROL SYSTEM (DMCS)
REVIEW COMMENTS AND RESOLUTIONS

Tracking No.: _____ (Optional)

Technical Point of Contact:	Phone No.:	Return Comments To:	MS:	E-Mail:	Comments Due By:	Reviewer's Name/Discipline:	Phone No.:
Roger E Draper	526-7066	Roger E Draper	5224	red6			

Comments resolved by:	Date:	Signature of reviewer accepting comment resolutions:	Date:

All comments, submitted within the scope of the review, must be resolved between submitter and document owner. If an acceptable resolution cannot be negotiated, the comment will be escalated to management for resolution.

Document ID: EDF-2614		Document Title: VCO Tank System INTEC-080 -- INTEC Tank Farm Auxiliary High-Level Waste Tank System Characterization	Revision ID: 0	DAR No.:
Item No.	Page No./ Section/Zone	Review Comment	Comment Resolution	
N/A	N/A	Resolutions to comments from IDEQ in a letter (CNN:34867) to Dave Wessman, VCO Project Manager DOE-Idaho Operations Office, dated 8/2/2002 regarding EDF-2614 (INTEC-080).		
1	5/4.1		Added line: A review of drawings 057500 Rev 1, 091498 Rev 0, and 090381 Rev 0 verify the E-Cell feed lines (1" PWA-15, 1" PWA-17, 1"PWA-19 and 1" PWA-21) were cut and capped prior to Calendar Year (CY) 1990.	
2	5/4.1		Added the word "nonhazardous" to sentence: This volume is attributed to valve leaks in the steam jet lines that inadvertently allowed nonhazardous steam condensate to slowly drain into the tanks and mix with the tank heel.	
3	5/4.1		Added line: Level indicator data logs shows a slow volume increase in the contents of tanks. In 1998 the steam valves for the feeds to the steam jets were tighten and the main valve replaced. Data logs of the level indicators show no increase in volumes since that time. The steam line for the steam jets in these tanks were further isolated in September 2001with a blind flange.	
4	6/4.1.2.3		Revised this section and removed reference "(INEEL 1999)".	

DOCUMENT MANAGEMENT CONTROL SYSTEM (DMCS)
REVIEW COMMENTS AND RESOLUTIONS

Tracking No.: _____ (Optional)

Document ID: EDF-2614		Document Title: VCO Tank System INTEC-080 -- INTEC Tank Farm Auxiliary High-Level Waste Tank System Characterization	Revision ID: 0	DAR No.:
Item No.	Page No./ Section/Zone	Review Comment	Comment Resolution	
5	9/8		Removed Reference: INEEL, 1999, A Regulatory Analysis and Reassessment of U.S. Environmental Protection Agency Listed Hazardous Waste Numbers for Applicability to the INTEC Liquid Waste System, INEEL/EXT□98□01213, Revision 1, February 1999.	
6	9/9		Added section 9 for reference drawings.	
7	6/4.1.1		Deleted the word "demineralized" from sentence: The four tanks were emptied by June 1974. By January 1975, all four tanks had also been flushed with demineralized water.	
8	8/4.2		Replaced the word "used" with "designed" in the sentence: The heat exchangers were used to cool vessel off-gas (VOG) and to condense entrained liquids in the VOG.	