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RCRA PART B PERMIT APPLICATION

FOR THE

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

Volume 14
INTEC Liquid Waste Management System

Introduction

October 2003

INTRODUCTION

This Hazardous Waste Management Act (HWMA)/Resource Conservation and Recovery Act (RCRA) Part B permit application addresses storage and treatment activities conducted in the Idaho Nuclear Technology and Engineering Center (INTEC) Liquid Waste Management System (ILWMS). The ILWMS consists of the Process Equipment Waste Evaporator (PEWE) system, the Liquid Effluent Treatment and Disposal (LET&D) facility, and the Evaporator Tank System (ETS). The system includes tanks and ancillary equipment in Building Numbers CPP-604, CPP-641, CPP-649, CPP-659/Annex, CPP-601, CPP-1618, CPP-1619 and associated valve boxes located at the INTEC.

There are three process codes associated with the regulated hazardous waste management units in the ILWMS. The process codes are S02, tank storage; T01, tank treatment; and X99, other miscellaneous treatment.

The purpose of the ETS facility is to concentrate liquid waste. This is accomplished in a manner similar to a distillery. The low boiling point materials in the waste are boiled and then condensed. This separates the waste into lower boiling point materials (condensates) and higher boiling point materials (bottoms). The condensates are transferred to the Process Equipment Waste Evaporator (PEWE) system and the bottoms are transferred back to the Tank Farm Facility (TFF). For all intents and purposes, all of the material entering the system is separated into either the condensate tank or the bottoms tank. The PEWE system further processes the ETS condensates. The ETS is not included in this permit application. The ETS will be addressed in a modification to the final partial permit when issued.

The PEWE system reduces the volume of hazardous wastes sent to the TFF. The PEWE system evaporates the wastes, producing concentrated wastes (bottoms) and vapor condensates (overheads). The overheads are transferred to the LET&D facility for further processing to recover nitric acid. Bottoms generated from the PEWE go to VES-WL-101 or VES-WL-111 or are recycled back to VES-WL-133 for further processing.

The LET&D treatment process reduces the volume of liquid waste by separating the PEWE overhead condensates into saturated steam/offgas and acid fractions. The LET&D facility recovers concentrated nitric acid that is the same molarity and purity as that normally purchased. This nitric acid is then used elsewhere on-Site for treatment and decontamination activities in lieu of purchasing commercial grade nitric acid; effectively minimizing the quantity of waste generated from INEEL activities.

For more information regarding the PEWE system and the LET&D facility, see section D of this permit application.

Permit Application Format

This permit application has been prepared in accordance with the format recommended by the United States Environmental Protection Agency (U.S. EPA). The format consists of the following sections:

A. Part A Permit Application

B. Facility Description

C. Waste Characteristics

D. Process Information

E. Groundwater Monitoring

F. Procedures to Prevent Hazards

G. Preparedness, Prevention, and Contingency Plan

H. Personnel Training

I. Closure and Post-Closure Requirements

J. Corrective Action for Solid Waste Management Units

K. Other Federal Laws

L. Part B Certification

M. Public Meeting.

Sections A, B, J, and K are contained in Volumes 1 through 3 of the INEEL RCRA Part B Permit Application, which have been submitted to the Idaho Department of Environmental Quality (DEQ). These sections are common to all INEEL Part B permit applications. A revised Part A permit application is submitted in this Volume 14 application. A Section B is also included in this application to provide basic information on the buildings within which mixed waste will be managed.

Throughout this permit application, references are made to names of organizations at the INTEC. These names are subject to change. Proper notification of any such changes will be provided to the DEQ.

Numerous exhibits are included in this permit application as graphic illustrations. These exhibits are presented for information purposes only and are not to be construed as exact representations. Exhibit B-3, Topographic map of the INTEC, Exhibit B-4, Plant drainage system at the INTEC, and Exhibit B-5, Plant sanitary waste system at the INTEC, are the only exhibits that are drawn to scale.

Organization of Permit Application

This Part B permit application is Volume 14 of the revised INEEL RCRA Part B Permit Application. This volume consists of four books, organized as follows:

Book 1

- Notice of Deficiency Response and Attachments

Book 2

- Introduction
- Checklist
- Part A Permit Application
- Sections B and C (and their appendices)

Book 3

- Sections D and E (and their appendices)

Book 4

- Sections F, G, H, I, J, K, L, and M (and their appendices)

INEEL and INTEC Description

The INEEL is owned by the United States Department of Energy and is operated by a management and operations (M&O) contractor. The INTEC is located about 42 air miles west of Idaho Falls and about 20 air miles east of Arco within the southwest quadrant of the 894 mi^2 area of the INEEL.

The missions of the INTEC are to store spent nuclear fuel and manage the wastes generated by the storage, recovery, and allied processes.

Any RCRA corrective action required at INTEC will be addressed under the Federal Facilities Agreement and Consent Order (FFA/CO) or Module V of the previously issued RSSF/RSWF/HFEF/703 Partial Permit. As indicated in Volume 3 of the INEEL RCRA Part B Permit Application, these activities will be performed through the INEEL Environmental Restoration Program and are not otherwise addressed in this permit application. As stated in the FFA/CO, Section 7.8, the FFA/CO, " . . . will be referenced and incorporated as corrective action in any permit issued to U.S. DOE for ongoing hazardous waste management activities at the INEEL."

Changes to INEEL RCRA Part A Permit Application

The changes to the Part A permit application incorporated in this INEEL RCRA Part B Permit Application, Volume 14, include updated HWN lists, increased volumes and annual throughputs, additional tanks, and updated process codes.

Revision 6, 1/88

Facility Name Volume 14

ID No.

Date Part B Received

Date Review Due

COMPLETENESS/TECHNICAL EVALUATION CHECKLIST

	Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
A. PART A APPLICATION					INEEL RCRA Permit Application, Vol. 14
B. FACILITY DESCRIPTION					
B-1 General description					INEEL RCRA Permit Application, Vol. 3, Section B-1 and Vol. 14, Section B-1
B-2 Topographic map					INEEL RCRA Permit Application, Vol. 3, Section B-2 and Vol. 14, Section B-1
B-2a General requirements					INEEL RCRA Permit Application, Vol. 3, Section B-2
B-2b Additional requirements for land disposal facilities					Not Applicable
B-3a Seismic standard					INEEL RCRA Permit Application, Vol. 3, Section B-3
B-3b Floodplain standard					INEEL RCRA Permit Application, Vol. 3, Section B-3
B-3b(1) Demonstration of compliance					INEEL RCRA Permit Application, Vol. 3, Section B-3 and Vol. 14, Section F-4b
B-3b(1)(a) Flood proofing and flood protection measures; <u>or</u>					INEEL RCRA Permit Application, Vol. 3, Section B-3 and Vol. 14, Section F-4b
B-3b(1)(b) Floodplain					INEEL RCRA Permit Application, Vol. 3, Section B-3
B-3b(2) Plan for future compliance with floodplain standard					Not Applicable
B-3b(3) Waiver for land storage and disposal facilities					Not Applicable
B-4 Traffic information					INEEL RCRA Permit Application, Vol. 3, Section B-4

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
C. WASTE CHARACTERISTICS						
C-1	Chemical and physical analyses, including sampling/analysis methods					Vol. 14, Sections C-1 and C-2a
C-1a	Containerized wastes					Not Applicable
C-1b	Waste in tank systems					Vol. 14, Section C-1b
C-1c	Waste in piles					Not Applicable
C-1d	Land-filled wastes					Not Applicable
C-1e	Waste incinerated and wastes used in performance tests					Not Applicable
C-1f	Wastes to be land treated					Not Applicable
C-1g	Wastes in miscellaneous units					Vol. 14, Section C-1g
C-2	Waste analysis plan					Vol. 14, Section C-2
C-2a	Parameters and rationale					Vol. 14, Section C-2a
C-2b	Test methods					Vol. 14, Section C-2b
C-2c	Sampling methods					Vol. 14, Section C-2c
C-2d	Frequency of analyses					Vol. 14, Section C-2d
C-2e	Additional requirements for wastes generated off-site					Not Applicable
C-2f	Additional requirements for ignitable, reactive, or incompatible wastes					Vol. 14, Section C-2f
C-3	Waste analysis requirements pertaining to land disposal restrictions					Vol. 14, Section C-3
C-3a	Waste characterization					Vol. 14, Section C-3a
C-3b	Sampling and analytical procedures					Vol. 14, Section C-3b
C-3c	Frequency of analysis					Vol. 14, Section C-3c

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
C-3d	Additional requirements for treatment facilities					Vol. 14, Section C-3d
C-3d(1)	Off-site facilities					Not Applicable
C-3d(2)	Analysis of treatment residues					Vol. 14, Section C-3d(2)
C-3d(3)	Sampling and analytical procedures					Vol. 14, Section C-3d(3)
C-3d(4)	Frequency of analysis					Vol. 14, Section C-3d(4)
C-3e	Additional requirements for disposal facilities					Not Applicable
C-3e(1)	Off-site facilities					Not Applicable
C-3e(2)	Analysis of waste or waste treatment residues					Not Applicable
C-3e(3)	Sampling and analytical procedures					Not Applicable
C-3e(4)	Frequency of analysis					Not Applicable
C-3f	Additional requirements for surface impoundments Exempted from Land Disposal Restrictions					Not Applicable
C-3f(1)	Sampling and Analysis of Impoundments Contents					Not Applicable
C-3f(2)	Annual Removal of Residues					Not Applicable
C-3g	Requirements for Land Disposal Facilities with an Approved Exemption or Extension					Not Applicable
C-4	Subpart AA, Subpart BB, and Subpart CC Applicability					Vol. 14, Section C-4

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D. PROCESS INFORMATION						
D-1	Containers					Not Applicable
D-1a	Containers with free liquids					Not Applicable
D-1a(1)	Description of containers					Not Applicable
D-1a(2)	Container management practices					Not Applicable
D-1a(3)	Secondary containment system design and operation					Not Applicable
D-1a(3)(a)	Requirement for the base of liner to contain liquids					Not Applicable
D-1a(3)(b)	Containment system drainage					Not Applicable
D-1a(3)(c)	Containment system capacity					Not Applicable
D-1a(3)(d)	Control of run-on					Not Applicable
D-1a(3)(e)	Removal of liquids from containment systems					Not Applicable
D-1b	Containers without free liquid					Not Applicable
D-1b(1)	Test for free liquids					Not Applicable
D-1b(2)	Description of containers					Not Applicable
D-1b(3)	Container management practices					Not Applicable
D-1b(4)	Container storage area drainage					Not Applicable
D-2	Tanks systems					Vol. 14, Sections D-1 and D-2
D-2a	Existing tank systems					Vol. 14, Section D-2a
D-2a(1)	Assessment of existing tank system integrity					Not Applicable
D-2a(2)	External corrosion practices					Vol. 14, Section D-2a(2)
D-2b	New tank systems					Vol. 14, Section D-2b
D-2b(1)	Assessment of new tank system integrity					Vol. 14, Section D-2b(1)
D-2b(2)	External corrosion protection					Vol. 14, Section D-2b(2)
D-2b(3)	Description of tank system installation and testing plans and procedures					Vol. 14, Section D-2b(3)
D-2c	Dimensions and capacity of each tank					Vol. 14, Section D-2c
D-2d	Description of feed systems, safety cutoff, bypass systems, and pressure control					Vol. 14, Section D-2d

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-2e	Diagram of piping, instrumentation, and process flow for each tank system					Vol. 14, Section D-2e
D-2f	Containment and detection of releases					Vol. 14, Section D-2f
D-2f(1)	Plans and description of the design, construction, and operation of the secondary containment system for each tank system					Vol. 14, Section D-2f(1)
D-2f(1)(a)	Tank age determination					Vol. 14, Section D-2f(1)(a)
D-2f(1)(b)	Requirements for secondary containment and leak detection					Vol. 14, Section D-2f(1)(b)
D-2f(1)(c)	Requirements for an external liner, vault, double-walled tank or equivalent device					Vol. 14, Section D-2f(1)(b)
D-2f(1)(d)	Secondary containment and leak detection requirements for ancillary equipment					Vol. 14, Section D-2f(1)(b)
D-2f(2)	Requirements for tank systems until secondary containment is implemented					Not Applicable
D-2f(3)	Variance from secondary containment requirements					Not Applicable
D-2f(3)(a)	Variance based on a demonstration of equivalent protection of groundwater and surface water					Not Applicable
D-2f(3)(b)	Variance based on a demonstration of no substantial present or potential hazard					Not Applicable
D-2f(3)(c)	Exemption based on no free liquids and location inside a building					Not Applicable
D-2g	Controls and practices to prevent spills and overflow					Vol. 14, Section D-2g
D-3	Waste piles					Not Applicable
D-3a	List of wastes					Not Applicable
D-3b	Liner exemption					Not Applicable
D-3b(1)	Enclosed dry piles					Not Applicable
D-3b(1)(a)	Protection from precipitation					Not Applicable
D-3b(1)(b)	Free liquids					Not Applicable
D-3b(1)(c)	Run-on protection					Not Applicable
D-3b(1)(d)	Wind dispersal control					Not Applicable
D-3b(1)(e)	Leachate generation					Not Applicable
D-3b(2)	Alternate design/No migration					Not Applicable
D-3c	Liner engineering report					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-3c(1)	Liner description					Not Applicable
D-3c(2)	Liner location relative to high water table					Not Applicable
D-3c(3)	Calculation of necessary soil liner thickness					Not Applicable
D-3c(4)	Liner strength requirements					Not Applicable
D-3c(5)	Liner strength demonstration					Not Applicable
D-3c(6)	Liner/waste compatibility testing results					Not Applicable
D-3c(7)	Liner installation					Not Applicable
D-3c(7)(a)	Synthetic liner seaming					Not Applicable
D-3c(7)(b)	Soil liner compaction					Not Applicable
D-3c(7)(c)	Installation inspection/testing programs					Not Applicable
D-3c(8)	Liner coverage					Not Applicable
D-3c(9)	Liner exposure prevention					Not Applicable
D-3c(10)	Synthetic-liner bedding					Not Applicable
D-3d	Liner foundation report					Not Applicable
D-3d(1)	Liner foundation design description					Not Applicable
D-3d(2)	Subsurface exploration data					Not Applicable
D-3d(3)	Laboratory testing data					Not Applicable
D-3d(4)	Engineering analyses					Not Applicable
D-3d(4)(a)	Settlement potential					Not Applicable
D-3d(4)(b)	Bearing capacity and stability					Not Applicable
D-3d(4)(c)	Potential for bottom heave or blowout					Not Applicable
D-3d(4)(d)	Construction and operational loading					Not Applicable
D-3d(5)	Foundation installation procedures					Not Applicable
D-3d(6)	Foundation installation inspection program					Not Applicable
D-3e	Leachate collection and removal system					Not Applicable
D-3e(1)	System design and operation					Not Applicable
D-3e(2)	Chemical resistance					Not Applicable
D-3e(3)	Strength of materials					Not Applicable
D-3e(4)	Prevention of clogging					Not Applicable
D-3e(5)	Installation					Not Applicable
D-3e(6)	Maintenance					Not Applicable
D-3f	Run-on control system					Not Applicable
D-3f(1)	Calculation of peak flow					Not Applicable
D-3f(2)	Design and performance					Not Applicable
D-3f(3)	Construction					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-3f(4)	Maintenance					Not Applicable
D-3g	Run-off control system					Not Applicable
D-3g(1)	Calculation of peak flow					Not Applicable
D-3g(2)	Design and performance					Not Applicable
D-3g(3)	Construction					Not Applicable
D-3g(4)	Maintenance					Not Applicable
D-3h	Management of collection and holding units					Not Applicable
D-3i	Control of wind dispersal					Not Applicable
D-3j	Groundwater monitoring exemption					Not Applicable
D-3j(1)	Engineered structure					Not Applicable
D-3j(2)	No liquid waste					Not Applicable
D-3j(3)	Exclusion of liquids					Not Applicable
D-3j(4)	Containment system					Not Applicable
D-3j(5)	Leak detection system					Not Applicable
D-3j(6)	Operation of leak detection system					Not Applicable
D-3j(7)	No migration					Not Applicable
D-3k	Treatment within the pile					Not Applicable
D-3i	Control of wind dispersal					Not Applicable
D-3j	Groundwater monitoring exemption					Not Applicable
D-3j(1)	Engineered structure					Not Applicable
D-3j(2)	No liquid waste					Not Applicable
D-3j(3)	Exclusion of liquids					Not Applicable
D-3j(4)	Containment system					Not Applicable
D-3j(5)	Leak detection system					Not Applicable
D-3j(6)	Operation of leak detection system					Not Applicable
D-3j(7)	No migration					Not Applicable
D-3k	Treatment within the pile					Not Applicable
D-3k(1)	Treatment process description					Not Applicable
D-3k(2)	Equipment used					Not Applicable
D-3k(3)	Residuals description					Not Applicable
D-3l	Special management plan for piles containing wastes F020, F021, F022, F023, F026, and F027					Not Applicable
D-3l(1)	Waste description					Not Applicable
D-3l(2)	Soil description					Not Applicable
D-3l(3)	Mobilizing properties					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-3l(4)	Additional management techniques					Not Applicable
D-4	Surface impoundments					Not Applicable
D-4a	List of wastes					Not Applicable
D-4b	Liner system exemption requests					Not Applicable
D-4b(1)	Exemption based on existing portion					Not Applicable
D-4b(2)	Exemption based on alternative design and location					Not Applicable
D-4c	Liner system, general items					Not Applicable
D-4c(1)	Liner system description					Not Applicable
D-4c(2)	Liner system location relative to high water table					Not Applicable
D-4c(3)	Loads on liner system					Not Applicable
D-4c(4)	Liner system coverage					Not Applicable
D-4c(5)	Liner system exposure prevention					Not Applicable
D-4d	Liner system foundation					Not Applicable
D-4d(1)	Foundation description					Not Applicable
D-4d(2)	Subsurface exploration data					Not Applicable
D-4d(3)	Laboratory testing data					Not Applicable
D-4d(4)	Engineering analyses					Not Applicable
D-4d(4)(a)	Settlement potential					Not Applicable
D-4d(4)(b)	Bearing capacity					Not Applicable
D-4d(4)(c)	Potential for excess hydrostatic or gas pressure					Not Applicable
D-4e	Liner systems, liners					Not Applicable
D-4e(1)	Synthetic liners					Not Applicable
D-4e(1)(a)	synthetic liner compatibility data					Not Applicable
D-4e(1)(b)	Synthetic liner strength					Not Applicable
D-4e(1)(c)	Synthetic liner bedding					Not Applicable
D-4e(2)	Soil liners					Not Applicable
D-4e(2)(a)	Material testing data					Not Applicable
D-4e(2)(b)	Soil liner compatibility data					Not Applicable
D-4e(2)(c)	Soil liner thickness					Not Applicable
D-4e(2)(d)	Soil liner strength					Not Applicable
D-4f	Liner system, leachate detection					Not Applicable
D-4f(1)	System operation and design					Not Applicable
D-4f(2)	Equivalent capacity					Not Applicable
D-4f(3)	Grading and drainage					Not Applicable
D-4f(4)	System compatibility					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-4f(5)	System strength					Not Applicable
D-4f(5)(a)	Stability of drainage layers					Not Applicable
D-4f(5)(b)	Strength of piping					Not Applicable
D-4f(6)	Prevention of clogging					Not Applicable
D-4g	Liner system, construction and maintenance					Not Applicable
D-4g(1)	Material specifications					Not Applicable
D-4g(1)(a)	Synthetic liners					Not Applicable
D-4g(1)(b)	Soil liners					Not Applicable
D-4g(1)(c)	Leachate detection system					Not Applicable
D-4g(2)	Construction specifications					Not Applicable
D-4g(2)(a)	Liner system foundation					Not Applicable
D-4g(2)(b)	Soil liner					Not Applicable
D-4g(2)(c)	Synthetic liners					Not Applicable
D-4g(2)(d)	Leachate detection system					Not Applicable
D-4g(3)	Construction quality control program					Not Applicable
D-4g(4)	Maintenance procedures for leachate detection system					Not Applicable
D-4g(5)	Liner repairs during operations					Not Applicable
D-4h	Prevention of overtopping					Not Applicable
D-4h(1)	Design features					Not Applicable
D-4h(2)	Operating procedure					Not Applicable
D-4h(3)	Overtopping prevention					Not Applicable
D-4h(4)	Freeboard requirements					Not Applicable
D-4h(5)	Outflow destination					Not Applicable
D-4i	Dike stability					Not Applicable
D-4i(1)	Engineer's certification					Not Applicable
D-4i(2)	Dike design description					Not Applicable
D-4i(3)	Erosion and piping protection					Not Applicable
D-4i(4)	Subsurface soil conditions					Not Applicable
D-4i(5)	Stability analysis					Not Applicable
D-4i(6)	Strength and consolidation test results					Not Applicable
D-4i(7)	Dike construction procedures					Not Applicable
D-4i(8)	Dike construction inspection program					Not Applicable
D-4j	Special waste management plan for surface impoundment containing wastes F020, F021, F022, F023, F026, and F027					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-4j(1)	Waste description					Not Applicable
D-4j(2)	Soil description					Not Applicable
D-4j(3)	Mobilizing properties					Not Applicable
D-4j(4)	Additional management					Not Applicable
D-5	Incinerators					Not Applicable
D-5(a)	Justification for exemption					Not Applicable
D-5b	Trial burn					Not Applicable
D-5b(1)	New incinerator start-up/shakedown conditions (reserved					Not Applicable
D-5b(2)	Trial burn plan					Not Applicable
D-5b(2)(a)	Engineering description of incinerator					Not Applicable
D-5b(2)(b)	Sampling, analysis and monitoring procedures including QA/QC plan					Not Applicable
D-5b(2)(c)	Trial burn schedule					Not Applicable
D-5b(2)(d)	Test protocols					Not Applicable
D-5b(2)(e)	Pollution control equipment operation					Not Applicable
D-5b(2)(f)	Shutdown procedures					Not Applicable
D-5b(2)(g)	New incinerator post-trial burn operation (reserved)					Not Applicable
D-5c	Data in lieu of trial burn					Not Applicable
D-5c(1)	Engineering description of incinerator					Not Applicable
D-5c(2)	Expected incinerator operation					Not Applicable
D-5c(3)	Design and operating condition comparisons					Not Applicable
D-5c(4)	Results of previous trial burns					Not Applicable
D-5c(4)(a)	Sampling and analysis techniques					Not Applicable
D-5c(4)(b)	Methods and results					Not Applicable
D-5d	Determinations					Not Applicable
D-6	Landfills					Not Applicable
D-6a	List of wastes					Not Applicable
D-6b	Liner system exemption requests					Not Applicable
D-6b(1)	Exemption based on existing portion					Not Applicable
D-6b(2)	Exemption based on alternative design and location					Not Applicable
D-6b(3)	Exemption for monofills					Not Applicable
D-6b(4)	Groundwater monitoring exemption					Not Applicable
D-6b(4)(a)	Engineered structure					Not Applicable
D-6b(4)(b)	No liquid waste					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-6b(4)(c)	Exclusion of liquids					Not Applicable
D-6b(4)(d)	Containment system					Not Applicable
D-6b(4)(e)	Leak detection system					Not Applicable
D-6b(4)(f)	Operation of leak detection system					Not Applicable
D-6b(4)(g)	No migration					Not Applicable
D-6c	Liner system, general items					Not Applicable
D-6c(1)	Liner system description					Not Applicable
D-6c(2)	Liner system location relative to high water table					Not Applicable
D-6c(3)	Loads on liner system					Not Applicable
D-6c(4)	Liner system coverage					Not Applicable
D-6c(5)	Liner system exposure prevention					Not Applicable
D-6d	Liner system, foundation					Not Applicable
D-6d(1)	Foundation description					Not Applicable
D-6d(2)	Subsurface exploration data					Not Applicable
D-6d(3)	Laboratory testing data					Not Applicable
D-6d(4)	Engineering analysis					Not Applicable
D-6d(4)(a)	Settlement potential					Not Applicable
D-6d(4)(b)	Bearing capacity					Not Applicable
D-6d(4)(c)	Stability of landfill slope					Not Applicable
D-6d(4)(d)	Potential for excess hydrostatic or gas pressure					Not Applicable
D-6e	Liner system, liners					Not Applicable
D-6(1)	Synthetic liners					Not Applicable
D-6e(1)(a)	Synthetic liner compatibility data					Not Applicable
D-6e(1)(b)	Synthetic liner strength					Not Applicable
D-6e(1)(c)	Synthetic liner bedding					Not Applicable
D-6e(2)	Soil liners					Not Applicable
D-6e(2)(a)	Material testing data					Not Applicable
D-6e(2)(b)	Soil liner compatibility data					Not Applicable
D-6e(2)(c)	Soil liner thickness					Not Applicable
D-6e(2)(d)	Soil liner strength					Not Applicable
D-6f	Liner system, leachate collection/detection systems					Not Applicable
D-6f(1)	System operation and design					Not Applicable
D-6f(2)	Equivalent capacity					Not Applicable
D-6f(3)	Grading and drainage					Not Applicable
D-6f(4)	Maximum leachate head					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-6f(5)	System compatibility					Not Applicable
D-6f(6)	System strength					Not Applicable
D-6f(6)(a)	Stability of drainage layers					Not Applicable
D-6f(6)(b)	Strength of piping					Not Applicable
D-6f(7)	Prevention of clogging					Not Applicable
D-6g	Liner system, construction and maintenance					Not Applicable
D-6g(1)	Material specifications					Not Applicable
D-6g(1)(a)	Synthetic liners					Not Applicable
D-6g(1)(b)	Soil liners					Not Applicable
D-6g(1)(c)	Leachate collection/detection systems					Not Applicable
D-6g(2)	Construction specifications					Not Applicable
D-6g(2)(a)	Liner system foundation					Not Applicable
D-6g(2)(b)	Soil liner					Not Applicable
D-6g(2)(c)	Synthetic liners					Not Applicable
D-6g(2)(d)	Leachate collection/detection systems					Not Applicable
D-6g(3)	Construction quality control program					Not Applicable
D-6g(4)	Maintenance procedures for leachate collection/detection system					Not Applicable
D-6g(5)	Liner repairs during operations					Not Applicable
D-6h	Run-on and run-off control systems					Not Applicable
D-6h(1)	Run-on control system					Not Applicable
D-6h(1)(a)	Design and performance					Not Applicable
D-6h(1)(b)	Calculation of peak flow					Not Applicable
D-6h(2)	Runoff control system					Not Applicable
D-6h(2)(a)	Design and performance					Not Applicable
D-6h(2)(b)	Calculation of peak flow					Not Applicable
D-6h(3)	Management of collection and holding units					Not Applicable
D-6h(4)	Construction					Not Applicable
D-6h(5)	Maintenance					Not Applicable
D-6i	Control of wind dispersal					Not Applicable
D-6j	Liquids in landfills					Not Applicable
D-6j(1)	Bulk or non-containerized free liquids					Not Applicable
D-6j(2)	Containers holding free liquids					Not Applicable
D-6j(3)	Restriction to small containers					Not Applicable
D-6j(4)	Non-storage containers					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-6j(5)	Labpacks					Not Applicable
D-6j(5)(a)	Inside containers					Not Applicable
D-6j(5)(b)	Overpack					Not Applicable
D-6j(5)(c)	Absorbent material					Not Applicable
D-6j(5)(d)	Incompatible wastes					Not Applicable
D-6j(5)(e)	Reactive wastes					Not Applicable
D-6k	Containerized wastes					Not Applicable
D-6l	Special waste management plan for landfills containing wastes F020, F021, F022, F023, F026, and F027					Not Applicable
D-6l(1)	Waste description					Not Applicable
D-6l(2)	Soil description					Not Applicable
D-6l(3)	Mobilizing properties					Not Applicable
D-6l(4)	Additional management techniques					Not Applicable
D-7	Land treatment					Not Applicable
D-7a	Treatment demonstration					Not Applicable
D-7a(1)	Demonstration wastes					Not Applicable
D-7a(2)	Demonstration data sources					Not Applicable
D-7a(2)(a)	Existing literature					Not Applicable
D-7a(2)(b)	Operating data					Not Applicable
D-7a(3)	Laboratory/field testing programs					Not Applicable
D-7a(3)(a)	Toxicity testing					Not Applicable
D-7a(3)(b)	Field plot testing					Not Applicable
D-7a(3)(c)	Laboratory testing					Not Applicable
D-7b	Land treatment program					Not Applicable
D-7b(1)	List of wastes					Not Applicable
D-7b(2)	Operating procedures					Not Applicable
D-7b(2)(a)	Waste application rates					Not Applicable
D-7b(2)(b)	Waste application methods					Not Applicable
D-7b(2)(c)	Control of soil pH					Not Applicable
D-7b(2)(d)	Enhancement of microbial or chemical reactions					Not Applicable
D-7b(2)(e)	Control of soil moisture					Not Applicable
D-7c	Unsaturated zone monitoring plan					Not Applicable
D-7c(1)	Soil-pore liquid monitoring					Not Applicable
D-7c(1)(a)	Sampling location					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-7c(1)(b)	Sampling frequency					Not Applicable
D-7c(1)(c)	Sampling equipment					Not Applicable
D-7c(1)(d)	Sampling equipment installation					Not Applicable
D-7c(1)(e)	Sampling procedures					Not Applicable
D-7c(1)(f)	Analytical procedures					Not Applicable
D-7c(1)(g)	Chain of custody					Not Applicable
D-7c(1)(h)	Background values					Not Applicable
D-7c(1)(i)	Statistical methods					Not Applicable
D-7c(1)(j)	Justification of principle hazardous constituents					Not Applicable
D-7c(2)	Soil core monitoring					Not Applicable
D-7c(2)(a)	Sampling location					Not Applicable
D-7c(2)(b)	Sampling frequency					Not Applicable
D-7c(2)(c)	Sampling equipment					Not Applicable
D-7c(2)(d)	Sampling procedures					Not Applicable
D-7c(2)(e)	Analytical procedures					Not Applicable
D-7c(2)(f)	Chain-of-custody					Not Applicable
D-7c(2)(g)	Background values					Not Applicable
D-7c(2)(h)	Statistical methods					Not Applicable
D-7c(2)(i)	Justification of principle hazardous constituents					Not Applicable
D-7d	Treatment zone description					Not Applicable
D-7d(1)	Horizontal and vertical dimensions					Not Applicable
D-7d(2)	Soil survey					Not Applicable
D-7d(3)	Soil series descriptions					Not Applicable
D-7d(4)	Soil sampling data					Not Applicable
D-7d(5)	Seasonal high water table					Not Applicable
D-7e	Unit design, construction, operation, and maintenance					Not Applicable
D-7e(1)	Run-on control					Not Applicable
D-7e(2)	Run-off control					Not Applicable
D-7e(3)	Minimizing hazardous constituent run-off					Not Applicable
D-7e(4)	Management of accumulated run-on and run-off					Not Applicable
D-7e(5)	Control of wind dispersal					Not Applicable
D-7f	Food chain crops					Not Applicable
D-7f(1)	Food chain crop demonstration					Not Applicable
D-7f(1)(a)	Demonstration basis					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-7f(1)(b)	Test procedures					Not Applicable
D-7f(2)	Cadmium-bearing wastes					Not Applicable
D-7f(2)(a)	Crops for human consumption					Not Applicable
D-7f(2)(b)	Animal feed					Not Applicable
D-7g	Waste management plan for land treatment units containing wastes F020, F021, F022, F023, F026, and F027					Not Applicable
D-7g(1)	Waste description					Not Applicable
D-7g(2)	Soil description					Not Applicable
D-7g(3)	Mobilizing properties					Not Applicable
D-7g(4)	Additional management techniques					Not Applicable
D-7h	Incompatible wastes					Not Applicable
D-8	Miscellaneous units					Vol. 14, Section D-8
D-8a	Description of miscellaneous units					Vol. 14, Section D-8a
D-8b	Environmental performance standards for miscellaneous units					Vol. 14, Section D-8b
D-8b(1)	Miscellaneous unit wastes					Vol. 14, Section D-8b(1)
D-8b(2)	Containment system					Vol. 14, Section D-8b(2)
D-8b(3)	Site air conditions					Vol. 14, Section D-8b(3)
D-8b(4)	Prevention of air emissions					Vol. 14, Section D-8b(4)
D-8b(5)	Operating standards					Vol. 14, Section D-8b(5)
D-8b(6)	Site hydrogeologic conditions					Vol. 14, Section D-8b(6)
D-8b(7)	Site precipitation					Vol. 14, Section D-8b(7)
D-8b(8)	Groundwater usage					Vol. 14, Section D-8b(8)
D-8b(9)	Surface waters and surface soils					Vol. 14, Section D-8b(9)

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
D-8b(10)	Area land use					Vol. 14, Section D-8b(10)
D-8b(11)	Migration of waste constituents					Vol. 14, Section D-8b(11)
D-8b(12)	Evaluation of risk to human health and the environment					Vol. 14, Section D-8b(12)

		Complete Y/N	Technically Adequate Y/N	See Attached Comment	See Attached Exhibit	Location of Information
E. GROUNDWATER MONITORING						
E-1	Exemption from groundwater protection requirements					Not Applicable
E-1a	Waste piles					Not Applicable
E-1b	Landfill					Not Applicable
E-1c	No migration					Not Applicable
E-2	Interim status period groundwater monitoring data					Not Applicable
E-3	Aquifer identification					Not Applicable
E-4	Contaminant plume description					Not Applicable
E-5	Detection monitoring program					Not Applicable
E-5a	Indicator parameters, waste constituents, reaction products to be monitored					Not Applicable
E-5a(1)	Hazardous waste characterization					Not Applicable
E-5a(2)	Behavior of constituents					Not Applicable
E-5a(3)	Detectability					Not Applicable
E-5b	Groundwater monitoring program					Not Applicable
E-5b(1)	Description of wells					Not Applicable
E-5b(2)	Representative samples					Not Applicable
E-5b(3)	Locations of background groundwater monitoring wells that are not upgradient					Not Applicable
E-5c	Background values					Not Applicable
E-5c(1)	Data currently available					Not Applicable
E-5c(1)(a)	Background groundwater quality data					Not Applicable
E-5c(1)(b)	Sampling frequency					Not Applicable
E-5c(1)(c)	Sampling quantity					Not Applicable
E-5c(1)(d)	Background values					Not Applicable
E-5c(2)	Plan for establishing groundwater quality data					Not Applicable
E-5c(2)(a)	Well location					Not Applicable
E-5c(2)(b)	Sampling frequency					Not Applicable
E-5c(2)(c)	Sampling quantity					Not Applicable
E-5c(2)(d)	Background values					Not Applicable
E-5d	Sampling, analysis and statistical procedures					Not Applicable
E-5d(1)	Sample collection					Not Applicable
E-5d(2)	Sample preservation and shipment					Not Applicable
E-5d(3)	Analytical procedure					Not Applicable
E-5d(4)	Chain of custody					Not Applicable

		Complete Y/N	Technically Adequate Y/N	See Attached Comment	See Attached Exhibit	Location of Information
E-5d(5)	Additional requirements for compliance point monitoring					Not Applicable
E-5d(5)(a)	Sampling frequency					Not Applicable
E-5d(5)(b)	Compliance point groundwater quality values					Not Applicable
E-5d(6)	Annual determination					Not Applicable
E-5d(7)	Statistical determinations					Not Applicable
E-5d(7)(a)	Statistical procedure					Not Applicable
E-5d(7)(b)	Results					Not Applicable
E-6	Compliance monitoring program					Not Applicable
E-6a	Waste description					Not Applicable
E-6b	Characterization of contaminated groundwater					Not Applicable
E-6c	Hazardous constituents to be monitored					Not Applicable
E-6d	Concentration limits					Not Applicable
E-6e	Alternate concentration limits					Not Applicable
E-6e(1)	Adverse effects on groundwater quality					Not Applicable
E-6e(2)	Potential adverse effects					Not Applicable
E-6f	Groundwater monitoring system					Not Applicable
E-6f(1)	Description of wells					Not Applicable
E-6f(2)	Representative samples					Not Applicable
E-6f(3)	Locations of background groundwater monitoring wells that are not upgradient					Not Applicable
E-6f(3)(a)	Inability to determine upgradient					Not Applicable
E-6f(3)(b)	Representative samples of background groundwater quality					Not Applicable
E-6g	Background values					Not Applicable
E-6g(1)	Data currently available					Not Applicable
E-6g(1)(a)	Background groundwater quality data					Not Applicable
E-6g(1)(b)	Sampling frequency					Not Applicable
E-6g(1)(c)	Sampling quantity					Not Applicable
E-6g(1)(d)	Background values					Not Applicable
E-6g(2)	Plan for establishing ground-water quality data					Not Applicable
E-6g(2)(a)	Background data					Not Applicable
E-6g(2)(b)	Well location					Not Applicable
E-6g(2)(c)	Sampling frequency					Not Applicable
E-6g(2)(d)	Sampling quantity					Not Applicable
E-6g(2)(e)	Background values					Not Applicable

		Complete Y/N	Technically Adequate Y/N	See Attached Comment	See Attached Exhibit	Location of Information
E-6h	Sampling, analysis and statistical procedures					Not Applicable
E-6h(1)	Sample collection					Not Applicable
E-6h(2)	Sample preservation and shipment					Not Applicable
E-6h(3)	Analytical procedure					Not Applicable
E-6h(4)	Chain of custody					Not Applicable
E-6h(5)	Additional requirements for compliance point monitoring					Not Applicable
E-6h(5)(a)	Sampling frequency					Not Applicable
E-6h(5)(b)	Testing for Appendix VIII hazardous constituents					Not Applicable
E-6h(5)(c)	Compliance point groundwater quality values					Not Applicable
E-6h(6)	Annual determination					Not Applicable
E-6h(7)	Statistical determination					Not Applicable
E-6h(7)(a)	Statistical procedure					Not Applicable
E-6h(7)(b)	Results					Not Applicable
E-7	Corrective action program					Not Applicable
E-7a	Characterization of contaminated groundwater					Not Applicable
E-7b	Concentration limits					Not Applicable
E-7c	Alternate concentration limits					Not Applicable
E-7c(1)	Adverse effects on groundwater quality					Not Applicable
E-7c(2)	Potential adverse effects					Not Applicable
E-7d	Corrective action plan					Not Applicable
E-7d(1)	Location					Not Applicable
E-7d(2)	Construction detail					Not Applicable
E-7d(3)	Plans for removing wastes					Not Applicable
E-7d(4)	Treatment technologies					Not Applicable
E-7d(5)	Effectiveness of correction program					Not Applicable
E-7d(6)	Re-injection system					Not Applicable
E-7d(7)	Additional hydrogeologic data					Not Applicable
E-7d(8)	Operation and maintenance					Not Applicable
E-7d(9)	Closure and post-closure plans					Not Applicable
E-7e	Groundwater monitoring program	`				Not Applicable
E-7e(1)	Description of wells					Not Applicable
E-7e(2)	Representative samples					Not Applicable

		Complete Y/N	Technically Adequate Y/N	See Attached Comment	See Attached Exhibit	Location of Information
E-7e(3)	Locations of background groundwater monitoring wells that are not upgradient					Not Applicable
E-7f	Background values					Not Applicable
E-7f(1)	Data currently available					Not Applicable
E-7f(1)(a)	Background groundwater quality data					Not Applicable
E-7f(1)(b)	Sampling frequency					Not Applicable
E-7f(1)(c)	Sampling quantity					Not Applicable
E-7f(1)(d)	Background values					Not Applicable
E-7f(2)	Plan for establishing groundwater quality data					Not Applicable
E-7f(2)(a)	Background data					Not Applicable
E-7f(2)(b)	Well location					Not Applicable
E-7f(2)(c)	Sampling frequency					Not Applicable
E-7f(2)(d)	Sampling quantity					Not Applicable
E-7f(2)(e)	Background values					Not Applicable
E-7g	Sampling, analysis and statistical procedures					Not Applicable
E-7g(1)	Sample collection					Not Applicable
E-7g(2)	Sample preservation and shipment					Not Applicable
E-7g(3)	Analytical procedure					Not Applicable
E-7g(4)	Chain of custody					Not Applicable
E-7g(5)	Additional requirements for compliance point monitoring					Not Applicable
E-7g(5)(a)	Sampling frequency					Not Applicable
E-7g(5)(b)	Testing for Appendix VIII hazardous constituents					Not Applicable
E-7g(5)(c)	Compliance point groundwater quality values					Not Applicable
E-7g(6)	Annual determination					Not Applicable
E-7g(7)	Statistical determination					Not Applicable
E-7g(7)(a)	Statistical procedure					Not Applicable
E-7g(7)(b)	Results					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
F. PROCEDURES TO PREVENT HAZARDS						
F-1	Security					Vol. 14, Section F-1
F-1a	Security procedures and equipment					Vol. 14, Section F-1a
F-1a(1)	24-hour surveillance system					Vol. 14, Section F-1a(1)
F-1a(2)	Barrier and means to control entry					Vol. 14, Section F-1a(2)
F-1a(2)(a)	Barrier					Vol. 14, Section F-1a(2)(a)
F-1a(2)(b)	Means to control entry					Vol. 14, Section F-1a(2)(b)
F-1a(3)	Warning signs					Vol. 14, Section F-1a(3)
F-1b	Waiver					Not Applicable
F-1b(1)	Injury to intruder					Not Applicable
F-1b(2)	Violation caused by intruder					Not Applicable
F-2	Inspection schedule					Vol. 14, Section F-2
F-2a	General inspection requirements					Vol. 14, Section F-2a
F-2a(1)	Types of problems					Vol. 14, Section F-2a(1)
F-2a(2)	Frequency of inspections					Vol. 14, Section F-2a(2)
F-2b	Specific process inspection requirements					Vol. 14, Section F-2b
F-2b(1)	Container inspection					Not Applicable
F-2b(2)	Tank system inspection					Vol. 14, Section F-2b(2)
F-2b(2)(a)	Certification for tank repairs					Vol. 14, Section F-2b(2)(a)

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
F-2b(2)(b)	Tank system external corrosion and releases					Vol. 14, Section F-2b(2)(b)
F-2b(2)(c)	Tank system construction materials and surrounding area					Vol. 14, Section F-2b(2)(b)
F-2b(2)(d)	Tank system overfilling control equipment					Vol. 14, Section F-2b(2)(d)
F-2b(2)(e)	Tank system monitoring and leak detection equipment					Vol. 14, Section F-2b(2)(e)
F-2b(2)(f)	Tank system cathodic protection					Vol. 14, Section F-2b(2)(f)
F-2b(2)(g)	Tank condition assessment					Vol. 14, Section F-2b(2)(g)
F-2b(3)	Waste pile inspection					Not Applicable
F-2b(3)(a)	Run-on and run-off control system					Not Applicable
F-2b(3)(b)	Wind dispersal system					Not Applicable
F-2b(3)(c)	Leachate collection and removal system					Not Applicable
F-2b(4)	Surface impoundment inspection					Not Applicable
F-2b(4)(a)	Condition assessment					Not Applicable
F-2b(4)(a)(1)	Overtopping control system					Not Applicable
F-2b(4)(a)(2)	Impoundment contents					Not Applicable
F-2b(4)(a)(3)	Deterioration					Not Applicable
F-2b(4)(b)	Structural integrity					Not Applicable
F-2b(5)	Incinerator inspection					Not Applicable
F-2b(5)(a)	Incinerator and associated equipment					Not Applicable
F-2b(5)(b)	Incinerator waste feed cut-off system and associated alarms					Not Applicable
F-2b(6)	Landfill inspection					Not Applicable
F-2b(6)(a)	Run-on and run-off control system					Not Applicable
F-2b(6)(b)	Wind dispersal control system					Not Applicable
F-2b(6)(c)	Leachate collection and removal system					Not Applicable
F-2b(7)	Land treatment facility inspection					Not Applicable
F-2b(7)(a)	Run-on and run-off control system					Not Applicable
F-2b(7)(b)	Wind dispersal control system					Not Applicable
F-2b(8)	Miscellaneous unit inspections					Vol. 14, Sections F-2 and F-2b(2)

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
F-3	Waiver or documentation of preparedness and prevention requirements					Vol. 14, Section F-3
F-3a	Equipment requirements					Vol. 14, Section F-3a
F-3a(1)	Internal communications					Vol. 14, Section F-3a(1)
F-3a(2)	External communications					Vol. 14, Section F-3a(2)
F-3a(3)	Emergency equipment					Vol. 14, Section F-3a(3)
F-3a(4)	Water for fire control					Vol. 14, Section F-3a(4)
F-3b	Aisle space requirement					Not Applicable
F-4	Preventive procedures, structures, and equipment					Vol. 14, Section F-4
F-4a	Unloading operations					Vol. 14, Section F-4a
F-4b	Run-off					Vol. 14, Section F-4b
F-4c	Water supplies					Vol. 14, Section F-4c
F-4d	Equipment and power failure					Vol. 14, Section F-4d
F-4e	Personnel protection equipment					Vol. 14, Section F-4e
F-4f	Releases to the atmosphere					Vol. 14, Section F-4f
F-5	Prevention of reaction of ignitable, reactive, and incompatible wastes					Vol. 14, Section F-5
F-5a	Precautions to prevent ignition or reaction of ignitable or reactive wastes					Vol. 14, Sections F-5 and C-2f
F-5b	General precautions for handling ignitable or reactive waste and mixing of incompatible waste					Vol. 14, Sections F-5 and C-2f
F-5c	Management of ignitable or reactive wastes in containers					Not Applicable
F-5d	Management of incompatible wastes in containers					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
F-5e	Management of ignitable or reactive wastes in tank systems					Vol. 14, Sections F-5 and C-2f
F-5f	Management of incompatible wastes in tanks systems					Not Applicable
F-5g	Management of ignitable or reactive wastes placed in waste piles					Not Applicable
F-5h	Management of incompatible wastes placed in waste piles					Not Applicable
F-5i	Management of ignitable or reactive wastes placed in surface impoundments					Not Applicable
F-5j	Management of incompatible wastes placed in surface impoundments					Not Applicable
F-5k	Management of ignitable or reactive wastes placed in landfills					Not Applicable
F-5l	Management of incompatible wastes placed in landfills					Not Applicable
F-5m	Management of ignitable or reactive wastes placed in land treatment units					Not Applicable
F-5m	Management of ignitable or reactive wastes placed in land treatment units					Not Applicable

	Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
G. CONTINGENCY PLAN					
G-1 General information					Vol. 14, Section G-1
G-2 Emergency coordinators					Vol. 14, Section G-2
G-3 Implementation					Vol. 14, Section G-3
G-4 Emergency response procedures					Vol. 14, Section G-4
G-4a Notification					Vol. 14, Section G-4a
G-4b Identification of hazardous materials					Vol. 14, Section G-4b
G-4c Assessment					Vol. 14, Section G-4c
G-4d Control procedures					Vol. 14, Section G-4d
G-4e Prevention of recurrence or spread of fires, explosions, or releases					Vol. 14, Section G-4e
G-4f Storage and treatment of released material					Vol. 14, Section G-4f
G-4g Incompatible waste					Vol. 14, Section G-4g
G-4h Post-emergency equipment maintenance					Vol. 14, Section G-4h
G-4i Container spills and leakage					Not Applicable
G-4j Tank spills and leakage					Vol. 14, Section G-4j
G-4j(1) Tank spills and leakage					Vol. 14, Section G-4j
G-4j(2) Spills and leaks from tanks containing wastes F020, F021, F022, F023, F026, and F027					Not Applicable
G-4k Surface impoundments spills and leakage					Not Applicable
G-4k(1) Emergency repairs					Not Applicable
G-4k(1)(a) Stopping waste addition					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
G-4k(1)(b)	Containing leaks					Not Applicable
G-4k(1)(c)	Stopping leaks					Not Applicable
G-4k(1)(d)	Preventing catastrophic failure					Not Applicable
G-4k(1)(e)	Emptying the impoundment					Not Applicable
G-4k(2)	Certification					Not Applicable
G-4k(3)	Repairs as a result of sudden drop					Not Applicable
G-4k(3)(a)	Existing portions of surface impoundment					Not Applicable
G-4k(3)(b)	Other portions of surface impoundment					Not Applicable
G-5	Emergency equipment					Vol. 14, Section G-5
G-6	Coordination agreements					Vol. 14, Section G-6
G-7	Evacuation plan					Vol. 14, Section G-7
G-8	Required reports					Vol. 14, Section G-8

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
H.	PERSONNEL TRAINING					
H-1	Outline of the training program					Vol. 14, Section H-1
H-1a	Job title/job description					Vol. 14, Section H-1a
H-1b	Training content, frequency, and techniques					Vol. 14, Section H-1b
H-1c	Training director					Vol. 14, Section H-1c
H-1d	Relevance of training to job position					Vol. 14, Section H-1d
H-1e	Training for emergency response					Vol. 14, Section H-1e
H-2	Implementation of training program					Vol. 14, Section H-2
H-3	Training records					Vol. 14, Section H-3

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
I. CLOSURE AND POST-CLOSURE REQUIREMENTS						
I-1	Closure plans					Vol. 14, Section 1.1.1
I-1a	Closure performance standard					Vol. 14, Section 1.1.2
I-1b	Maximum waste inventory					Vol. 14, Section 1.1.3
I-1c	Disposal or decontamination of equipment, structures, soils					Vol. 14, Sections 1.1.2, 1.1.3, and 1.1.5
I-1c(1)	Closure of containers					Not Applicable
I-1c(2)	Closure of tank systems					Vol. 14, Sections 1.1.2, 1.1.3, and 1.2.1
I-1c(3)	Closure of waste piles					Not Applicable
I-1c(4)	Closure of surface impoundments					Not Applicable
I-1c(5)	Closure of incinerators					Not Applicable
I-1c(6)	Closure of land treatment facilities					Not Applicable
I-1c(6)(a)	Continuance of treatment					Not Applicable
I-1c(6)(b)	Vegetative cover					Not Applicable
I-1c(7)	Closure of miscellaneous units					Vol. 14, Sections 1.1.2, 1.1.3, and 1.3.1
I-1d	Closure of disposal units					Not Applicable
I-1d(1)	Disposal impoundments					Not Applicable
I-1d(1)(a)	Elimination of liquids					Not Applicable
I-1d(1)(b)	Waste stabilization					Not Applicable
I-1d(2)	Cover design					Not Applicable
I-1d(3)	Minimization of liquid migration					Not Applicable
I-1d(4)	Maintenance needs					Not Applicable
I-1d(5)	Drainage and erosion					Not Applicable
I-1d(6)	Settlement and subsidence					Not Applicable
I-1d(7)	Cover permeability					Not Applicable
I-1d(8)	Freeze/thaw effects					Not Applicable
I-1e	Ancillary closure activities					Vol. 14, Sections 1.1.2 and 1.1.3

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
I-1f	Schedule for closure					Vol. 14, Section 1.1.3
I-1g	Extensions for closure time					Vol. 14, Section 1.1.4
I-1h	Certification of closure					Vol. 14, Section 1.1.6
I-2	Post-closure plan					Vol. 14, Sections 1.1.8 and 1.1.9
I-2a	Inspection plan					Not Applicable
I-2b	Monitoring plan					Not Applicable
I-2c	Maintenance plan					Not Applicable
I-2d	Land treatment					Not Applicable
I-2e	Miscellaneous units					Not Applicable
I-2f	Post-closure security					Not Applicable
I-2g	Post-closure contact					Not Applicable
I-2h	Post-closure certification					Vol. 14, Section 1.1.11
I-3	Post-closure notices					Vol. 14, Section 1.1.10
I-4	Closure cost estimate					Not Applicable
I-5	Financial assurance mechanism for closure					Not Applicable
I-5a	Closure trust fund					Not Applicable
I-5b	Surety bond					Not Applicable
I-5b(1)	Surety bond guaranteeing payment into a closure fund					Not Applicable
I-5b(2)	Surety bond guaranteeing performance of closure					Not Applicable
I-5c	Closure letter of credit					Not Applicable
I-5d	Closure insurance					Not Applicable
I-5e	Financial test and corporate guarantee for closure					Not Applicable
I-5f	Use of multiple financial mechanisms					Not Applicable
I-5g	Use of financial mechanism for multiple facilities					Not Applicable
I-6	Post-closure cost estimate					Not Applicable
I-7	Financial assurance mechanism for post-closure care					Not Applicable
I-7a	Post-closure trust fund					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
I-7b	Surety bond					Not Applicable
I-7b(1)	Surety bond guaranteeing payment into a post-closure trust fund					Not Applicable
I-7b(2)	Surety bond guaranteeing performance of post-closure care					Not Applicable
I-7c	Post-closure letter of credit					Not Applicable
I-7d	Post-closure insurance					Not Applicable
I-7e	Financial test and corporate guarantee for post-closure care					Not Applicable
I-7f	Use of multiple financial mechanisms					Not Applicable
I-7g	Use of a financial mechanism for multiple facilities					Not Applicable
I-8	Liability requirements					Not Applicable
I-8a	Coverage for sudden accidental occurrences					Not Applicable
I-8a(1)	Endorsement or certification					Not Applicable
I-8a(2)	Financial test for liability coverage					Not Applicable
I-8a(3)	Use of multiple insurance mechanisms					Not Applicable
I-8b	Coverage for nonsudden accidental occurrences					Not Applicable
I-8b(1)	Endorsement or certification					Not Applicable
I-8b(2)	Financial test for liability coverage					Not Applicable
I-8b(3)	Use of multiple insurance mechanisms					Not Applicable
I-8c	Request for variance					Not Applicable
I-9	State mechanisms					Not Applicable
I-9a	Use of state-required mechanism					Not Applicable
I-9b	State assumption of responsibility					Not Applicable

		Complete (Y/N)	Technically Adequate (Y/N)	See Attached Comment	See Attached Exhibit	Location of Information
J. CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS						
J-1	Solid waste management units					INEEL RCRA Permit Application, Vol. 3, Section J
J-1a	Characterize the solid waste management unit					INEEL RCRA Permit Application, Vol. 3, Section J
J-1b	No solid waste management units					INEEL RCRA Permit Application, Vol. 3, Section J
J-2	Releases					INEEL RCRA Permit Application, Vol. 3, Section J
J-2a	Characterize releases					INEEL RCRA Permit Application, Vol. 3, Section J
J-2b	No releases					INEEL RCRA Permit Application, Vol. 3, Section J
K.	OTHER FEDERAL LAWS					INEEL RCRA Permit Application, Vol. 3, Section K
L.	PART B CERTIFICATION					Vol. 14, Section L

OMB #: 2050-0034 Expires 10/31/02

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT INFORMATION FORM

1. Facility Permit Contact (See instructions on page 35)	**First Name:** DONALD	**MI:** N	**Last Name:** RASCH
	Phone Number: (208) 526-1511		**Phone Number Extension:** Not Applicable
2. Facility Permit Contact Mailing Address (See instructions on page 35)	**Street or P.O. Box:** 1955 NORTH FREEMONT DRIVE		
	City, Town, or Village: IDAHO FALLS		
	State: ID		
	Country: USA		**Zip Code:** 83415
3. Legal Owner Mailing Address and Telephone Number (See instructions on page 36)	**Street or P.O. Box:** 1955 NORTH FREEMONT DRIVE		
	City, Town, or Village: IDAHO FALLS		
	State: ID		
	Country: USA	**Zip Code:** 83451	**Phone Number:** (208) 526-5665
4. Operator Mailing Address and Telephone Number (See instructions on page 36)	**Street or P.O. Box:** P.O. BOX 1625		
	City, Town, or Village: IDAHO FALLS		
	State: ID		
	Country: USA	**Zip Code:** 83415	**Phone Number:** (208) 526-1014
5. Facility Existence Date (See instructions on page 36)	**Facility Existence Date (mm/dd/yyyy):** 06/01/1949		

6. Other Environmental Permits (See instructions on page 36)

A. Permit Type *(Enter code)*	B. Permit Number												C. Description
R	I	D	4	8	9	0	0	0	8	9	5	2	Final HWMA Storage Permit for the RWMC on the INEEL
R	I	D	4	8	9	0	0	0	8	9	5	2	Final HWMA/RCRA Storage & Treatment Permit for the WERF/WROC on the INEEL
R	I	D	4	8	9	0	0	0	8	9	5	2	Final HWMA Storage & Treatment Permit for the INTEC on the INEEL
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part B Permit Application for the INEEL
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part B Post Closure Permit Application for the INEEL - Waste Calcining Facility
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part A Permit Application for the INEEL - Bechtel BWXT Idaho, LLC.
P, E, N, F, U													See Item 6 Supplement - pages 1a through 1e

7. Nature of Business (Provide a brief description; see instructions on page 37)

The Idaho National Engineering and Environmental Laboratory was established in 1949, as a center where nuclear power reactors and support facilities could be built, tested, and operated. The INEEL site covers approximately 890 square miles and is 25 miles west of Idaho Falls, ID. For many years the INEEL was the site of the largest nuclear power research & development effort in the world. During the 1970's the INEEL's mission broadened to include such areas as biotechnology, energy and materials research, and conservation and renewable energy. At the end of the Cold War, waste treatment and cleanup of previously contaminated sites became a priority. Today the INEEL is a science-based, applied engineering national laboratory dedicated to completing its waste cleanup mission and meeting the nations environmental, energy, nuclear science and technology, and national security needs. Additionally, in 2002, it was announced that the INEEL will serve as the nation's leading nuclear technology center.

Additional Information
Supplement to Item 6.
'Other Environmental Permits'

AIR PERMITS

(Permit Type P)

Idaho National Engineering and Environmental Laboratory (INEEL)

- **Title V Operating Permit Application** (Permit Pending)

Central Facilities Area (CFA)

Permit to Construct (PTC) (Permit Number PTC-023-00001)

- Boiler for Space Heating at CFA 609 HQ/SRT Building
- CFA boilers permitted under the INTEC Site-wide NOx permit:
  - CFA-650-007, CFA-662-011, CFA-662-027, CFA-668-002, CFA-671-007, CFA-671-008, CFA-688-043, CFA-688-044

Idaho Nuclear Technology and Engineering Center (INTEC)

PTC (Permit Number PTC-023-00001)

- Idaho Nuclear Technology and Engineering Center, Nitrogen Oxide Sources
- Idaho Chemical Processing Plant Pilot Plants, CPP-637
- Fuel Storage Area-Rack Reconfiguration Project, CPP-737
- CPP-1619 Liquid Waste Storage Facility
- New Waste Calcining Facility/Decontamination Area, CPP-659
- CPP-606 Distillate Oil-Fired Boilers and INTEC Distillate Oil-fired Portable Boilers
- CPP TMI Fuel Storage (Storage is regulated under the NRC - not the state)

Test Area North (TAN)

PTC (Permit Number PTC-023-00001)

- SMC Consolidated Activities
- TAN-603 Boilers #4 and #5

Additional Information
Supplement to Item 6.
'Other Environmental Permits'

AIR PERMITS (continued)

Test Reactor Area (TRA)

PTC (Permit Number PTC-023-00001)

- TRA-715 Evaporation Pond

PTC (Application submitted to DEQ January 2001)

- TRA-674-M-6 Generator (permit has not been issued yet)

Waste Reduction Operations Complex/Power Burst Facility (WROC/PBF)

- WROC/PBF boiler permitted under the INTEC Site-wide NOx permit
  - PER-620-023

National Emission Standards for Hazardous Air Pollutants (NESHAPS) 40 CFR 61 Subpart H

(Permit Type E)

- SMC Project
- CFA Lab Complex #3, CFA-625
- Liquid Effluent Treatment and Disposal (LET&D), CPP-1618
- Bin Set #7
- NWCF Filter Leach Facility, CPP-659
- Decontamination Support Facility, TAN
- Hazardous Chemical and Radioactive Waste Staging Facility, CPP-1619
- Waste Storage Area (RWMC)
- WERF Waste Compaction
- WERF Waste Stabilization
- SPERT II Waste Stabilization WEDF at PBF
- TRA Warm Waste Evaporation Pond
- TRA Tritium Laboratory
- TRA-661 Laboratory Addition
- IRC Radiotracer Use
- TAN TMI 2 Independent Spent Fuel Storage Installation

Additional Information
Supplement to Item 6.
'Other Environmental Permits'

WATER PERMITS

Clean Water Act Notifications/Permits/Plans

(Permit Type N, E)

Idaho Falls Industrial Waste Acceptance (IWA) Permit covers 14 facilities in Idaho Falls; 12 of these facilities are operated by the DOE-designated contractor and 2 are operated by the DOE-ID. These facilities have Industrial Pretreatment Disclosure Forms (IPDFs) submitted and are permitted by the City of Idaho Falls. The IWA Permits are as follows:

- INEEL Research Complex: IF-601, IF-602, IF-603, IF-611, IF-627, IF-638, IF-655, IF-657, IF-658
- IF-604A, IF-604B Technical Support Annex and Technical Support Building
- IF-605 Electric Vehicle Building
- IF-606 DOE-ID South
- IF-608 INEEL Supercomputing Center
- IF-609 DOE-ID North
- IF-613 North Boulevard Annex
- IF-614 May Street North
- IF-615 May Street South
- IF-616 Willow Creek Building and IF-617 Willow Creek Mechanical Building
- IF-631 Bus Dispatch Building
- IF-639 North Holmes Laboratory
- IF-651 North Yellowstone Laboratory
- IF-654 Engineering Research Office Building

- NPDES General Permit for Storm Water Discharges from Construction Activities
  - DOE-ID Permit No. - IDR10A339
  - Bechtel BWXT Idaho, LLC Permit No. - IDR10A432
- NPDES Storm Water Multi-Sector General Permit for Industrial Activities
  - DOE-ID Permit No. - IDR05A60F
  - Bechtel BWXT Idaho, LLC (BBWI) Permit No. - IDR05A422

Additional Information
Supplement to Item 6.
'Other Environmental Permits'

Clean Water Act Notifications/Permits/Plans (continued)

- Spill Prevention Control and Countermeasures (SPCC) Plans (INTEC and RWMC facilities only - not required at any other INEEL facilities)
- Oil Pollution Prevention Act, "No Substantial Harm Certifications"

EPA 404 - Dredge or Fill Permits under Section 303 of the CWA

(Permit Type F)

- Spreading Area B, RWMC (Permit Number - 930301750)

State of Idaho Underground Injection Well Permits [Idaho Department of Water Resources (IDWR)]

(Permit Type U)

- SPERT Disposal I, Well 34-W-3-1
- SPERT Disposal II, Well 34-W-3-2
- SPERT Disposal III, Well 34-W-3-3
- CFA Disposal, Well 34-W-3-4
- TAN Disposal I, Well 34-W-3-5
- TAN Disposal II, Well 34-W-3-6
- TAN Disposal III, Well 34-W-3-7
- IRC Closed-Loop Heat Pump Return Well 25-W-62

State of Idaho Monitoring Well Permits (IDWR)

(Permit Type U)

INEEL monitoring well permit applications are sent annually to the IDWR for wells (greater than 18 feet deep) to be constructed in the current calendar year. Permits are authorized by agreement between the DOE-ID and the IDWR.

State of Idaho Wastewater Land Application Permits (WLAP)

(Permit Type E)

- Central Facilities Area - Sewage Treatment Plant -Permit Number LA-000141-01
- Idaho Nuclear Technology and Engineering Center New Percolation Ponds – Permit Number LA-000130-03

Additional Information
Supplement to Item 6.
'Other Environmental Permits'

State of Idaho WLAP Permits (continued)

- Idaho Nuclear Technology and Engineering Center - Sewage Treatment Plant - Permit Number LA-000115-02
- Test Area North Technical Support Facility Sewage Treatment Facility- Permit Number LA-000153-01
- TRA Cold Waste - Application was submitted to the DEQ on January 7, 1997. Written authorization to operate while the permit application is being processed was received from the DEQ on January 19, 2001.

Ground Water Rights

(Permit Type E)

INEEL operates under a Federal Reserved Water Right for groundwater use.

8. Process Codes and Design Capacities (See instructions on page 37)

A. PROCESS CODE - Enter the code from the list of process codes below that best describes each process to be used at the facility. Thirteen lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in Item 9.

B. PROCESS DESIGN CAPACITY- ***For each code entered in column A, enter the capacity of the process.***

1. **AMOUNT -** ***Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.***
2. **UNIT OF MEASURE -** ***For each amount entered in column B(1), enter the code in column B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.***

C. PROCESS TOTAL NUMBER OF UNITS - ***Enter the total number of units for each corresponding process code.***

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	Disposal:	
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectare-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
	Storage:	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Acres; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
	Treatment:	
T01	Tank Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; or Metric Tons Per Hour
T02	Surface Impoundment Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons per Day; Kilograms Per Hour; Metric Tons Per Day; or Metric Tons Per Hour
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Day; Liters Per Hour; or Million Btu Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; Btu Per Hour; or Million Btu Per Hour

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds
T82	Lime Kiln	Per Hour; Short Tons Per Hour; Kilograms
T-83	Aggregate Kiln	Per Hour; Metric tons Per Day; Metric
T-84	Coke Over	Tons Per Hour; Short Tons Per Day; Btu Per
T-85	Phosphate Kiln	Hour; Liters Per Hour; Kilograms Per
T-86	Blast Furnace	Hour; or Million Btu Per Hour
T-87	Smelting, Melting, or Refining Furnace	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms
T-88	Titanium Oxide Chloride Oxidation Reactor	Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per
T-89	Methane Reforming Furnace	Hour; Gallons Per Hour; Liters Per Hour; or Million Btu Per Hour
T-90	Pulping Liquor Recovery Furnace	
T-91	Combustion Device Used In The Recovery Of Sulfur Values From Spent Sulfuric Acid	
T-92	Halogen Acid Furnaces	
T-93	Other Industrial Furnaces Listed In 40 CFR §260.10	
T-94	Containment Building - Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
	Miscellaneous (Subpart X):	
X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour;Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour, or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; or Million Btu Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

Unit of Measure	Unit of Measure Code
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V

Unit of Measure	Unit of Measure Code
Short Tons Per Hour	D
Metric tons Per Hour	W
Short Tons Per Day	N
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	R
Million Btu Per Hour	X

Unit of Measure	Unit of Measure Code
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
Btu Per Hour	I

8. Process Codes and Design Capacities (continued)

EXAMPLE FOR COMPLETING Item 8 (shoun in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	B. (2) Unit of Measure (Enter code)	C. Process Total Number of Units	For Official Use Only
X	1	S	0	2	5 3 3 . 7 8 8	G	0 0 1	
	1	S	0	2	1 9 2, 3 4 9 .	G	0 1 7	
	2	T	0	1	1 9 6, 6 0 0 .	U	0 0 8	
	3				.			
	4				.			
	5				.			
	6				.			
	7				.			
	8				.			
	9				.			
1	0				.			
1	1				.			
1	2				.			
1	3				.			

NOTE: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for "other" processes (i.e., D99, S99, T04 and X99) in Item 9.

9. Other Processes (See instructions on page 37 and follow instructions from Item 8 for D99, S99, T04 and X99 process codes)

Line Number (Enter #s in sequence with Item 8)		A. Process Code Code (From List Above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	B. (2) Unit of Measure (Enter code)	C. Process Total Number of Units	D. Description of Process
X	1	T	0	4	.			In-situ Vitrification
	1	X	9	9	1, 0 0 0 .	E	0 0 1	EVAPORATION
	2	X	9	9	1, 1 0 0 .	E	0 0 1	FRACTIONATION
	3				.			
	4				.			

Supplement to Item 8.
'Process Codes and Design Capacities'

LINE NUMBER	PROCESS TYPE UNIT NAME		PROCESS DESIGN CAPACITY
1	**S02 - TANK STORAGE INCLUDES:**		
	CPP-604 Evaporator Feed Sediment Tank: • VES-WL-132 @ 4,700 gallons		4,700 gallons
	CPP-604 Evaporator Feed Collection Tank: • VES-WL-133 @ 19,000 gallons		19,000 gallons
	CPP-604 Surge Tank for VES-WL-133: • VES-WL-102 @ 18,400 gallons		18,400 gallons
	CPP-604 Evaporator Head Tank: • VES-WL-109 @ 270 gallons		270 gallons
	CPP-604 Evaporator Units: • EVAP-WL-129 @ 1,000 gallons • EVAP-WL-161 @ 1,000 gallons		2,000 gallons
	CPP-604 Process Condensate Surge Tanks: • VES-WL-134 @ 500 gallons • VES-WL-131 @ 66 gallons		566 gallons
	CPP-604 Process Off-gas Condensate Knock Out Tank: • VES-WL-108 @ 98 gallons		98 gallons
	CPP-604 Bottoms Collection Tanks: • VES-WL-111 @ 1,500 gallons • VES-WL-101 @ 18,400 gallons		19,900 gallons
	CPP-641 Westside Waste Holdup Tanks: • VES-WL-103 @ 5,000 gallons • VES-WL-104 @ 5,000 gallons • VES-WL-105 @ 5,000 gallons		15,000 gallons
	CPP-604 Tank Farm Tanks: • VES-WM-100 @ 18,400 gallons • VES-WM-101 @ 18,400 gallons • VES-WM-102 @ 18,400 gallons		55,200 gallons
	CPP-601 Deep Tanks: • VES-WG-100 @ 4,500 gallons • VES-WG-101 @ 4,500 gallons • VES-WH-100 @ 4,500 gallons • VES-WH-101 @ 4,500 gallons		18,000 gallons

Supplement to Item 8.
'Process Codes and Design Capacities'

LINE NUMBER	PROCESS TYPE UNIT NAME		PROCESS DESIGN CAPACITY
1 (continued)	**CPP-604 Process Waste Liquid (PWL) System Tanks:** • VES-WL-135 @ 10 gallons • VES-WL-136 @ 10 gallons • VES-WL-137 @ 25 gallons • VES-WL-138 @ 25 gallons • VES-WL-139 @ 10 gallons • VES-WL-142 @ 10 gallons • VES-WL-144 @ 25 gallons • VES-WL-150 @ 50 gallons		165 gallons
	CPP-604 Process Condensate Collection Tanks: • VES-WL-106 @ 5,000 gallons • VES-WL-107 @ 5,000 gallons • VES-WL-163 @ 5,000 gallons		15,000 gallons
	Acid Fractionator Waste Feed Head Tank: • VES-WLK-197 @ 270 gallons		270 gallons
	Acid Fractionator: • VES-WLL-170 @ 460 gallons • VES-WLK-171 @ 460 gallons		920 gallons
	Acid Fractionator Bottoms Tank: • VES-WLL-195 @ 270 gallons		270 gallons
	LET&D Nitric Acid Recycle Tank System: • VES-NCR-171 @ 22,500 gallons • VES-NCR-173 @ 90 gallons		22,590gallons
		Line 1 Total:	**192,349 gallons**

Supplement to Item 8.
'Process Codes and Design Capacities'

LINE NUMBER	PROCESS TYPE UNIT NAME		PROCESS DESIGN CAPACITY
2	**T01 - TANK TREATMENT INCLUDES:**		
	CPP-604 Evaporator Feed Sediment Tank: • VES-WL-132 @ 28,000 gallons/day		28,000 gallons/day
	CPP-604 Evaporator Feed Collection Tank: • VES-WL-133 @ 28,000 gallons/day		28,000 gallons/day
	CPP-604 Surge Tank for VES-WL-133: • VES-WL-102 @ 18,400 gallons/day		18,400 gallons/day
	CPP-604 Bottoms Collection Tanks: • VES-WL-111 @ 3,000 gallons/day • VES-WL-101 @ 16,000 gallons/day		19,000 gallons/day
	CPP-641 Westside Waste Holdup Tanks: • VES-WL-103 @ 5,000 gallons/day • VES-WL-104 @ 5,000 gallons/day • VES-WL-105 @ 5,000 gallons/day		15,000 gallons/day
	CPP-604 Tank Farm Tanks: • VES-WM-100 @ 18,400 gallons/day • VES-WM-101 @ 18,400 gallons/day • VES-WM-102 @ 18,400 gallons/day		55,200 gallons/day
	CPP-601 Deep Tanks: • VES-WG-100 @ 4,500 gallons/day • VES-WG-101 @ 4,500 gallons/day • VES-WH-100 @ 4,500 gallons/day • VES-WH-101 @ 4,500 gallons/day		18,000 gallons/day
	CPP-604 Process Condensate Collection Tanks: • VES-WL-106 @ 5,000 gallons/day • VES-WL-107 @ 5,000 gallons/day • VES-WL-163 @ 5,000 gallons/day		15,000 gallons/day
		Line 2 Total:	**196,600 gallons/day**

Supplement to Item 9.
'Other Processes'

<table>
<tr><th>LINE NUMBER</th><th>PROCESS TYPE
UNIT NAME</th><th></th><th>PROCESS DESIGN CAPACITY</th></tr>
<tr><td rowspan="2">1</td><td>X99 - OTHER SUBPART X TREATMENT - EVAPORATION - INCLUDES:
CPP-604 PEW Evaporators
• EVAP-WL-129 @ 500 gallons/hour
• EVAP-WL-161 @ 500 gallons/hour</td><td></td><td>1,000 gallons/hour</td></tr>
<tr><td></td><td>Line 1 Total:</td><td>1,000 gallons/hour</td></tr>
<tr><td rowspan="2">2</td><td>X99 - OTHER SUBPART X TREATMENT - FRACTIONATION - INCLUDES:
CPP-1618 LET&D Fractionators
• FRAC-WLL-170 @ 550 gallons/hour
• FRAC-WLK-171 @ 550 gallons/hour</td><td></td><td>1,100 gallons/hour</td></tr>
<tr><td></td><td>Line 2 Total:</td><td>1,100 gallons/hour</td></tr>
</table>

10. Description of Hazardous Wastes (See instructions on page 37)

A. **EPA HAZARDOUS WASTE NUMBER** - *Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.*

B. **ESTIMATED ANNUAL QUANTITY** - *For each listed waste entered in column A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.*

C. **UNIT OF MEASURE** - *For each quantity entered in column B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:*

ENGLISH UNIT OF MEASURE	*CODE*	*METRIC UNIT OF MEASURE*	*CODE*
POUNDS	*P*	*KILOGRAMS*	*K*
TONS	*T*	*METRIC TONS*	*M*

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

D. **PROCESSES**

1. **PROCESS CODES:**

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Items 8A and 9A on page 3 to indicate the waste will be stored, treated, and/or disposed at the facility.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Items 8A and 9A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. Enter the first two as described above.
2. Enter "000" in the extreme right box of Item 10.D(1).
3. Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 10.E.

2. **PROCESS DESCRIPTION:** *If a code is not listed for a process that will be used, describe the process in Item 10.D(2) or in Item 10.E(2).*

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER - Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.

2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.

3. Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING Item 10 (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number		*A. EPA Hazardous Waste No. (Enter Code)*				*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES* *(1) PROCESS CODES (Enter code)*									*(2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
X	**1**	K	0	5	4	900	P	T	0	3	D	8	0				
X	**2**	D	0	0	2	400	P	T	0	3	D	8	0				
X	**3**	D	0	0	1	100	P	T	0	3	D	8	0				
X	**4**	D	0	0	2												Included With Above

Item 10. DESCRIPTION OF HAZARDOUS WASTES
Table of Contents

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number	*A. EPA Waste No. (Enter code)*	*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*	*D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
1	D001	13,600	T	S02 T01	CPP-604 Evaporator Feed Sediment Tank (VES-WL-132)
2	D002				Included with above
3	D004				Included with above
4	D005				Included with above
5	D006				Included with above
6	D007				Included with above
7	D008				Included with above
8	D009				Included with above
9	D010				Included with above
10	D011				Included with above
11	D018				Included with above
12	D019				Included with above
13	D021				Included with above
14	D022				Included with above
15	D026				Included with above
16	D028				Included with above
17	D032				Included with above
18	D034				Included with above
19	D035				Included with above
20	D036				Included with above
21	D038				Included with above
22	D039				Included with above
23	D040				Included with above
24	F001				Included with above
25	F002				Included with above
26	F003				Included with above
27	F005				Included with above
28	U134				Included with above
29					
30					
31					
32					
33					

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number	*A. EPA Waste No. (Enter code)*	*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*	*D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
1	D001	13,600	T	S02 T01	CPP-604 Evaporator Feed Collection Tank (VES-WL-133)
2	D002				Included with above
3	D004				Included with above
4	D005				Included with above
5	D006				Included with above
6	D007				Included with above
7	D008				Included with above
8	D009				Included with above
9	D010				Included with above
10	D011				Included with above
11	D018				Included with above
12	D019				Included with above
13	D021				Included with above
14	D022				Included with above
15	D026				Included with above
16	D028				Included with above
17	D032				Included with above
18	D034				Included with above
19	D035				Included with above
20	D036				Included with above
21	D038				Included with above
22	D039				Included with above
23	D040				Included with above
24	F001				Included with above
25	F002				Included with above
26	F003				Included with above
27	F005				Included with above
28	U134				Included with above
29					
30					
31					
32					
33					

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number		A. EPA Waste No. (Enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
	1	D	0	0	1	16,600	T	S	0	2	T	0	1				CPP-604 Surge Tank for VES-WL-133 (VES-WL-102)
	2	D	0	0	2												Included with above
	3	D	0	0	4												Included with above
	4	D	0	0	5												Included with above
	5	D	0	0	6												Included with above
	6	D	0	0	7												Included with above
	7	D	0	0	8												Included with above
	8	D	0	0	9												Included with above
	9	D	0	1	0												Included with above
1	0	D	0	1	1												Included with above
1	1	D	0	1	8												Included with above
1	2	D	0	1	9												Included with above
1	3	D	0	2	1												Included with above
1	4	D	0	2	2												Included with above
1	5	D	0	2	6												Included with above
1	6	D	0	2	8												Included with above
1	7	D	0	3	2												Included with above
1	8	D	0	3	4												Included with above
1	9	D	0	3	5												Included with above
2	0	D	0	3	6												Included with above
2	1	D	0	3	8												Included with above
2	2	D	0	3	9												Included with above
2	3	D	0	4	0												Included with above
2	4	F	0	0	1												Included with above
2	5	F	0	0	2												Included with above
2	6	F	0	0	3												Included with above
2	7	F	0	0	5												Included with above
2	8	U	1	3	4												Included with above
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number		*A. EPA Waste No. (Enter code)*				*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*									*D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
	1	D	0	0	1	13,600	T	S	0	2							CPP-604 Evaporator Head Tank (VES-WL-109)
	2	D	0	0	2												Included with above
	3	D	0	0	4												Included with above
	4	D	0	0	5												Included with above
	5	D	0	0	6												Included with above
	6	D	0	0	7												Included with above
	7	D	0	0	8												Included with above
	8	D	0	0	9												Included with above
	9	D	0	1	0												Included with above
1	0	D	0	1	1												Included with above
1	1	D	0	1	8												Included with above
1	2	D	0	1	9												Included with above
1	3	D	0	2	1												Included with above
1	4	D	0	2	2												Included with above
1	5	D	0	2	6												Included with above
1	6	D	0	2	8												Included with above
1	7	D	0	3	2												Included with above
1	8	D	0	3	4												Included with above
1	9	D	0	3	5												Included with above
2	0	D	0	3	6												Included with above
2	1	D	0	3	8												Included with above
2	2	D	0	3	9												Included with above
2	3	D	0	4	0												Included with above
2	4	F	0	0	1												Included with above
2	5	F	0	0	2												Included with above
2	6	F	0	0	3												Included with above
2	7	F	0	0	5												Included with above
2	8	U	1	3	4												Included with above
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number	*A. EPA Waste No. (Enter code)*	*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*	*D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
1	D001	13,600	T	S02 X99	CPP-604 PEW Evaporators (EVAP-WL-129, EVAP-WL-161)
2	D002				Included with above
3	D004				Included with above
4	D005				Included with above
5	D006				Included with above
6	D007				Included with above
7	D008				Included with above
8	D009				Included with above
9	D010				Included with above
10	D011				Included with above
11	D018				Included with above
12	D019				Included with above
13	D021				Included with above
14	D022				Included with above
15	D026				Included with above
16	D028				Included with above
17	D032				Included with above
18	D034				Included with above
19	D035				Included with above
20	D036				Included with above
21	D038				Included with above
22	D039				Included with above
23	D040				Included with above
24	F001				Included with above
25	F002				Included with above
26	F003				Included with above
27	F005				Included with above
28	U134				Included with above
29					
30					
31					
32					
33					

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number		A. EPA Waste No. (Enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
	1	D	0	0	1	13,600	T	S	0	2							CPP-602 Process Condensate Surge Tanks (VES-WL-134, VES-WL-131)
	2	D	0	0	2												Included with above
	3	D	0	0	4												Included with above
	4	D	0	0	5												Included with above
	5	D	0	0	6												Included with above
	6	D	0	0	7												Included with above
	7	D	0	0	8												Included with above
	8	D	0	0	9												Included with above
	9	D	0	1	0												Included with above
1	0	D	0	1	1												Included with above
1	1	D	0	1	8												Included with above
1	2	D	0	1	9												Included with above
1	3	D	0	2	1												Included with above
1	4	D	0	2	2												Included with above
1	5	D	0	2	6												Included with above
1	6	D	0	2	8												Included with above
1	7	D	0	3	2												Included with above
1	8	D	0	3	4												Included with above
1	9	D	0	3	5												Included with above
2	0	D	0	3	6												Included with above
2	1	D	0	3	8												Included with above
2	2	D	0	3	9												Included with above
2	3	D	0	4	0												Included with above
2	4	F	0	0	1												Included with above
2	5	F	0	0	2												Included with above
2	6	F	0	0	3												Included with above
2	7	F	0	0	5												Included with above
2	8	U	1	3	4												Included with above
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number		A. EPA Waste No. (Enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
	1	D	0	0	1	13,500	T	S	0	2							CPP-604 Process Off-gas Condensate Knock Out Tank (VES-WL-108)
	2	D	0	0	2												Included with above
	3	D	0	0	4												Included with above
	4	D	0	0	5												Included with above
	5	D	0	0	6												Included with above
	6	D	0	0	7												Included with above
	7	D	0	0	8												Included with above
	8	D	0	0	9												Included with above
	9	D	0	1	0												Included with above
1	0	D	0	1	1												Included with above
1	1	D	0	1	8												Included with above
1	2	D	0	1	9												Included with above
1	3	D	0	2	1												Included with above
1	4	D	0	2	2												Included with above
1	5	D	0	2	6												Included with above
1	6	D	0	2	8												Included with above
1	7	D	0	3	2												Included with above
1	8	D	0	3	4												Included with above
1	9	D	0	3	5												Included with above
2	0	D	0	3	6												Included with above
2	1	D	0	3	8												Included with above
2	2	D	0	3	9												Included with above
2	3	D	0	4	0												Included with above
2	4	F	0	0	1												Included with above
2	5	F	0	0	2												Included with above
2	6	F	0	0	3												Included with above
2	7	F	0	0	5												Included with above
2	8	U	1	3	4												Included with above
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number		*A. EPA Waste No. (Enter code)*				*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES*									
								(1) PROCESS CODES (Enter code)									*(2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
	1	D	0	0	1	270	T	S	0	2	T	0	1				CPP-604 Bottoms Collection Tanks (VES-WL-111, VES-WL-101)
	2	D	0	0	2												Included with above
	3	D	0	0	4												Included with above
	4	D	0	0	5												Included with above
	5	D	0	0	6												Included with above
	6	D	0	0	7												Included with above
	7	D	0	0	8												Included with above
	8	D	0	0	9												Included with above
	9	D	0	1	0												Included with above
1	0	D	0	1	1												Included with above
1	1	D	0	1	8												Included with above
1	2	D	0	1	9												Included with above
1	3	D	0	2	1												Included with above
1	4	D	0	2	2												Included with above
1	5	D	0	2	6												Included with above
1	6	D	0	2	8												Included with above
1	7	D	0	3	2												Included with above
1	8	D	0	3	4												Included with above
1	9	D	0	3	5												Included with above
2	0	D	0	3	6												Included with above
2	1	D	0	3	8												Included with above
2	2	D	0	3	9												Included with above
2	3	D	0	4	0												Included with above
2	4	F	0	0	1												Included with above
2	5	F	0	0	2												Included with above
2	6	F	0	0	3												Included with above
2	7	F	0	0	5												Included with above
2	8	U	1	3	4												Included with above
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number		*A. EPA Waste No. (Enter code)*				*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES* (1) PROCESS CODES (Enter code)									*(2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
	1	D	0	0	1	120	T	S	0	2	T	0	1				CPP-641 Westside Waste Holdup Tanks (VES-WL-103, VES-WL-104, VES-WL-105)
	2	D	0	0	4												Included with above
	3	D	0	0	5												Included with above
	4	D	0	0	6												Included with above
	5	D	0	0	7												Included with above
	6	D	0	0	8												Included with above
	7	D	0	0	9												Included with above
	8	D	0	1	0												Included with above
	9	D	0	1	1												Included with above
1	0	D	0	1	8												Included with above
1	1	D	0	1	9												Included with above
1	2	D	0	2	1												Included with above
1	3	D	0	2	2												Included with above
1	4	D	0	2	6												Included with above
1	5	D	0	2	8												Included with above
1	6	D	0	3	2												Included with above
1	7	D	0	3	4												Included with above
1	8	D	0	3	5												Included with above
1	9	D	0	3	6												Included with above
2	0	D	0	3	8												Included with above
2	1	D	0	3	9												Included with above
2	2	D	0	4	0												Included with above
2	3	F	0	0	1												Included with above
2	4	F	0	0	2												Included with above
2	5	F	0	0	3												Included with above
2	6	F	0	0	5												Included with above
2	7	U	1	3	4												Included with above
2	8																
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number		*A. EPA Waste No. (Enter code)*				*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*									*D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
	1	D	0	0	1	13,600	T	S	0	2	T	0	1				CPP-604 Tank Farm Tanks (VES-WM-100, VES-WM-101, VES-WM-102)
	2	D	0	0	2												Included with above
	3	D	0	0	4												Included with above
	4	D	0	0	5												Included with above
	5	D	0	0	6												Included with above
	6	D	0	0	7												Included with above
	7	D	0	0	8												Included with above
	8	D	0	0	9												Included with above
	9	D	0	1	0												Included with above
1	0	D	0	1	1												Included with above
1	1	D	0	1	8												Included with above
1	2	D	0	1	9												Included with above
1	3	D	0	2	1												Included with above
1	4	D	0	2	2												Included with above
1	5	D	0	2	6												Included with above
1	6	D	0	2	8												Included with above
1	7	D	0	3	2												Included with above
1	8	D	0	3	4												Included with above
1	9	D	0	3	5												Included with above
2	0	D	0	3	6												Included with above
2	1	D	0	3	8												Included with above
2	2	D	0	3	9												Included with above
2	3	D	0	4	0												Included with above
2	4	F	0	0	1												Included with above
2	5	F	0	0	2												Included with above
2	6	F	0	0	3												Included with above
2	7	F	0	0	5												Included with above
2	8	U	1	3	4												Included with above
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number		*A. EPA Waste No. (Enter code)*				*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*									*(2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
	1	D	0	0	1	5,000	T	S	0	2	T	0	1				CPP-601 Deep Tanks (VES-WG-100, VES-WG-101, VES-WH-100, VES-WH-101)
	2	D	0	0	2												Included with above
	3	D	0	0	4												Included with above
	4	D	0	0	5												Included with above
	5	D	0	0	6												Included with above
	6	D	0	0	7												Included with above
	7	D	0	0	8												Included with above
	8	D	0	0	9												Included with above
	9	D	0	1	0												Included with above
1	0	D	0	1	1												Included with above
1	1	D	0	1	8												Included with above
1	2	D	0	1	9												Included with above
1	3	D	0	2	1												Included with above
1	4	D	0	2	2												Included with above
1	5	D	0	2	6												Included with above
1	6	D	0	2	8												Included with above
1	7	D	0	3	2												Included with above
1	8	D	0	3	4												Included with above
1	9	D	0	3	5												Included with above
2	0	D	0	3	6												Included with above
2	1	D	0	3	8												Included with above
2	2	D	0	3	9												Included with above
2	3	D	0	4	0												Included with above
2	4	F	0	0	1												Included with above
2	5	F	0	0	2												Included with above
2	6	F	0	0	3												Included with above
2	7	F	0	0	5												Included with above
2	8	U	1	3	4												Included with above
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)																	
Line Number		*A. EPA Waste No. (Enter code)*				*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES*									
								(1) PROCESS CODES (Enter code)									*(2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
	1	D	0	0	1	8.3	T	S	0	2							CPP-604 Process Waste Liquid System Tanks (VES-WL-135, -136, -137, -138, -139, -142, -144, -150)
	2	D	0	0	2												Included with above
	3	D	0	0	4												Included with above
	4	D	0	0	5												Included with above
	5	D	0	0	6												Included with above
	6	D	0	0	7												Included with above
	7	D	0	0	8												Included with above
	8	D	0	0	9												Included with above
	9	D	0	1	0												Included with above
1	0	D	0	1	1												Included with above
1	1	D	0	1	8												Included with above
1	2	D	0	1	9												Included with above
1	3	D	0	2	1												Included with above
1	4	D	0	2	2												Included with above
1	5	D	0	2	6												Included with above
1	6	D	0	2	8												Included with above
1	7	D	0	3	2												Included with above
1	8	D	0	3	4												Included with above
1	9	D	0	3	5												Included with above
2	0	D	0	3	6												Included with above
2	1	D	0	3	8												Included with above
2	2	D	0	3	9												Included with above
2	3	D	0	4	0												Included with above
2	4	F	0	0	1												Included with above
2	5	F	0	0	2												Included with above
2	6	F	0	0	3												Included with above
2	7	F	0	0	5												Included with above
2	8	U	1	3	4												Included with above
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number	*A. EPA Waste No. (Enter code)*	*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*	*D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
1	D 0 0 1	13,500	T	S 0 2 T 0 1	CPP-604 Process Condensate Collection Tanks (VES-WL-106, VES-WL-107, VES-WL-163)
2	D 0 0 2				Included with above
3	D 0 0 4				Included with above
4	D 0 0 5				Included with above
5	D 0 0 6				Included with above
6	D 0 0 7				Included with above
7	D 0 0 8				Included with above
8	D 0 0 9				Included with above
9	D 0 1 0				Included with above
1 0	D 0 1 1				Included with above
1 1	D 0 1 8				Included with above
1 2	D 0 1 9				Included with above
1 3	D 0 2 1				Included with above
1 4	D 0 2 2				Included with above
1 5	D 0 2 6				Included with above
1 6	D 0 2 8				Included with above
1 7	D 0 3 2				Included with above
1 8	D 0 3 4				Included with above
1 9	D 0 3 5				Included with above
2 0	D 0 3 6				Included with above
2 1	D 0 3 8				Included with above
2 2	D 0 3 9				Included with above
2 3	D 0 4 0				Included with above
2 4	F 0 0 1				Included with above
2 5	F 0 0 2				Included with above
2 6	F 0 0 3				Included with above
2 7	F 0 0 5				Included with above
2 8	U 1 3 4				Included with above
2 9					
3 0					
3 1					
3 2					
3 3					

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number		*A. EPA Waste No. (Enter code)*				*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*									*(2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
	1	D	0	0	1	13,500	T	S	0	2							CPP-1618 Acid Fractionator Waste Feed Head Tank (VES-WL-197)
	2	D	0	0	2												Included with above
	3	D	0	0	4												Included with above
	4	D	0	0	5												Included with above
	5	D	0	0	6												Included with above
	6	D	0	0	7												Included with above
	7	D	0	0	8												Included with above
	8	D	0	0	9												Included with above
	9	D	0	1	0												Included with above
1	0	D	0	1	1												Included with above
1	1	D	0	1	8												Included with above
1	2	D	0	1	9												Included with above
1	3	D	0	2	1												Included with above
1	4	D	0	2	2												Included with above
1	5	D	0	2	6												Included with above
1	6	D	0	2	8												Included with above
1	7	D	0	3	2												Included with above
1	8	D	0	3	4												Included with above
1	9	D	0	3	5												Included with above
2	0	D	0	3	6												Included with above
2	1	D	0	3	8												Included with above
2	2	D	0	3	9												Included with above
2	3	D	0	4	0												Included with above
2	4	F	0	0	1												Included with above
2	5	F	0	0	2												Included with above
2	6	F	0	0	3												Included with above
2	7	F	0	0	5												Included with above
2	8	U	1	3	4												Included with above
2	9																
3	0																
3	1																
3	2																
3	3																

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number	*A. EPA Waste No. (Enter code)*	*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*	*D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
1	D 0 0 1	13,500	T	S 0 2 X 9 9	CPP-1618 Acid Fractionators (VES-WLL-170, VES-WLK-171)
2	D 0 0 2				Included with above
3	D 0 0 4				Included with above
4	D 0 0 5				Included with above
5	D 0 0 6				Included with above
6	D 0 0 7				Included with above
7	D 0 0 8				Included with above
8	D 0 0 9				Included with above
9	D 0 1 0				Included with above
1 0	D 0 1 1				Included with above
1 1	D 0 1 8				Included with above
1 2	D 0 1 9				Included with above
1 3	D 0 2 1				Included with above
1 4	D 0 2 2				Included with above
1 5	D 0 2 6				Included with above
1 6	D 0 2 8				Included with above
1 7	D 0 3 2				Included with above
1 8	D 0 3 4				Included with above
1 9	D 0 3 5				Included with above
2 0	D 0 3 6				Included with above
2 1	D 0 3 8				Included with above
2 2	D 0 3 9				Included with above
2 3	D 0 4 0				Included with above
2 4	F 0 0 1				Included with above
2 5	F 0 0 2				Included with above
2 6	F 0 0 3				Included with above
2 7	F 0 0 5				Included with above
2 8	U 1 3 4				Included with above
2 9					
3 0					
3 1					
3 2					
3 3					

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number	*A. EPA Waste No. (Enter code)*	*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*	*D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
1	D001	270	T	S02	CPP-1618 Acid Fractionator Bottoms Tank (VES-WLL-195)
2	D002				Included with above
3	D004				Included with above
4	D005				Included with above
5	D006				Included with above
6	D007				Included with above
7	D008				Included with above
8	D009				Included with above
9	D010				Included with above
10	D011				Included with above
11	D018				Included with above
12	D019				Included with above
13	D021				Included with above
14	D022				Included with above
15	D026				Included with above
16	D028				Included with above
17	D032				Included with above
18	D034				Included with above
19	D035				Included with above
20	D036				Included with above
21	D038				Included with above
22	D039				Included with above
23	D040				Included with above
24	F001				Included with above
25	F002				Included with above
26	F003				Included with above
27	F005				Included with above
28	U134				Included with above
29					
30					
31					
32					
33					

10. Description of Hazardous Wastes (Continued; use additional sheets as necessary)

Line Number	*A. EPA Waste No. (Enter code)*	*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*D. PROCESSES (1) PROCESS CODES (Enter code)*	*D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
1	D001	270	T	S02	CPP-1618 LET&D Nitric Acid Recycle Tank System (VES-NCR-171, VES-NCR-173)
2	D002				Included with above
3	D004				Included with above
4	D005				Included with above
5	D006				Included with above
6	D007				Included with above
7	D008				Included with above
8	D009				Included with above
9	D010				Included with above
10	D011				Included with above
11	D018				Included with above
12	D019				Included with above
13	D021				Included with above
14	D022				Included with above
15	D026				Included with above
16	D028				Included with above
17	D032				Included with above
18	D034				Included with above
19	D035				Included with above
20	D036				Included with above
21	D038				Included with above
22	D039				Included with above
23	D040				Included with above
24	F001				Included with above
25	F002				Included with above
26	F003				Included with above
27	F005				Included with above
28	U134				Included with above
29					
30					
31					
32					
33					

Item 13. Photographs
Idaho Nuclear Technology and Engineering Center (INTEC)

Photo Number	Photo Description – Unit Process Code(s)	Date of Photo	Page Number
827	Looking Northwest at Building CPP-601, Location of the CPP-601 Deep Tanks – S02, T01	12/99	3
ODP-32594	CPP-601 WG Vault, Looking Southeast at Deep Tanks VES-WG-100 and VES-WG-101 – S02, T01	3/91	4
ODP-32584	CPP-601 WG Vault, Looking West at Deep Tanks VES-WG-101 and VES-WG-100 (in background) – S02, T01	3/91	5
ODP-32306	CPP-601 WH Vault, Looking West at Deep Tank, VES-WH-100 – S02, T01	10/90	6
ODP-32061	CPP-601 WH Vault, Looking East at Deep Tanks, VES-WH-100 and VES-WH-101 – S02, T01	4/90	7
565	Looking North at Building CPP-604/605, Location of Process Equipment Waste Evaporator (PEWE) System Units - S02, T01, X99	6/99	8
ODP-31455	CPP-604 Process Condensate Collection Tanks, VES-WL-106, VES-WL-107, and VES-WL-163 – S02, T01	1985	9
ODP-32077	CPP-604 Evaporator Feed Sediment Tank, VES-WL-132 – S02, T01	1964	10
ODP-32073	CPP-604 Evaporator Feed Collection Tank, VES-WL-133 – S02, T01	1964	11
ODP-32074	CPP-604 Evaporator Feed Collection Tank, VES-WL-133 – S02, T01	1964	12
No photo number available (N/A)	Looking down at CPP-604 Bottoms Collection Tank, VES-WL-111 – S02, T01	NA	13
ODP-3130	CPP-604 Evaporator, EVAP-WL-129 – S02, X99	1989	14
ODP-27335	CPP-604 Evaporator, EVAP-WL-161 – S02, X99	1984	15

Photo Number	Photo Description – Unit Process Code(s)	Date of Photo	Page Number
601	Looking East at Building CPP-641, Control Building for the Westside Waste Holdup Tanks, VES-WL-103, VES-WL-104, and VES-WL-105 – S02, T01	6/99	16
NA	Looking at the Northeast Corner of Building CPP-641 and Access Vaults for the Westside Waste Holdup Tanks, VES-WL-103, VES-WL-104, and VES-WL-105 – S02, T01	1998	17
537	Looking Northeast at Buildings CPP-659 and -659 Annex, location of the Liquid Effluent Treatment and Disposal (LET&D) Nitric Acid Recycle Tank, VES-NCR-171 – S02	6/99	18
577	Looking Northwest at Building CPP-1618, Location of the LET&D Facility, Location of LET&D Units – S02, X99	6/99	19
32795	CPP-1618 LET&D Fractionator, Cell 2, 1st Floor – S02, X99	1991	20
559	Looking West towards the CPP-604 Tank Farm Tanks – S02	6/99	21

Photo 827. Looking Northwest at Building CPP-601, Location of the CPP-601 Deep Tanks.

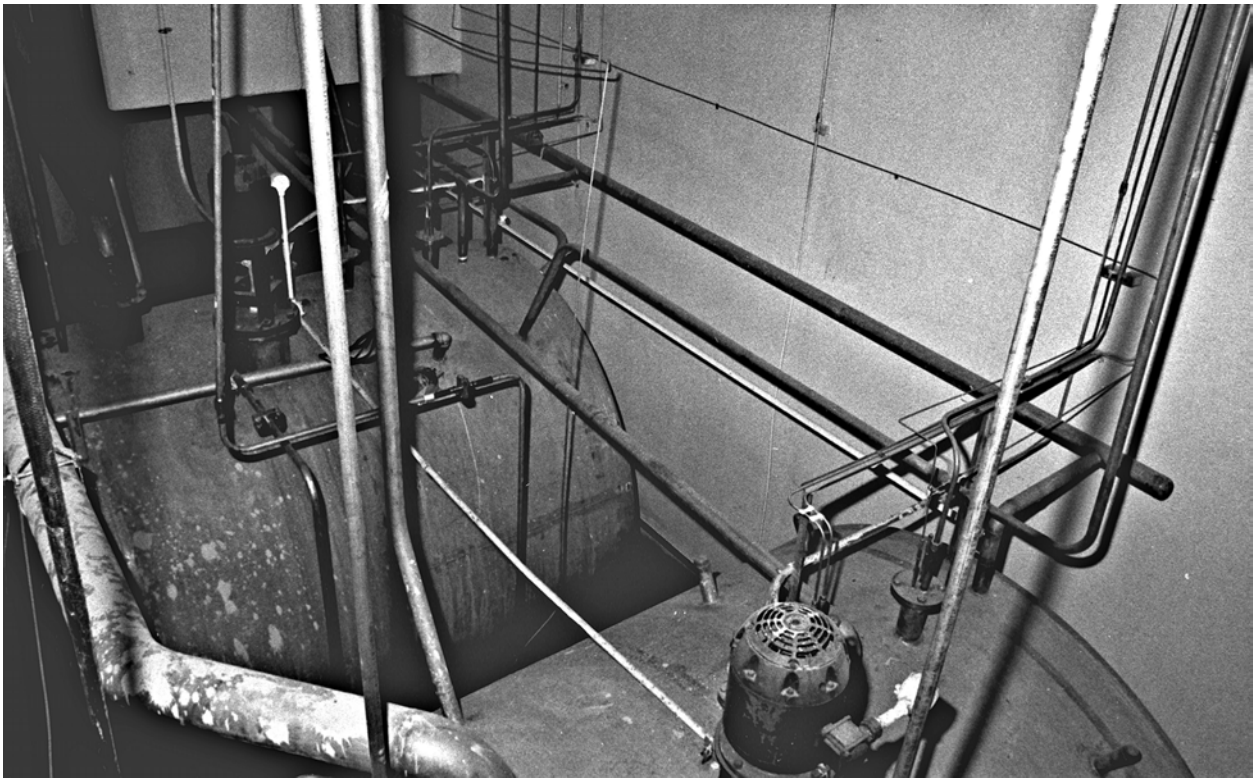


Photo ODP-32594. CPP-601 WG Vault, Looking Southeast at Deep Tanks VES-WG-100 and VES-WG-101.

Photo ODP-32584. CPP-601 WG Vault, Looking West at Deep Tanks VES-WG-101 and VES-WG-100 (in background).

Photo ODP-32306. CPP-601 WH Vault, Looking West at Deep Tank, VES-WH-100.

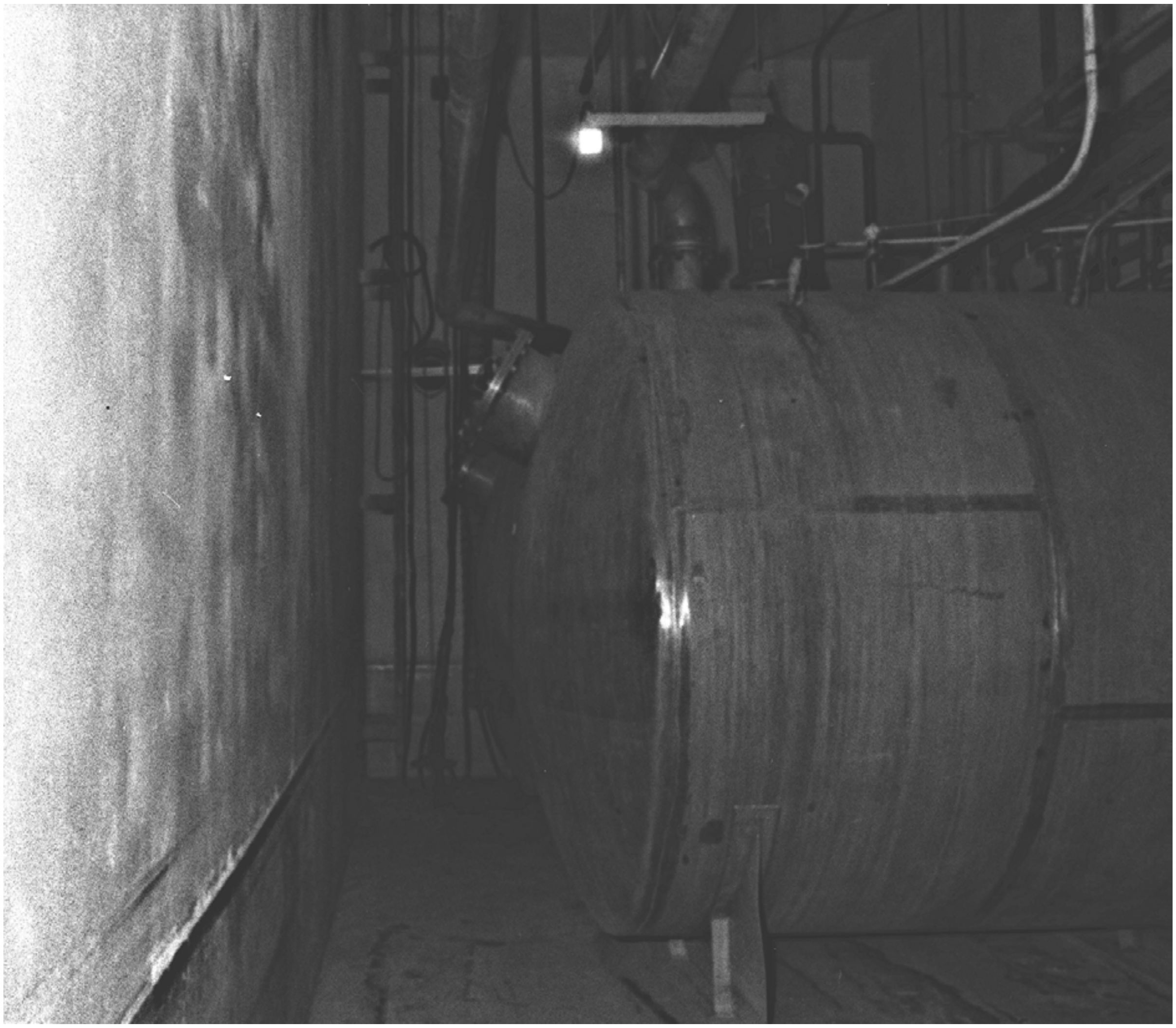


Photo ODP-32061. CPP-601 WH Vault, Looking East at Deep Tanks, VES-WH-100 and VES-WH-101.

Photo 565. Looking North at Building CPP-604/605, Location of Process Equipment Waste Evaporator (PEWE) System Units.

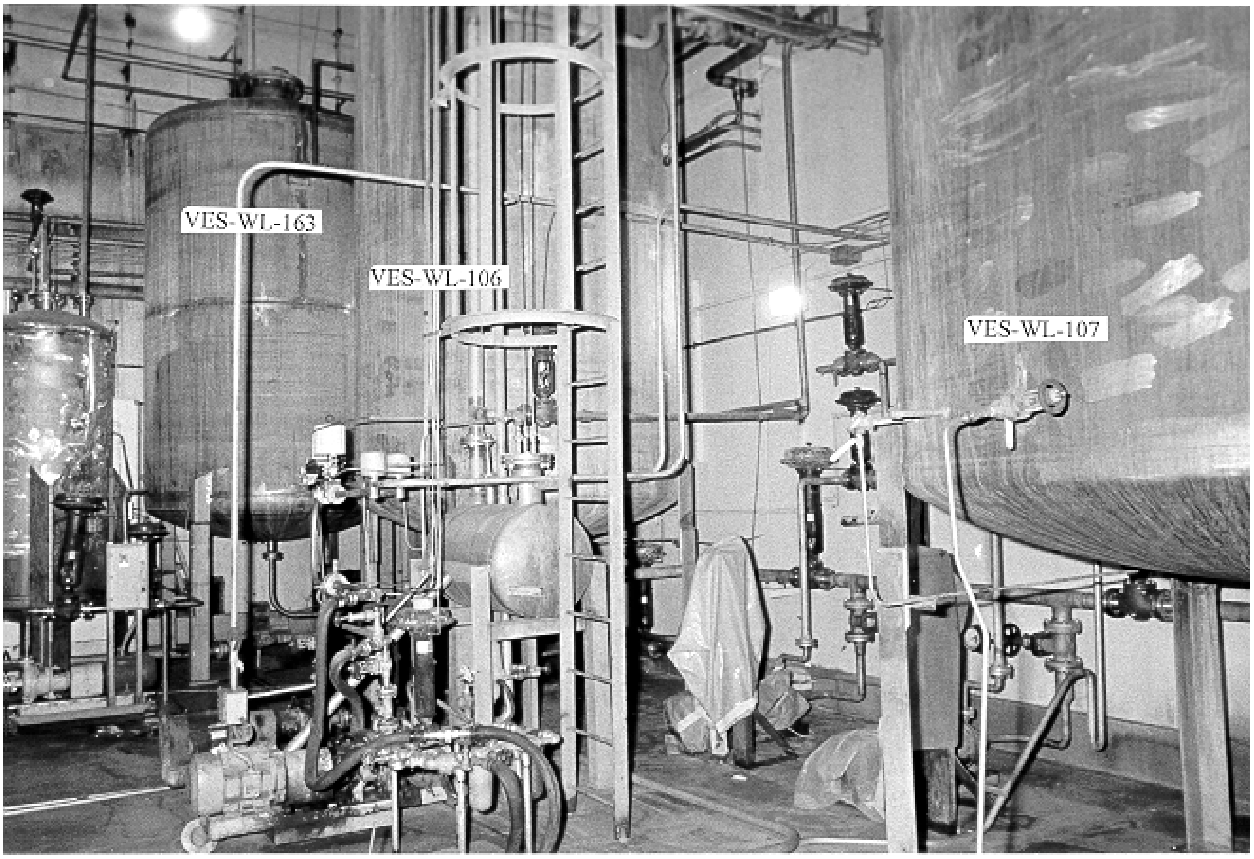


Photo ODP-31455, CPP-604 Process Condensate Collection Tanks,
VES-WL-106, VES-WL-107, and VES-WL-163.

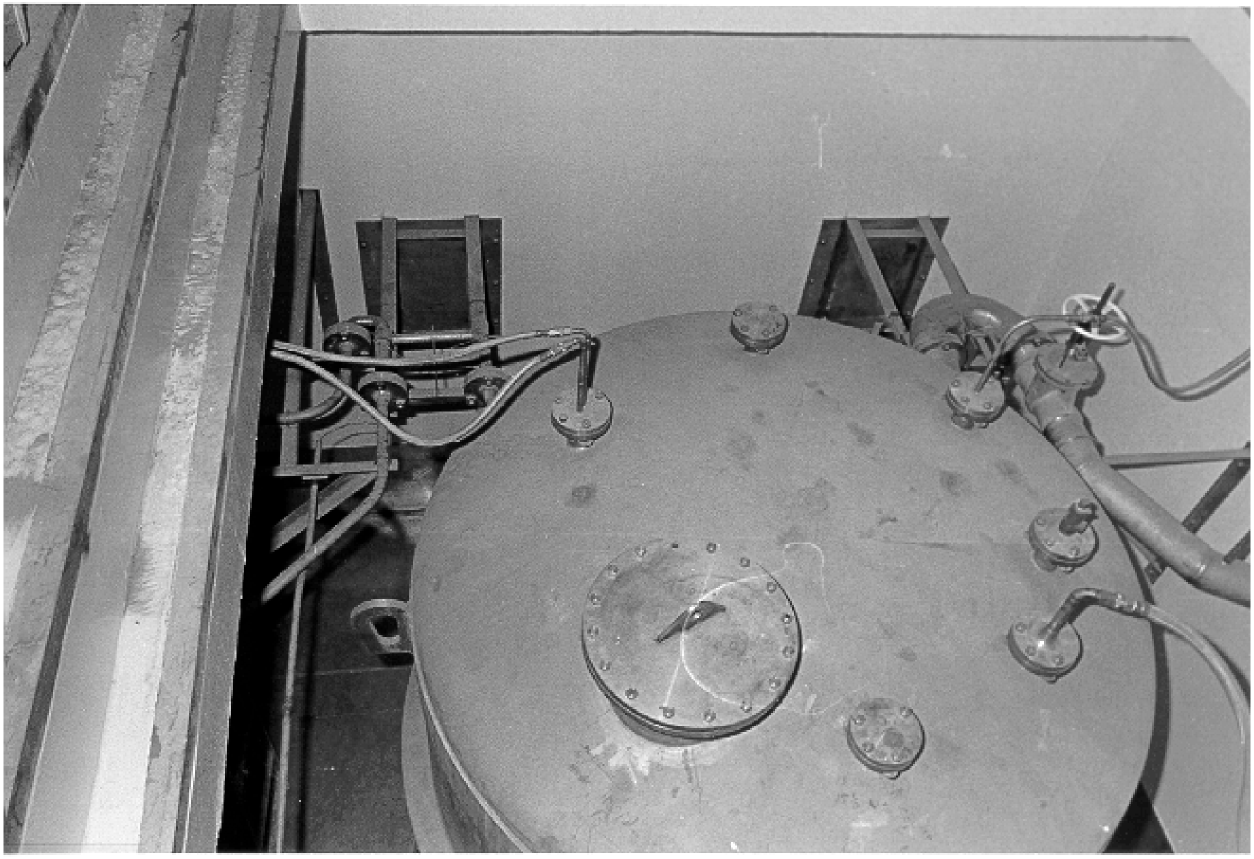


Photo ODP-32077. CPP-604 Evaporator Feed Sediment Tank, VES-WL-132.

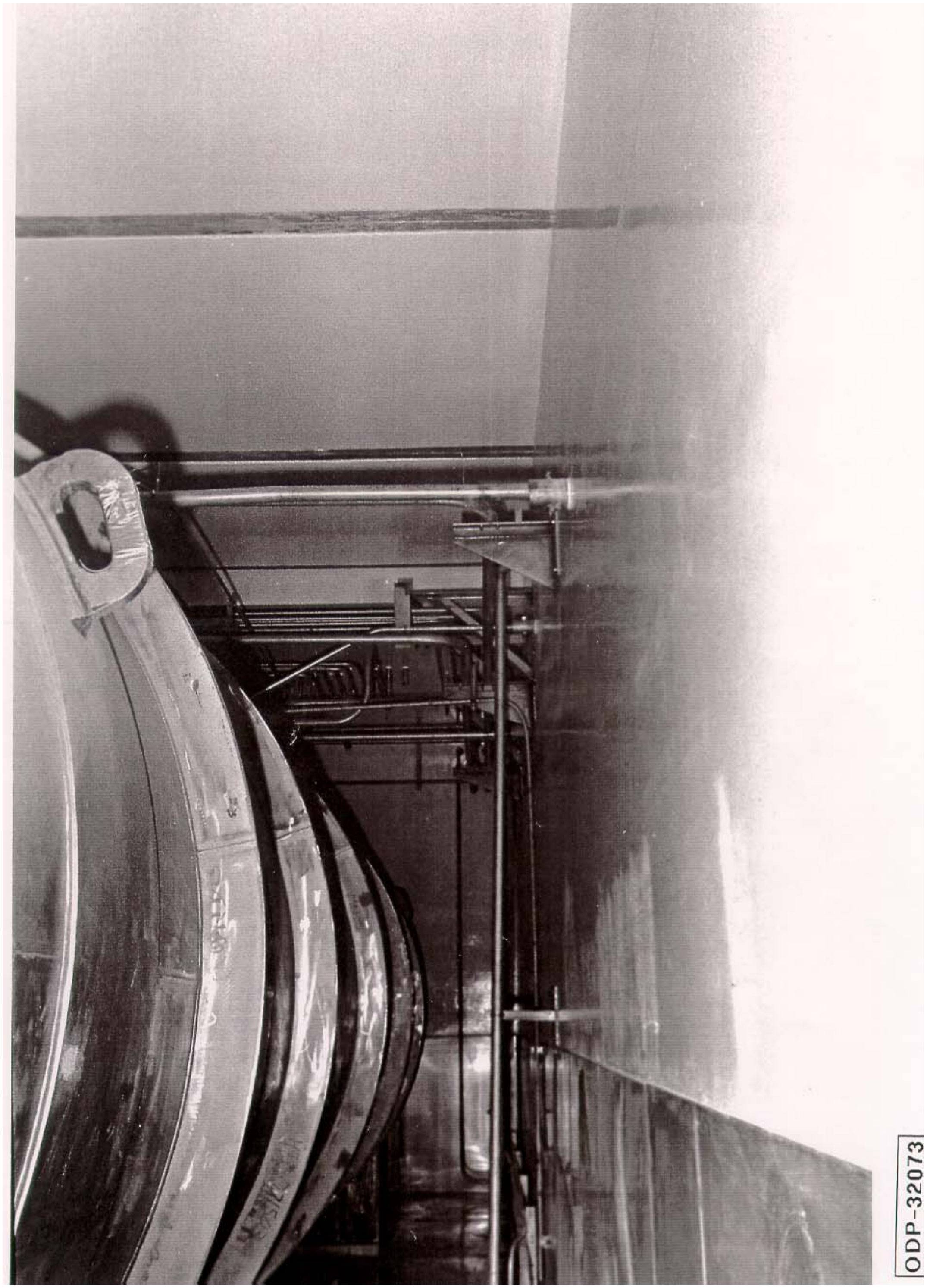


Photo ODP-32073. CPP-604 Evaporator Feed Collection Tank, VES-WL-133.

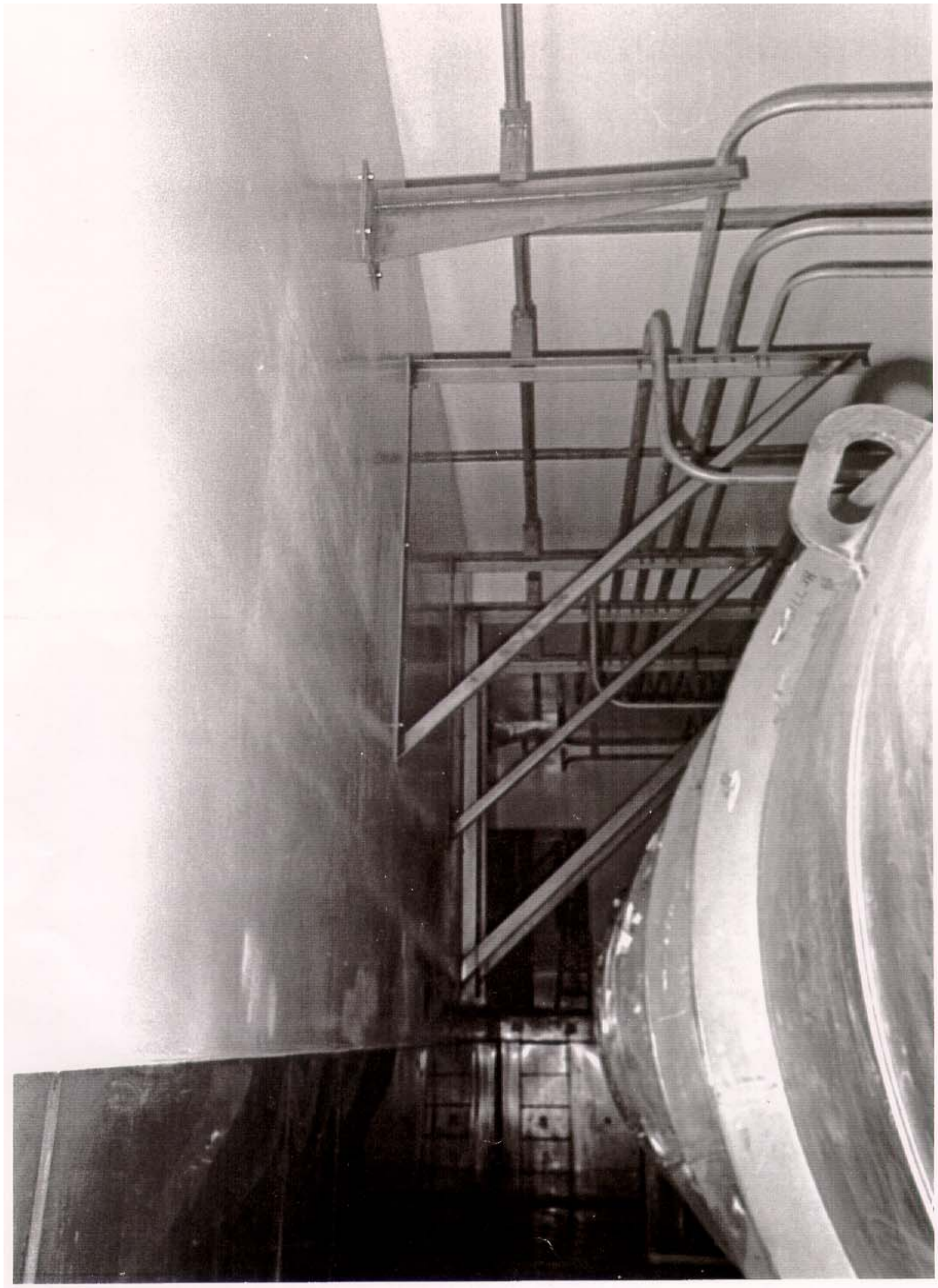


Photo ODP-32074. CPP-604 Evaporator Feed Collection Tank, VES-WL-133.

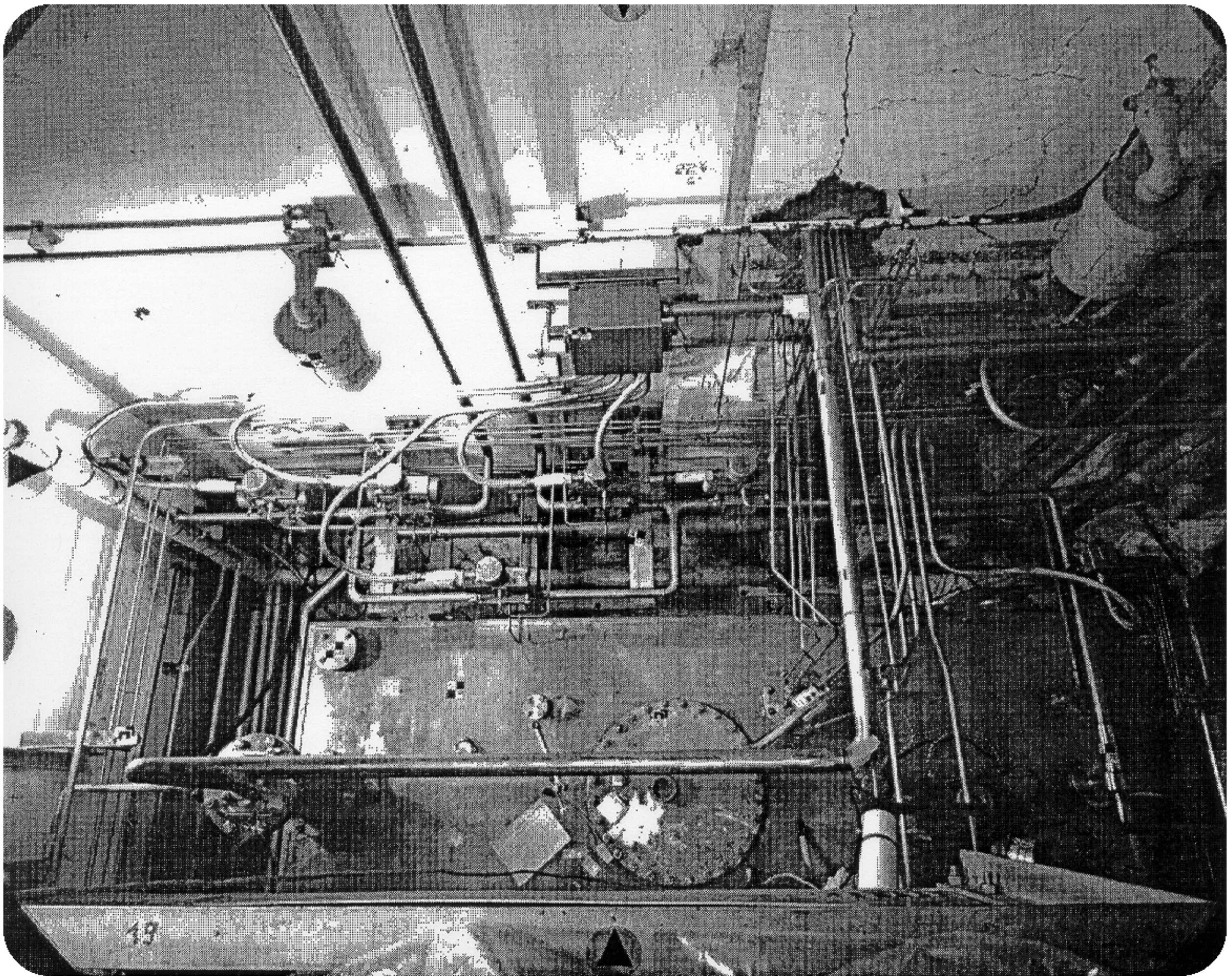


Photo N/A. Looking down at CPP-604 Bottoms Collection Tank, VES-WL-111.

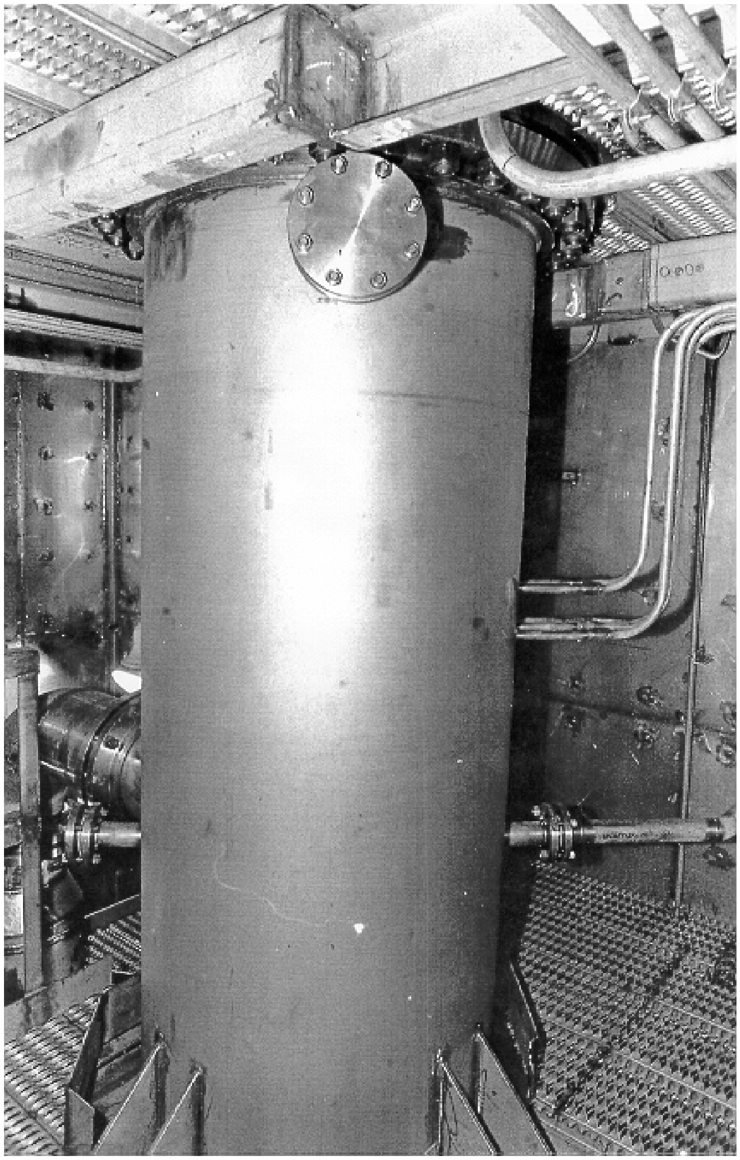


Photo ODP-3130. CPP-604 Evaporator, EVAP-WL-129.

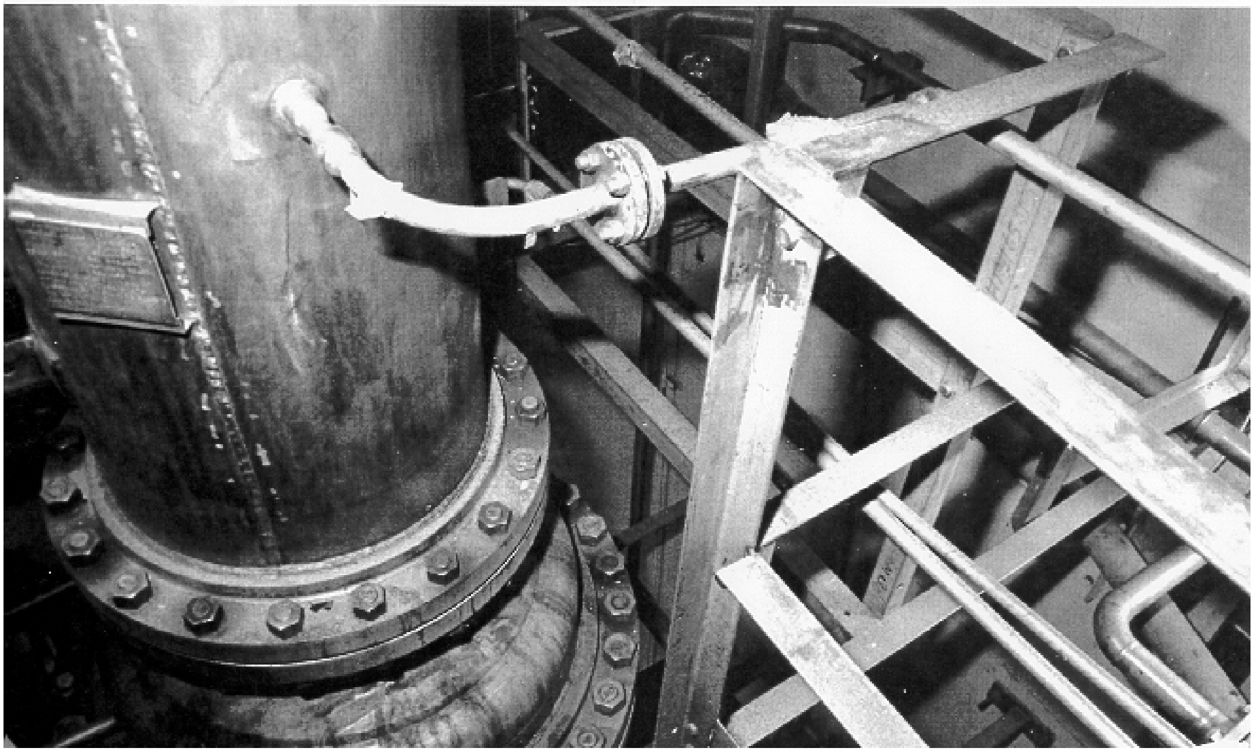


Photo ODP-27335. CPP-604 Evaporator, EVAP-WL-161.

Photo 601. Looking East at Building CPP-641, Control Building for the Westside Waste Holdup Tanks, VES-WL-103, VES-WL -104, and VES-WL -105.

Photo N/A. Looking at Northeast Corner of Building CPP-641 and Access Vaults for the Westside Waste Holdup Tanks,VES-WL-103, VES-WL-104, and VES-WL-105.

Photo 537. Looking Northeast at Buildings CPP-659 and -659 Annex, Location of the Liquid Effluent Treatment and Disposal (LET&D) Nitric Acid Recycle Tank, VES-NCR-171.

Photo 577. Looking Northwest at Building CPP-1618, LET&D Facility, Location of LET&D Units.

Photo 32795. CPP-1618 LET&D Fractionator, Cell 2, 1st Floor.

Photo 559. Looking West towards the CPP-604 Tank Farm Tanks.

11. Map (See instructions on page 38)

Attach to this application a topographic map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements. **[See Volme 14 - Section B, Exhibit B-3]**

12. Facility Drawing (See instructions on page 39)

All existing facilities must include a scale drawing of the facility (see instructions for more detail). **[See Volume 14 - Section B]**

13. Photographs (See instructions on page 39)

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

14. Comments (See instructions on page 39)

MAIL THE COMPLETED FORM TO: The appropriate EPA Regional or State Office.	**United States Environmental Protection Agency** **RCRA SUBTITLE C SITE IDENTIFICATION FORM**	

1. Reason for Submittal (See instructions on page 25) CHECK CORRECT BOX(ES)	**Reason for Submittal:** ❑ To provide initial notification (to obtain an EPA ID Number for hazardous waste, universal waste, or used oil activities). ❑ To provide subsequent notification (to update site identification information). ❑ As a component of a First RCRA Hazardous Waste Part A Permit Application. ☒ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (**Amendment # Volume 14, Rev. 2 - October 2003**). ❑ As a component of the Hazardous Waste Report.
2. Site EPA ID Number (See instructions on page 26)	**EPA ID Number:** ID4890008952
3. Site Name (See instructions on page 26)	**Name:** IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
4. Site Location Information (See instructions on page 26)	**Street Address:** **City, Town, or Village:** Scoville — **State:** ID **County Name:** BUTTE, CLARK, JEFFERSON, BONNEVILLE, BINGHAM — **Zip Code:** 83415
5. Site Land Type (See instructions on page 26)	**Site Land Type:** ❑ Private ❑ County ❑ District ☒ Federal ❑ Indian ❑ Municipal ❑ State ❑ Other
6. North American Industry Classification System (NAICS) Code(s) for the Site (See instructions on page 26)	A. 92411 — B. 54171 C. 336992 — D. Not Applicable
7. Site Mailing Address (See instructions on page 27)	**Street or P. O. Box:** 1955 NORTH FREEMONT DRIVE, IDAHO FALLS **State:** ID **Country:** USA — **Zip Code:** 83415
8. Site Contact Person (See instructions on pages 27)	**First Name:** DONALD — **MI:** N — **Last Name:** RASCH **Phone Number:** (208) 526-1511 — **Phone Number Extension:** Not Applicable
9. Legal Owner and Operator of the Site (See instructions on pages 27 and 28)	**A. Name of Site's Legal Owner:** US Department of Energy Idaho Operations Office — **Date Became Owner (mm/dd/yyyy):** 01/01/1952 **Owner Type:** ❑ Private ❑ County ❑ District ☒ Federal ❑ Indian ❑ Municipal ❑ State ❑ Other **B. Name of Site's Operator:** BECHTEL BWXT IDAHO LLC — **Date Became Operator (mm/dd/yyyy):** 10/01/1999 **Operator Type:** ☒ Private ❑ County ❑ District ❑ Federal ❑ Indian ❑ Municipal ❑ State ❑ Other

EPA ID No. I D 4 8 9 0 0 0 8 9 5 2

10. Type of Regulated Waste Activity (Mark 'X' in the appropriate boxes. See instructions on pages 28 to 32)

A. Hazardous Waste Activities

1. Generator of Hazardous Waste

(choose only one of the following three categories)

☒ a. LQG: Greater than 1,000 kg/mo (2,200 lbs./mo.) of non-acute hazardous waste; or

☐ b. SQG: 100 to 1,000 kg/mo (220 - 2,200 lbs./mo.) of non-acute hazardous waste; or

☐ c. CESQG: Less than 100 kg/mo (220 lbs./mo.) of non-acute hazardous waste

In addition, indicate other generator activities (check all that apply)

☐ d. United States Importer of Hazardous Waste

☒ e. Mixed Waste (hazardous and radioactive) Generator

For Items 2 through 6, check all that apply:

☒ **2. Transporter of Hazardous Waste**

☒ **3. Treater, Storer, or Disposer of Hazardous Waste (at your site)** Note: A hazardous waste permit is required for this activity.

☒ **4. Recycler of Hazardous Waste (at your site)** Note: A hazardous waste permit is required for this activity.

5. Exempt Boiler and/or Industrial Furnace

☐ a. Small Quantity On-site Burner Exemption

☐ b. Smelting, Melting, and Refining Furnace Exemption

☐ **6. Underground Injection Control**

B. Universal Waste Activities

1. Large Quantity Handler of Universal Waste (accumulate 5,000 kg or more) [refer to your State regulations to determine what is regulated]. Indicate types of universal waste generated and/or accumulated at your site. (check all boxes that apply):

	Generated	Accumulated
a. Batteries	☒	☐
b. Pesticides	☒	☒
c. Thermostats	☒	☒
d. Lamps	☒	☒
e. Other (specify)__________	☐	☐
f. Other (specify)__________	☐	☐
g. Other (specify)__________	☐	☐

☐ **2. Destination Facility for Universal Waste**
Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities

1. Used Oil Transporter - Indicate Type(s) of Activity(ies)

☐ a. Transporter

☐ b. Transfer Facility

2. Used Oil Processor and/or Re-refiner - Indicate Type(s) of Activity(ies)

☐ a. Processor

☐ b. Re-refiner

☐ **3. Off-Specification Used Oil Burner**

4. Used Oil Fuel Marketer - Indicate Type(s) of Activity(ies)

☐ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner

☐ b. Marketer Who First Claims the Used Oil Meets the Specifications

11. Description of Hazardous Wastes (See instructions on page 33)

A. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.

See Item 10 on the Hazardous Waste Permit Information Form (OMB #: 2050-0034)

OMB#: 2050-0175 Expires 12/31/2003

EPA ID No. I D 4 8 9 0 0 0 8 9 5 2

B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes. Please list the waste codes of the State-regulated hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed for waste codes.

12. Comments (See instructions on page 33)

13. Certification. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. **(See instructions on page 33)**

Signature of owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
Susan G Stiger	**Susan G. Stiger, Vice President, Idaho Completion Project, Bechtel BWXT Idaho, LLC.**	08/26/2003
Elizabeth D Sellers	**Elizabeth D. Sellers, Manager, Department of Energy Idaho Operations Office**	10/2/03

RCRA PART B PERMIT APPLICATION

FOR THE

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

Volume 14
INTEC Liquid Waste Management System

Section B
Facility Description

October 2003

CONTENTS

EXHIBITS

APPENDICES

ACRONYMS

APS	Atmospheric Protection System
ASTM	American Society for Testing Materials
CFR	Code of Federal Regulations
CPP	Chemical Processing Plant
DEQ	Department of Environmental Quality
ETS	Evaporator Tank System
IDAPA	Idaho Administrative Procedures Act
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
LET&D	Liquid Effluent Treatment and Disposal
PEWE	Process Equipment Waste Evaporator
RCRA	Resource Conservation and Recovery Act
TFF	Tank Farm Facility
TFT	Tank Farm Tank

B. FACILITY DESCRIPTION

B-1. General Description [IDAPA 58.01.05.012; 40 CFR 270.14(b)(1)]

This Resource Conservation and Recovery Act (RCRA) Part B permit application addresses the Idaho Nuclear Technology and Engineering Center (INTEC) Liquid Waste Management System. The system consists of the Process Equipment Waste Evaporator (PEWE) system, the Liquid Effluent Treatment and Disposal (LET&D) system and the Evaporator Tank System (ETS). The ETS is also known as the High Level Liquid Waste Evaporator. The ETS will be addressed in a modification to the final partial permit when issued. The INTEC Liquid Waste Management System is located at INTEC at the Idaho National Engineering and Environmental Laboratory (INEEL).

The INTEC is located in the south-central portion of the INEEL in Butte County. The location of this complex on the INEEL Site is shown in Exhibit B-1. The locations of Building Numbers CPP-601, CPP-604, CPP-641, CPP-649, CPP-659 Annex, and CPP-1618 are shown in Exhibit B-2. The physical conditions around these buildings are typical for the INEEL Site, approximately 5,000 ft above mean sea level, as shown on the topographical map, Exhibit B-3. The area is relatively flat and receives little rainfall. However, poor drainage patterns can produce localized flooding that consists of shallow puddles that form near buildings during periods of rapid snowmelt or heavy rainfall. Due to the lack of rainfall and the poor quality of the surface soils, the site has little agricultural value. Wind patterns are generally in a northeast/southwest axis, with some seasonal variability.

Exhibit B-4 shows the principal culverts, ditches, and storm systems at the INTEC. Exhibit B-5 shows the sanitary waste system at the INTEC. There are no recreation areas present on or adjacent to the INTEC.

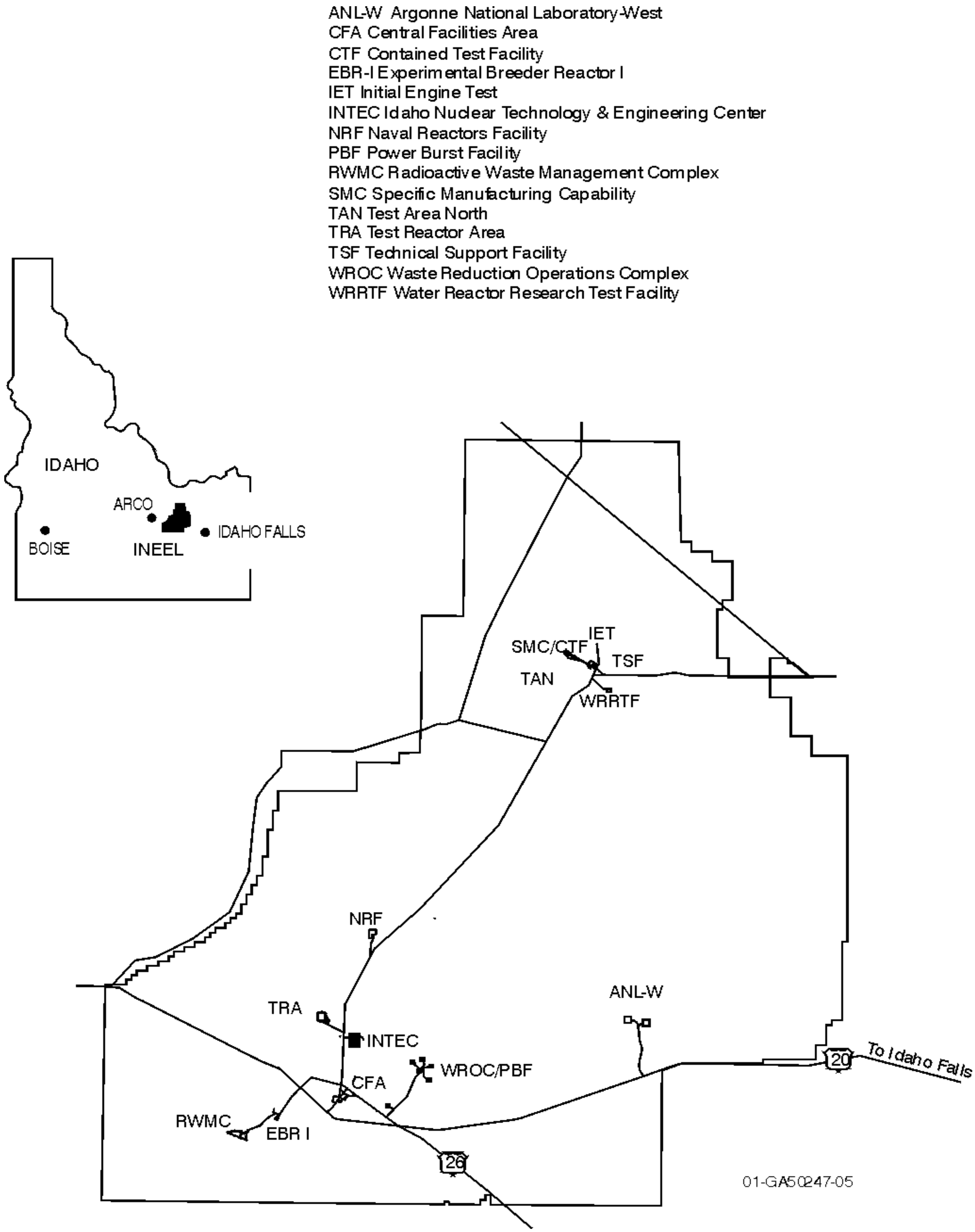


Exhibit B-1. Location of the INTEC at the INEEL.

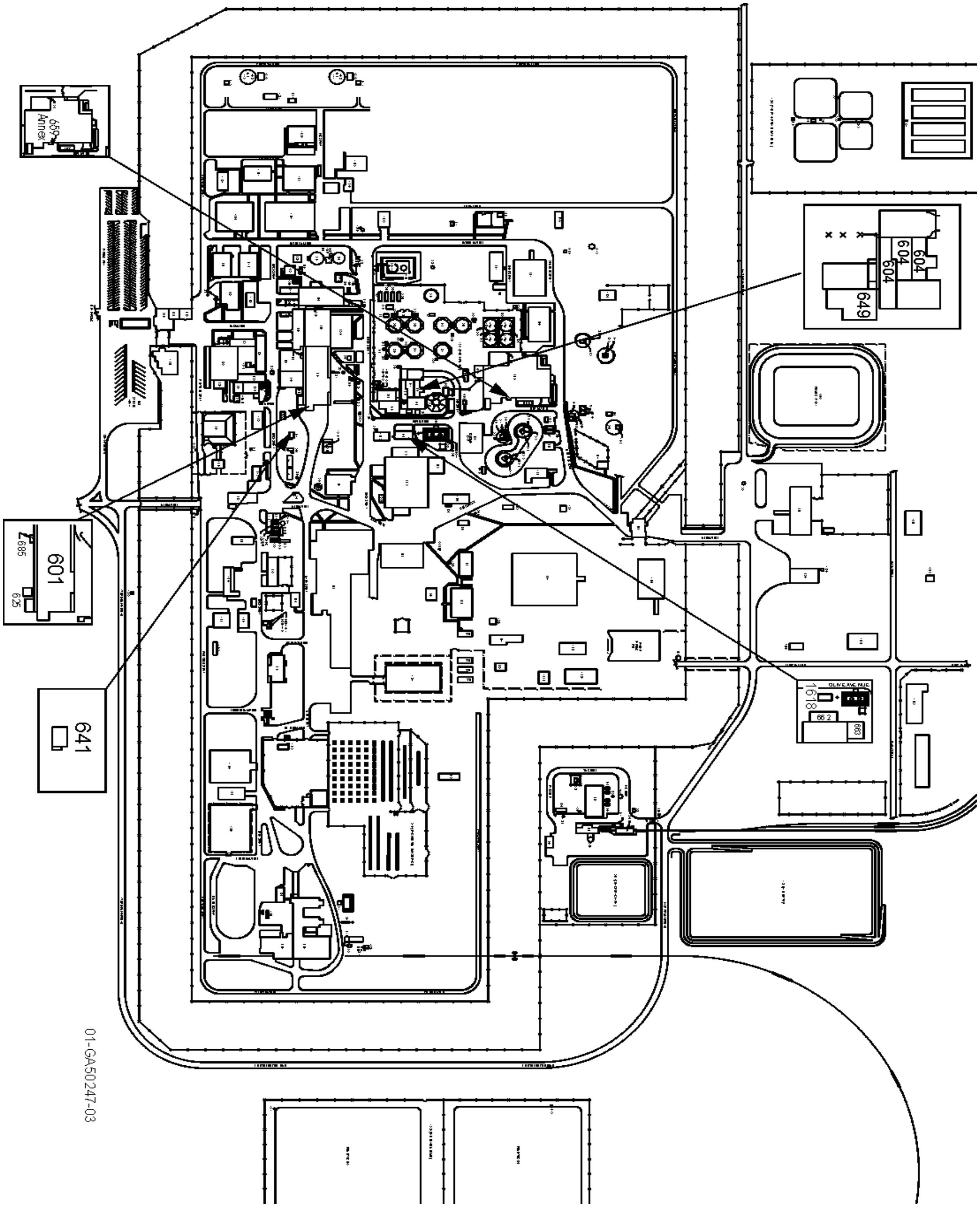


Exhibit B-2. Buildings CPP-601, CPP-604, CPP-641, CPP-659 Annex and CPP-1618 at the INTEC.

Exhibit B-3. Topographic map of the INTEC.

Exhibit B-4. Plant drainage system at the INTEC.

Exhibit B-5. Plant sanitary waste system at the INTEC.

PEWE System Storage and Treatment

The PEWE system reduces the volume of hazardous waste sent to the INTEC Tank Farm Facility (TFF). The PEWE system evaporates the wastes, producing concentrated wastes (bottoms) and vapor condensates (overheads). The overheads are transferred to the LET&D for further processing. The bottoms generated from the PEWE go to VES-WL-101 or VES-WL-111 or are recycled back to VES-WL-133 for further processing. From VES-WL-101 or VES-WL-111, the bottoms can be sent to the CPP-604 Tank Farm Tanks (TFT), VES-WM-100, VES-WM-101, and VES-WM-102, the TFF, or back to the ETS.

The PEWE system includes tanks and ancillary equipment in buildings CPP-604, CPP-601, CPP-641, CPP-649, CPP-659 Annex, CPP-1618, and associated valve boxes at the INTEC. For a detailed description of the PEWE system, see Section D of this Part B Permit Application.

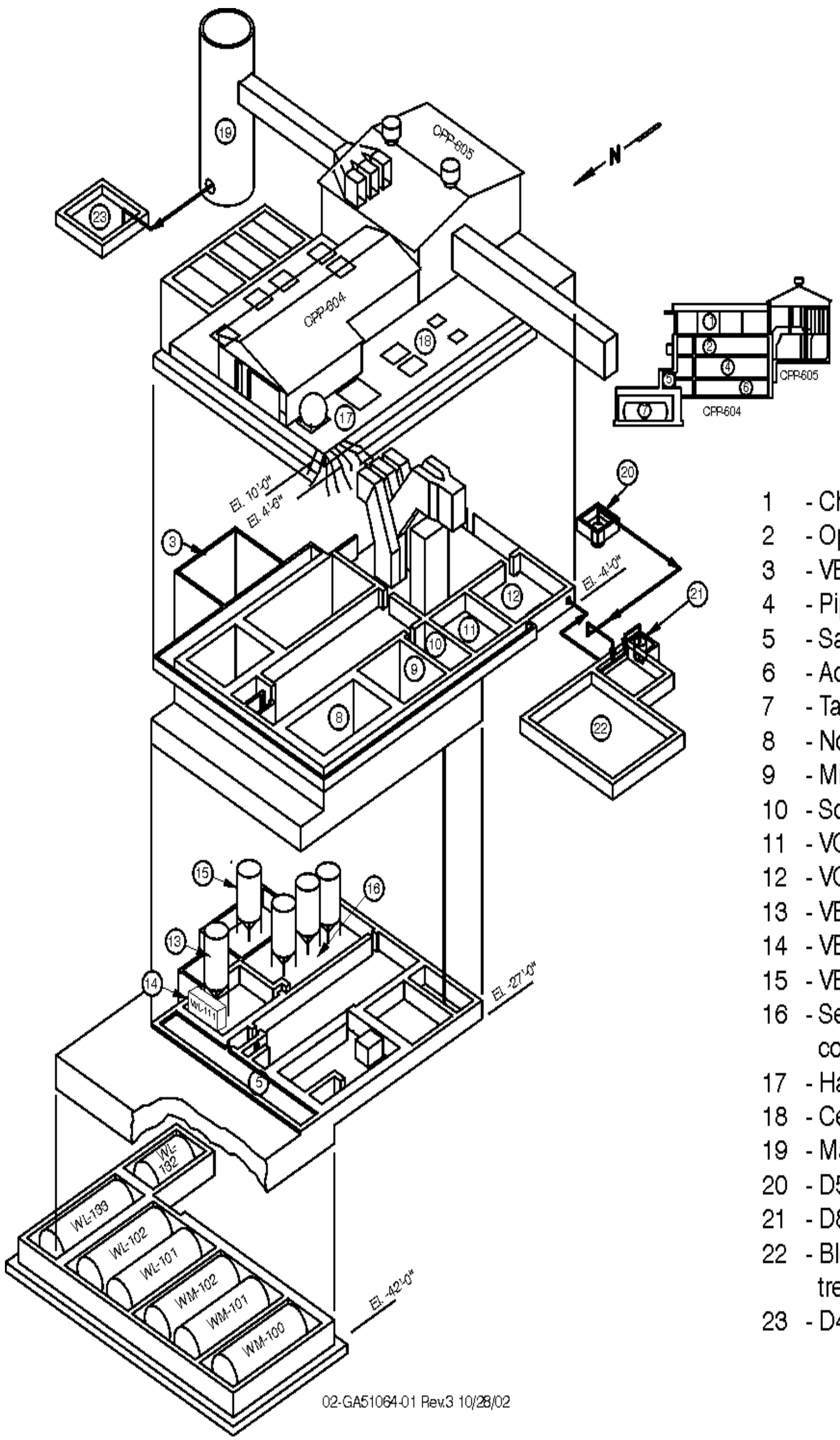
Building CPP-604

The Waste Treatment Building, CPP-604, contains equipment for treating INTEC liquid wastes. The Atmospheric Protection System (APS) Building, CPP-649, contains equipment for further treatment of the INTEC offgas.

CPP-604 is located east of the Process Building, CPP-601, and south of the TFF. Exhibit B-6 is an isometric drawing of CPP-604, showing the physical arrangement of the various cells, corridors, and other areas.

CPP-604 was originally constructed in the 1951 to 1953 timeframe. In the early 1970s, an additional evaporator, EVAP-WL-129, was installed. In the early 1980s, the Evaporator Feed Sediment Tank, VES-WL-132, and the new Feed Collection Tank, VES-WL-133, were installed. Finally, in the early 1990’s the CPP-604 Bottoms Collection Tank, VES-WL-111, was added to the system. The main portion of CPP-604 is located below grade and is constructed of reinforced concrete. The building is approximately 115 ft wide on its widest end (north end) and 130 ft long on its longest side (west side). Drawings 400814 and 400815 in the drawing package (Appendix B-1) included with this application represent the space occupancy floor plan for CPP-604.

The building CPP-604 consists of three primary areas (See Exhibit B-6) associated with this permit application.



Legend

1 - Chemical Makeup Area
2 - Operating corridor
3 - VES-WL-129 evaporator cell
4 - Pipe corridor
5 - Sample corridor
6 - Access corridor
7 - Tank storage vault
8 - North cell
9 - Middle cell
10 - South cell
11 - VOG filter cell
12 - VOG blower cell
13 - VES-WL-161 Evaporator
14 - VES-WL-111
15 - VES-WL-129 Evaporator
16 - Separation and Condensation collection cell
17 - Hatch access to north cell
18 - Cell hatches
19 - Main exhaust stack
20 - D5 vault
21 - D8 vault
22 - Bldg. 649 process off-gas treatment area
23 - D4 vault

Exhibit B-6. Building CPP-604.

Evaporator Feed Collection/Feed Sediment Tank Vaults

The vaults for the Evaporator Feed Collection Tank, VES-WL-133, and the Evaporator Feed Sediment Tank, VES-WL-132, are connected by a doorway in a common wall. A ladder provides access to the VES-WL-133 vault from the VES-WL-132 vault, and a concrete hatch seals the VES-WL-132 vault from the above-grade portion of the building. The VES-WL-133 vault is in the northeast corner of the CPP-604 building. The vault has internal dimensions of 16 ft 6 in. by 42 ft. The VES-WL-132 vault is located just south of the VES-WL-133 vault and has internal dimensions of 16 ft 6 in. by 17 ft. The vault is constructed of reinforced concrete and the floor and lower 2 ft 6 in. of the walls are lined with stainless steel. This information is described in section, D-2f (1)(b), “Requirements for Secondary Containment and Leak Detection.”

Evaporator Cells, Process Condensate Collection Cell, and Feed Pump Cell

The two evaporator cells contain the evaporators, EVAP-WL-161 and EVAP-WL-129. The process condensate collection cell contains the Process Condensate Collection Tanks (VES-WL-106, VES-WL-107, and VES-WL-163). The feed pump cell contains the two feed pumps, P-WL-228 and P-WL-229. The cells are all interconnected. Access to these cells is gained through a doorway into the condensate collection cell from the access corridor or by removing the cell hatches. The process condensate collection cell has internal dimensions of 21 ft by 46 ft. The EVAP-WL-161 evaporator cell is located just north of the process condensate collection cell; it has internal dimensions of 18 ft by 22 ft. The EVAP-WL-161 evaporator cell also houses VES-WL-111. The EVAP-WL-129 evaporator cell, located east of the condensate collection cell, has internal dimensions of 14 ft by 15 ft 8 in. The feed pump cell is located just north of the VES-WL-129 evaporator cell and has internal dimensions of 9 ft 2 in. by 14 ft 6 in. Drawings 155069, 155070, and 103171 show typical concrete installation, and Drawings 103180, 158768 and 162748 show the stainless steel liner installation (See Appendix B-1).

CPP-604 Tank Farm Tanks, VES-WM-100, VES-WM-101, and VES-WM-102 Vaults

The TFT system tanks are located in two connected and below-grade vaults at the north end of CPP-604.

The west vault, containing VES-WM-100, is constructed of reinforced concrete and is 17 ft wide, 43 ft long, and 16 ft high. The adjacent vault contains VES-WM-101 and VES-WM-102 and is 30 ft 6 in. by 43 ft by 16 ft high. The floors and lower 3 ft 6 in. of the walls in both vaults are lined with stainless steel. Drawing 400815 in the drawing package (Appendix B-1) included with the application represents the space occupancy floor plan for the CPP-604 building. Drawing 103171 shows the typical concrete and stainless steel liner installations (See Appendix B-1). Drawing 103544 shows the typical stainless steel floor and wall lining details for VES-WM-100 vault and VES-WM-101 and -102 vault (See Appendix B-1). Drawing 103530 shows the foundation and enclosure plans, sections, and details for the VES-WM-100 vault and the VES-WM-101/VES-WM-102 vault (See Appendix B-1).

Bottoms Tank (VES-WL-101) and Feed Collection Tank (VES-WL-102) Vault

The vault contains VES-WL-101 and VES-WL-102 and is constructed of reinforced concrete that ranges in thickness from 2 to 4 feet. This vault is 30 ft wide, 43 ft long, and 16 ft high.

The secondary containment is constructed of concrete floor lined with a Hypalon membrane (registered trademark of DuPont), which extends three feet up the walls. The main body of the membrane has a 45-mil nominal thickness and is reinforced with denier polyester fabric scrim. Unreinforced membrane that is used for corner reinforcement and around the sump liner insert, which must be molded to fit, is 60-mil nominal thickness. The Hypalon membrane conforms to the requirements of the National Sanitation Foundation Standard 54 (revised May 1991) Type 3-45, (industrial grade chlorosulfonated polyethylene). All seams in the secondary containment are heat-welded or adhesive bonded to avoid any cracks or gaps. The membrane is sealed around the tank saddles by silicone rubber sealant that is capable of withstanding the expected waste solutions for extended periods of time. Drawing 103530 shows the foundation and enclosure plans, sections, and details, and Drawings 370862, 370863, 370864, 370865, 370866, and 370867 show the liner installations and sections for the VES-WL-101/VES-WL-102 vault (See Appendix B-1).

Building CPP-601

CPP-601 consists of five levels. The lowest level (below grade) contains the WG/WH tanks and vaults. The building is constructed of reinforced concrete, and the upper level (above grade), of structural steel. The building is rectangular: 244 ft by 102 ft and a maximum of 95 ft 3 in. high, extending from 57 ft 6 in. below grade to 37 ft 9 in. above grade at the peak of the roof. Drawing 340569 represents the space occupancy floor plan for CPP-601. (The drawing package included with this application is found in Appendix B-1). Drawings 103057 and 103254 show typical concrete and stainless steel liner installation (Appendix B-1).

CPP-601 is joined on the north by a common firewall with the Laboratory Building, CPP-602. The northeast corner is connected to the Office Building, CPP-630. CPP-601 consists of 25 process cells in two rows extending the length of the building, with various corridors (operating, access, service, vent, and sampling corridors) extending between and outside the cell rows. Most of the process equipment is controlled from an operating corridor that runs the length of the building between the two rows of cells. The operating corridor contains valves that control the flow of solutions, instruments for monitoring the properties of the solutions, and flow diagrams to guide the operators. A service and access corridor is below the operating corridor. Sampling and ventilation corridors flank the rows of cells. The top story of the building is an unpartitioned area used for storage and makeup of chemical solutions. An isometric of the building is shown in Exhibit B-7. The vaults are shown in Exhibit B-8.

The four WG/WH tanks, also known as the Deep Tanks, are on the lower level of CPP-601. Two tanks are located in each of two stainless-steel-lined, reinforced concrete cells. Each cell is 22 ft by 42 ft (outside dimensions). The interior dimensions of the vaults are 38 ft 6 in. by 15 ft. The vaults are lined with stainless steel on the floor and 3 ft up the walls. Both vaults are provided with sumps.

Building CPP-641

The Westside Waste Holdup System (VES-WL-103, VES-WL-104, and VES-WL-105) is housed in CPP-641, which is a cinderblock building 22 ft long and 15 ft wide. CPP-641 contains the instrumentation, motor control center, sample station, and jet valves for the tanks.

The three tanks are located in two underground vaults north of CPP-641. The vault complex is 39 ft 8 in. long and 20 ft wide (outside dimensions). The east vault is 18 ft by 22 ft by 12 ft 6 in. high. The west vault measures 18 ft by 12 ft 2 in. by 12 ft 6 in. high. VES-WL-104 and VES-WL-105 share the east vault; VES-WL-103 is located in the west vault. The vault floors, ceilings, and walls are coated with epoxy paint. A ladder in CPP-641 provides access to the VES-WL-103 vault. Access to both vaults can be gained by removing hatches and concrete plugs located north of CPP-641. Drawing 057757 represents the space occupancy floor plan for the CPP-641 building. Drawing 111809 demonstrates the concrete plan sections and details for the VES-WL-103 vault and the VES-WL-104 and -105 vault. Drawing 111810 demonstrates the concrete plan sections and details for the control house. The drawings are included in Appendix B-1. Exhibit B-9 shows an overview of the vault configuration.

1. Elevator
2. Cell Hatch (typ.)
3. Access Chute (typ.)
4. Truck Stop (typ.)
5. East H&V Room
6. Loading Ramp
7. Ramp (vehicle)
8. Foul Weather Entry
9. West H&V Room
10. Filter Room
11. Blower Room
12. West Sample Corridor
13. East Sample Corridor
14. Operating Corridor
15. North Corridor
16. South Corridor
17. Service Corridor
18. West Vent Corridor
19. East Vent Corridor
20. South Vent Corridor
21. High Vacuum Cell
22. Ramp (personnel)
23. Fill
24. Access Corridor
25. South Access Corridor
26. Pipe Tunnel
27. West Control Room, WA
28. East Control Room, WF
29. Pump Cell, WB
30. Pump Cell, WC
31. Pump Cell, WD
32. Pump Cell, WE
33. West Tank Cell, WG
34. East Tank Cell, WH

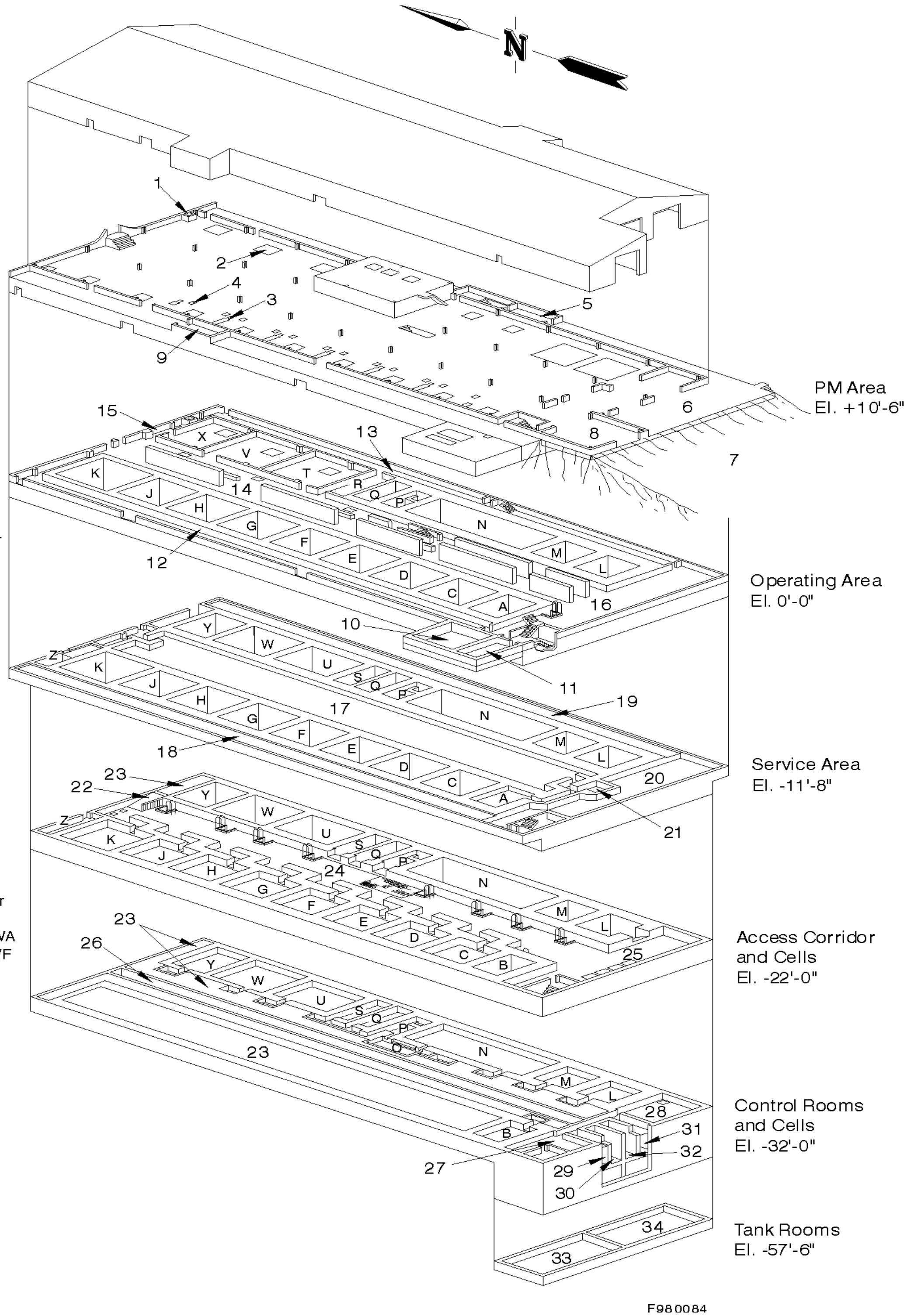


Exhibit B-7. Isometric of CPP-601.

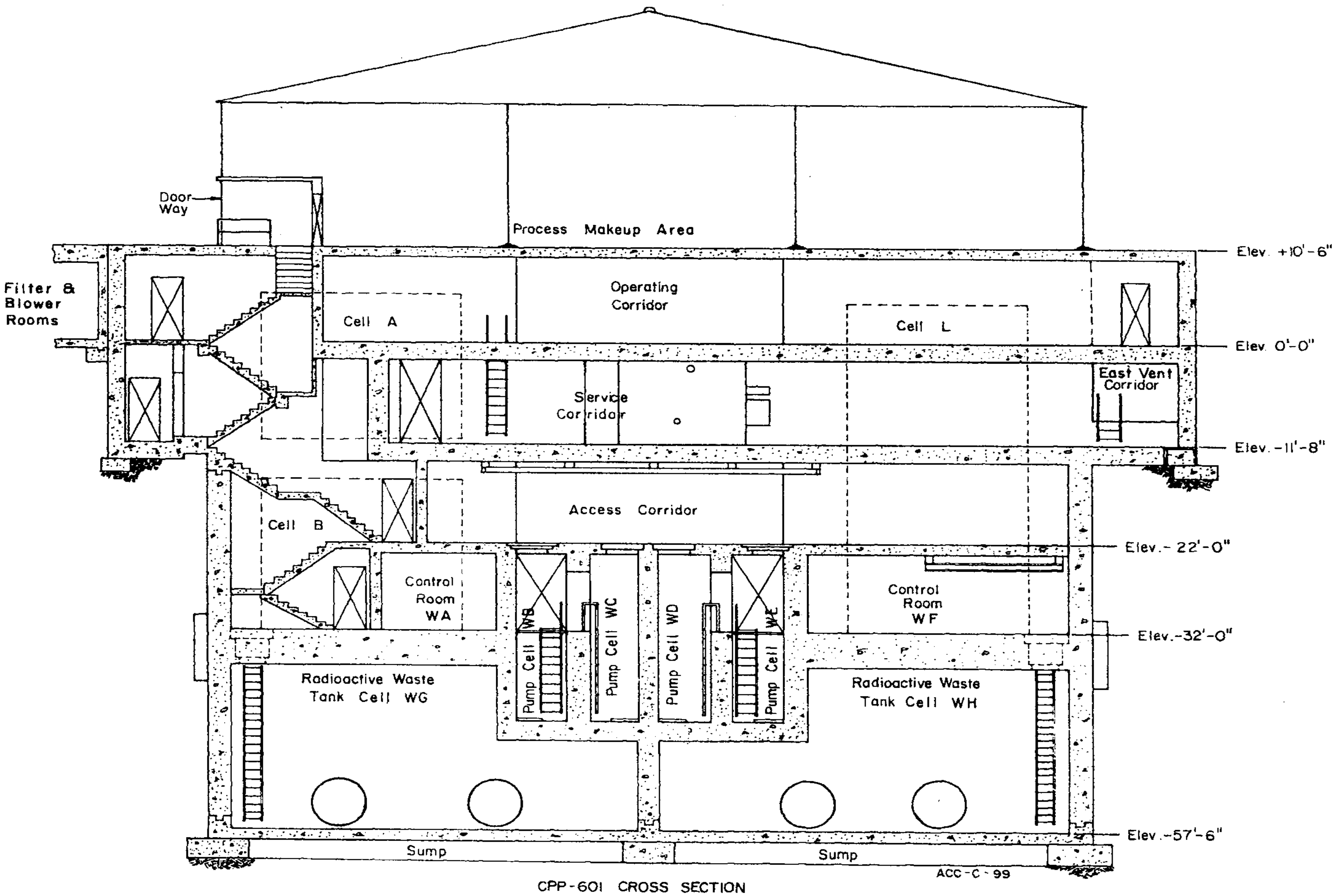


Exhibit B-8. CPP-601 Process Building cross-sectional view.

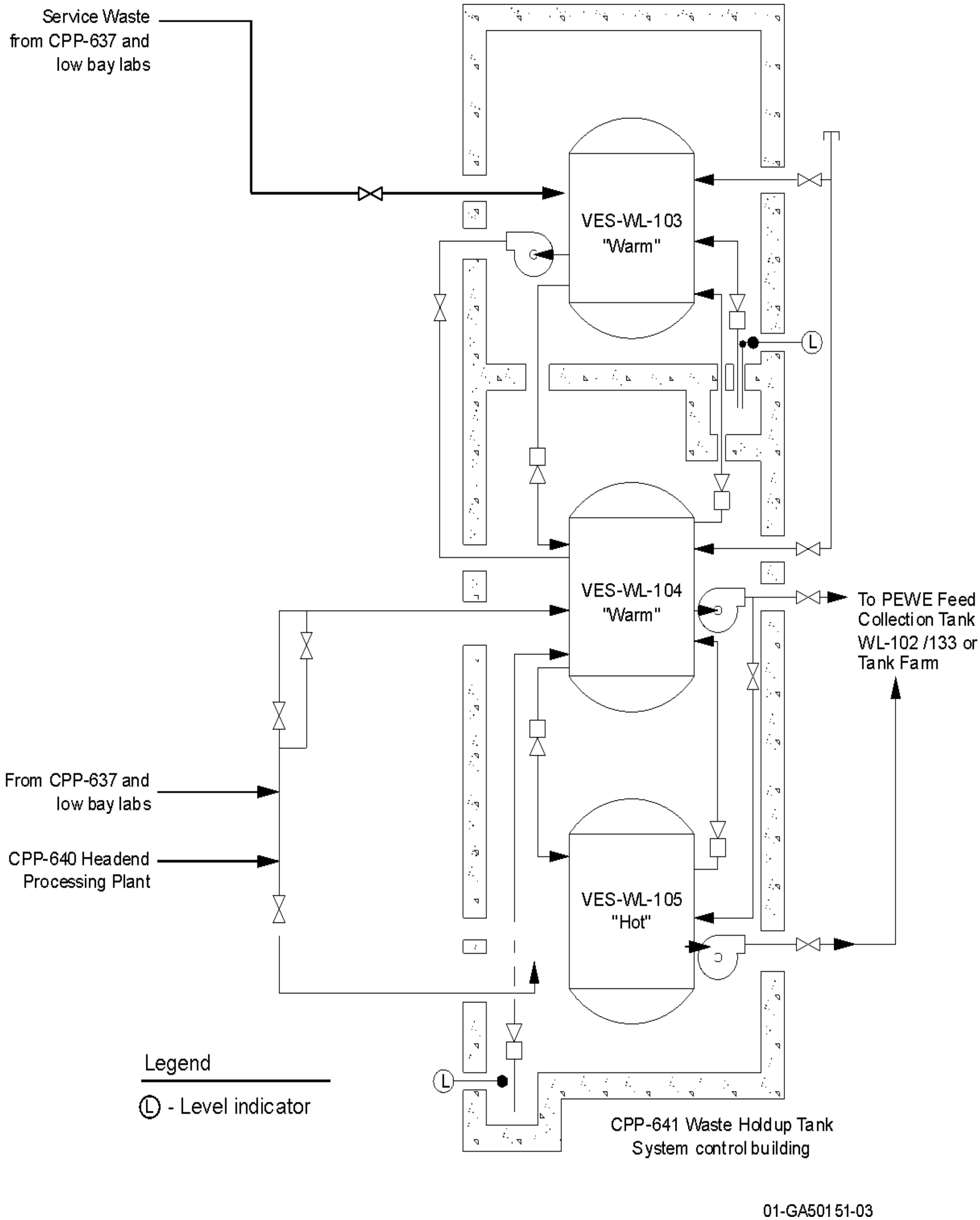


Exhibit B-9. Westside Holdup Tank System.

Building CPP-1618 LET&D System Storage and Treatment

The LET&D treatment process reduces the volume of liquid waste by fractionating PEWE overhead condensates into saturated steam/offgas and acid fractions. The fractionators separate the waste solution into water (overheads) and nitric acid (bottoms).

Wastes are treated and stored in tanks in CPP-1618. The LET&D system includes tanks and ancillary equipment in the CPP-659 Annex and in CPP-1618. For a detailed description of the LET&D system, see Section D of this Part B Permit Application.

The Liquid Effluent Treatment and Disposal (LET&D) facility is currently used to concentrate nitric acid solutions. Construction of the facility was completed in 1992. System operability tests were completed and waste storage and treatment were started in January 1993.

The LET&D facility is a three-story, steel-frame, metal-sided structure. It has two reinforced concrete process cells. The Acid Fractionator Cells have internal dimensions of 17 ft by 14 ft 6 in. The cell walls are epoxy-coated, and the lower 3 ft of the walls and the floors are lined with stainless steel. The cells contain the Acid Fractionator Waste Feed Head Tank, VES-WLK-197; the acid fractionator units, FRAC-WLL-170 and FRAC-WLK-171; the Bottoms Tank, VES-WLL-195; and associated ancillary equipment. The remaining portions of the three-story structure contain the process offgas system, sample cell, and utility support systems. Drawing 092440 represents the space occupancy floor plan for CPP-1618 (see Appendix B-1). Exhibit B-10 shows the equipment arrangement in the first floor plan of the LET&D facility. Drawings 347791, 347796, and 347798 illustrate the CPP-1618 concrete and liner details.

LET&D Acid Recycle Tank Building and Acid Head Tank (CPP-659 Annex)

The Acid Recycle Tank, VES-NCR-171, and Acid Head Tank, VES-NCR-173, are located in the CPP-659 Annex adjacent to the New Waste Calcining Facility (NWCF, CPP-659). The CPP-659 Annex is used to house a 22,500 gallon stainless steel tank which stores acid produced by the LET&D fractionation process. VES-NCR-173 is a stainless steel tank, which stores nitric acid prior to being transferred throughout the INTEC for reuse. The tank has capacity of approximately 90 gallons. A sump, 4 ft by 4 ft by 9 ft 9 in., is located in the corner of the annex. The vault has internal dimensions of 17 ft 4 in. by 41 ft 3 in., with a stainless steel wainscot 4 ft 8 in. high. The floor, sump, and walls are lined with stainless steel to a height of 4 ft 8 in., to contain leaks and spills. Drawing 176263 illustrates the CPP-659 Annex concrete (see Appendix B-1) and drawing 176265 illustrates the stainless steel liner.

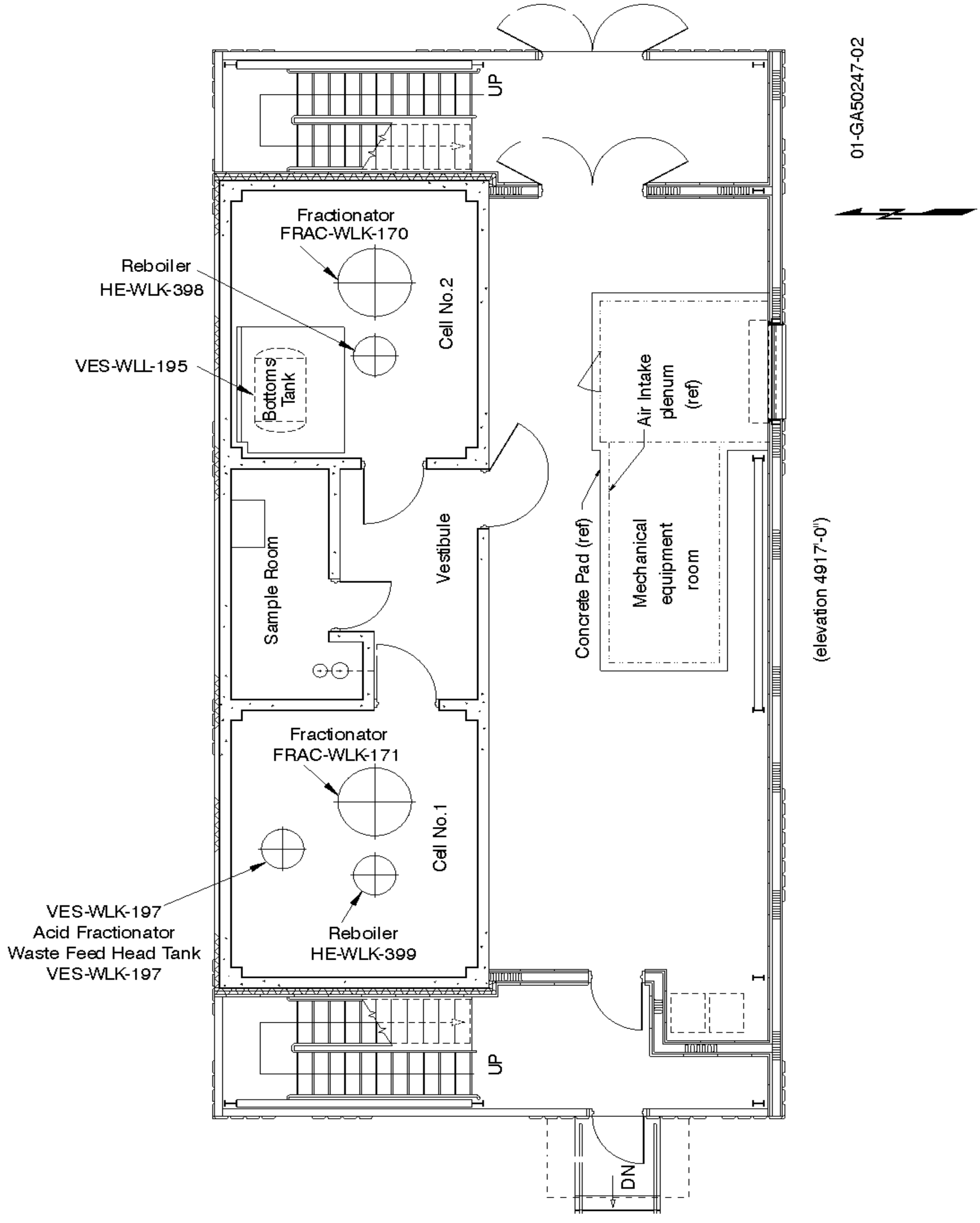


Exhibit B-10. LET&D facility first floor plan.

LET&D Cells and Vaults

LET&D Fractionator Cell 1

Acid Fractionator Cell 1 is 17 ft long and 14 ft 6 in. wide, with a stainless steel liner on the floor and 3-ft up the walls. The cell is constructed of steel-reinforced concrete. The cell has a door in the east wall. In front of the door is a step measuring 3 ft 10 in. by 3 ft 10 in. by 4 in. The floor is sloped toward a sump, which is located slightly to the northeast of the center of the cell. The cell walls are steel-reinforced concrete coated with epoxy.

LET&D Fractionator Cell 2

Acid Fractionator Cell 2 is 17 ft long and 14 ft 6 in. wide. The cell is constructed of steel-reinforced concrete with a stainless-steel liner on the floor and 3-ft up the walls. The cell has a door in the east wall. The floor is sloped toward a sump, which is located in the cell.

In the northwest corner of Fractionator Cell 2 is the vault containing the Bottoms Tank, VES-WLL-195. Although the floor of the fractionator cell does not slope directly to the Bottoms Tank vault, the vault would serve as the containment mechanism if a leak caused the sump to overflow. The vault containing the Bottoms Tank is completely lined with stainless steel. The floor of the Bottoms Tank vault slopes toward the west, where the vault sump is located.

Construction Specifications for CPP-601, CPP-604, CPP-641 and CPP-1618

Buildings CPP-604 and CPP-601 were constructed using the same construction specifications (Specification RC-542). Concrete floors and walls were constructed in accordance with the “Concrete and Reinforced Concrete” section of that specification (included as Appendix B-2). Painting was done in accordance with the “Painting” section (included as Appendix B-3), and structural steel was fabricated and erected in accordance with the “Structural Steel” section (included as Appendix B-4).

Building CPP-641 was constructed to a different set of construction specifications than CPP-604 and CPP-601. The floors and walls of these buildings were constructed in accordance with the “Concrete Masonry” specifications, which are included as Appendix B-5. The epoxy paint specifications used throughout INTEC are included as Appendix B-6.

These specifications are typical of the specifications used for the construction of the PEWE system. Modifications were performed under very similar specifications, using standards applicable at the time of construction. A sample modification specification for the addition of the spare evaporator, EVAP-WL-129, is provided in Appendix B-7.

Appendix B-1 contains applicable structural drawings for the PEWE system. All of the PEWE system vaults are lined with stainless steel, except the CPP-641 vaults, DVB-OGF-D8, and the VES-WL-101/VES-WL-102 vault. The CPP-641 vaults and DVB-OGF-D8 are painted with acid resistant epoxy paint that is compatible with the waste being stored/treated. The VES-WL-101/VES-WL-102 vault is lined with a Hypalon membrane, which is compatible with the waste being stored/treated. The containment and liners are further discussed in Section D-2f.

APPENDIX B-1

Drawing List/Package

Drawing List	Description
057757	CPP-641 CPP-661 CPP-681 SPACE OCCUPANCY FLOOR PLAN
092440	CPP-1618 SPACE OCCUPANCY FLOOR PLAN
103057	CPP-601 PROCESS BUILDING FOUNDATION PLAN
103171	CPP-604 WASTE DISPOSAL BUILDING SLAB AT ELEVATION 27 0 HATCH COVER DETAILS
103180	CPP-604 WASTE DISPOSAL BUILDING LIQUID EVAPORATION ROOM
103254	CPP-601 PROCESS BUILDING TANK ROOM STAINLESS STEEL FLOOR & WALL LINING
103530	CPP-604 FOUNDATION & ENCLOSURE FOR STORAGE TANKS SECTION PLAN DETAILS
103544	CPP-604 STORAGE TANK ENCLOSURE STAINLESS STEEL FLOOR & WALL LINING
111809	CPP-641 WASTE HOLD-UP TANK SYSTEM CONTROL HOUSE CONCRETE PLAN SECTIONS & DETAILS
111810	CPP-641 WASTE HOLD-UP TANK SYSTEM CONTROL HOUSE CONCRETE SECTIONS & DETAILS
133376	CPP-659 FLOW DIAGRAM LEGEND SYMBOLS AND ABBREVIATIONS
155069	CPP-604 SPARE PEW EVAPORATOR SYSTEM PLAN & SECTIONS
155070	CPP-604 SPARE PEW EVAPORATOR SYSTEM SECTIONS & DETAILS
158768	CPP-604 CONDENSATE CELL FLOOR LINER PLAN & CONNECTIONS
162748	CPP-604 WL-129 EVAPORATOR UPGRADE CELL NO. 2 CELL LINING PLAN SECTIONS AND DETAILS
176263	CPP-659 LET&D ACID RECYCLE SYSTEM FOUNDATION PLAN
176265	CPP-659 LET&D ACID RECYCLE SYSTEM FOUNDATION SECTIONS
176301	CPP-659 LET&D ACID RECYCLE SYSTEM HEAD TANK VES-NCR-173 & SUPPORT BRACKET
340569	CPP-601 SPACE OCCUPANCY FLOOR PLAN TANK CONTROL & PUMP RM
347791	CPP-1618 LIQUID EFFLUENT TREATMENT & TREATMENT FACILITY NOTES & ABBREVIATIONS
347796	CPP-1618 LIQUID EFFLUENT TREATMENT & DISPOSAL FACILITY BOTTOMS TANK PIT PLAN SECTIONS & DETAILS
347798	CPP-1618 LIQUID EFFLUENT TREATMENT AND DISPOSAL FACILITY FIRST FLOOR PLAN

369374	PWL COLLECTION SYSTEM SUMP DETAILS
369376	PWL COLLECTION SYSTEM FLOOR /WALL PENETRATIONS DETAILS
370862	604 WL-101/102 VAULT PROJECT VAULT LINER SYSTEM ASSEMBLY PLAN & INSTALLATION NOTES.
370863	604 WL-101/102 VAULT PROJECT VAULT LINER SYSTEM ASSEMBLY SECTIONS.
370864	CPP-604 WL-101 WL-102 VAULT PROJECT VAULT LINER INSTALLATION
370865	CPP-604 WL-101 WL-102 VAULT PROJECT VAULT LINER INSTALLATION NOTES & DETAILS
370866	CPP-604 WL-101 WL-102 VAULT PROJECT VAULT LINER FOLDING PATTERN
370867	CPP-604 WL-101 WL-102 VAULT PROJECT VAULT LINER FABRICATION
400814	CPP-604 SPACE OCCUPANCY FLOOR PLAN
400815	CPP-604 SPACE OCCUPANCY FLOOR PLAN

APPENDIX B-2

Concrete and Reinforced Concrete Specification

FOSTER WHEELER CORPORATION
165 BROADWAY
NEW YORK CITY

<table>
<tr><td rowspan="3">OIL
DIVISION

DESIGN
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CONCRETE

2-01 GENERAL SPECIFICATIONS

General Specifications outlined under Section 1 are a component part of this Specification and shall be consulted in detail for instructions pertaining to this work.

2-02 SCOPE OF WORK

a. These specifications cover the use of concrete and reinforced concrete in buildings, foundations, frames and other similar structures forming a part of the Chemical Process Plant.

b. The 1940 “Report of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete,” containing their Recommended Practice and Standard Specifications for Concrete and Reinforced Concrete and hereinafter referred as the J.C.R., is the basis of these specifications and the recommendations and specifications of this Report shall be followed in all respects except as modified and interpreted by these specifications. References to “Sections” and chapters in these specifications refer to Sections and chapters of the same number in the J.C.R.; and any such references herein or in the J.C.R. shall be understood to include the modifications and interpretations of these specifications.

2-03 DRAWINGS FOR CONCRETE WORK

Working drawings and schedules furnished by the Contracting Officer show typical dimensions, form of concrete, sizes and typical arrangement of reinforcing. The work shall be installed in full accordance with these drawings and this specification.

2-04 FORMWORK

a. General: Forms shall conform to shape, elevations, lines and dimensions of the members as called for on the drawings. They shall be straight and true and must be carefully checked immediately prior to the placing of concrete.

All forms shall be constructed so as to prevent leakage of mortar and shall be amply strong, rigidly braced, shored and tied together so as to maintain position and shape.

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Responsibility for adequacy and safety of forms rests with the Contractor, but design of all such work is subject to the Engineer's approval. Completed forms in place must be inspected and approved by Engineer before any concrete is placed.

Contractor shall provide inserts to form raggles, chases or openings in the work, as shown on drawings.

Form Ties shall be bolts and rods of adjustable type to permit tightening from outside of the forms, and sufficiently rigid to prevent displacement from mechanical vibration; arrange so that upon removal of forms no metal is within 1 inch of any exposed concrete surface; form ties for walls subject to internal or external pressure shall be permanent snap type with water seals; twisted wire ties not permitted for any forms.

Material for forms may be reused only so long as its condition is such as will produce smooth, true, defect-free surfaces and straight joint lines in the finished concrete. Edges of forms shall be square, true and flush and shall be butted tight. All butt joints and edges shall be supported full length of board.

Forms for exposed surfaces of concrete shall be made of plywood or other material approved by the Contracting Officer. If plywood is used it shall be Commercial Douglas Fir, concrete form plywood, not less than 5 ply and at least 5/8 inch thick. Adsorptive form liners shall be used when required by the Engineer.

The edge of all concrete shall be chamfered 1 inch unless otherwise specified.

The face of all forms for concrete surfaces that are to be painted, shall be coated with Amercoat-33 or approved equal which is non-oil, wax or paraffin bearing.

In the case where the excavation for footing or foundation walls has been made to the exact dimension of the finished concrete and no further forming is required, the earth shall be wet down before placing concrete.

Temporary opening shall be provided at the base of column and wall footing forms to facilitate cleaning and inspection before concrete is deposited.

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All forms shall be cleaned of all debris and shall be approved by the Contracting Officer before concrete is placed. Form work approved for concrete shall be properly protected until concrete is poured.

b. Setting Items Furnished by Other Trades: The Contractor shall carefully and accurately install anchor bolts, miscellaneous iron items, nailing strips, sleeves, inserts, masonry anchors, etc., that are to be furnished by the Contractor under other divisions of the work and that are to be cast into the concrete.

Where anchor bolts and dowels extend into existing concrete a hole of at least 1 inch larger diameter than the bolts or dowels shall be drilled into the concrete. Holes shall be filled with molten lead when anchor bolts or dowels are in place.

c. Removal of Forms: Forms shall not be disturbed until the concrete has hardened sufficiently to permit their removal with safety. Shoring shall not be removed until the member has acquired sufficient strength to support safely its own weight and the load upon it. Members subject to additional loads during construction shall be adequately shored to support both the member and construction loads in a manner that will protect the member from damage.

Forms and shoring shall not be removed without permission of the Contracting Officer; however, approval to remove forms shall not relieve the contractor of responsibility for too early removal.

No painting or damp proofing of concrete shall be done until the work has been examined by the Contracting Officer and his permission given.

2-05 REINFORCEMENT

a. General: Wire mesh reinforcement shall be welded, cold drawing steel wire conforming to the requirements of the A.S.T.M. Standard Specifications for Cold Drawn Wire Reinforcement, Serial Designation A-82 and A-185.

All reinforcing bars lacking grade identification marks shall on delivery be accompanied by a manufacturer's guarantee of grade which will identify variations.

b. Metal reinforcement shall be free from scale and ice before placing.

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Reinforcement shall be accurately formed to dimensions on drawings. Stirrups and tie bars shall be bent around a pin having a diameter of not less than twice the bar thickness. Bends for other bars shall be a full semi-circle made around pins having the following minimum diameter:

6 times the minimum bar diameter

All bars shall have a minimum extension of 6” beyond bends

All bends shall be made cold.

Metal reinforcement shall be accurately positioned and secured against displacement by using annealed iron wire ties or clips at intersections and shall be supported by concrete or metal supports or metal hangers.

The minimum center to center distance between bars shall be 2-1/2 times the diameter of round or 3 times the side dimension of square bars, but in no case shall the clear distance between the bars be less than 1-1/2 times the maximum size coarse aggregate.

At those surfaces of footings or the principal structural member in which concrete is deposited against the ground, reinforcement shall have a protective coating of 3 inches. At all other surfaces reinforcement shall be protected by 2 inches of concrete.

Bars which are intended to be used for future bonding shall be protected by cinder concrete.

Splices in reinforcement shall be of sufficient length to transfer the stress by bond and shear. Spaces of reinforcement shall be avoided at points of maximum stress in slabs, beams, and girders.

Where a change occurs, in the cross section of a column the longitudinal reinforcing bars shall be offset in a region where lateral support is afforded the column. The slope of the inclined portion of the bar shall not be more than 1” in 6”. In tied columns the ties shall be spaced at 3” maximum centers for a distance of one foot below the actual point of offset.

Reinforcing bars shall be deformed bars of intermediate grade or hard grade steel as specified and conforming to ASTM Spec. A184 (intermediate grade billet steel), or ASTM A185. The type of deformed bars and type of fabricated reinforcing must meet with the approval of the Engineer.

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Reinforcement shall be stored in a manner preventing objectionable changes in original surface characteristics in separate piles or racks above grade.

CONCRETE MATERIALS

2-06 CLASSIFICATION OF CONRETE

a. The intent of this specification is to secure for every part of the work, concrete of homogenous structure which, when hardened, will have the required strength and resistance to weathering when made with materials as specified and in accordance with limiting strengths and water content shown in Table A, for the particular class or classes of concrete called for on the drawings.

b. Strength Requirements for classes of concrete listed:

Table A.

(1) Class of Concrete	(2) Min. Allow. Compressive Strength at 28 Days for Type I Cement P.S.I	(3) Min. Allow. Compressive Strength at 7 Days for Type I Cement P.S.I	(4) Max. Allow. *Net Water Content Gallons per Sack of Cement	(5) Max. Allow. Compacted Volume of Aggregate per Volume of Cement	(6) Slump Range Inches for Standard Cone
“A”	2500	1500	7	5	1-3
“B”	3000	1950	6	4	1-3
“C”	3750	2625	5-1/4	3-1/2	1-3

Normal, Type I ASTM Designation C150 Portland Cement, with alkali content limited to 0.06% by weight, shall be used.

Class “C” concrete shall have a minimum density of 144 lbs. per cubic foot.

* Net water is the water content after correction has been made for absorption by aggregate or free water in aggregate, whichever condition exists.

2-07 PROPORTIONS OF AGGREGATE

Proportions of aggregates in the mix shall be maintained within the limits of Table B.

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TABLE B

Maximum Size Coarse Aggregate in Inches	Ratio of Fine to Total Aggregate on Basis of Dry Compact Volumes Measured Separately	
	MINIMUM	MAXIMUM
3/8	55%	70%
¾	40%	60%
1-1/2	35%	50%

2-08 COMPOSITION

a. General: Concrete shall be composed of cement, sand, coarse aggregate and water, all well mixed and brought to the proper consistency. It is contemplated that the concrete will range in character from mass concrete in which the maximum size of coarse aggregate is one and one-half inches, to heavily reinforced concrete in which the maximum size of coarse aggregate is three-quarters of an inch.

b. Maximum Size of Aggregate: The maximum size of coarse aggregate used in the concrete for any part of the work shall be the largest of the specified sizes of which, in the opinion of the Engineer, it is practicable to use and secure satisfactory placing of the concrete.

c. Mix Proportions: The exact proportions in which the various ingredients are to be used for the different parts of the work shall be determined from time to time during the progress of the work, as tests are made of samples of the aggregates mined on the basis of producing concrete having suitable workability, density, impermeability, and required strength, without the use of an excessive amount of cement. Test of the concrete will be made by the Commission. Misproportions shall be changed whenever necessary or desirable, to secure the required economy, workability, density, impermeability, or strength, and the subcontractor shall be entitled to no additional compensation because of such changes.

d. Consistency: The amount of water used in the concrete shall be changed as required to secure concrete of the proper consistency and to adjust for any variation in the moisture content or grading the aggregates as they enter the mixer. The quantity of water entering any batch of concrete shall be just sufficient, with a normal mixing period, to produce concrete of the required consistency.

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Addition of water to compensate for stiffening of the concrete resulting from excessive overmixing or objectionable drying prior to placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required. For mass concrete, the slump shall not exceed 3 inches and for ordinary reinforced walls, beams, lining and slabs, the slump shall not exceed 3 inches. A greater slump than 3 inches, but not exceeding a maximum of 6 inches will be permitted only in exceptional cases where internal or external vibration of the concrete is not practicable and where specifically authorized by the Engineer for concrete in positions especially difficult to place. The slumps stated herein are the maximum slumps of the concrete after being deposited but prior to being compacted, and the right is reserved to require lesser slumps in any or all mixes whenever such lesser slumps are practicable and will produce concrete of better quality or grater economy.

e. Test: The compressive strength of the concrete will be determined through the medium of tests of 6 x 12 inch cylinders, made and tested in accordance with the latest A.S.T.M. Standard. Slump tests will also be made in accordance with the latest A.S.T.M. Standard C143. The subcontractor shall provide facilities and labor for procuring and handling representative test samples, which shall be four test cylinders for each 100 cu. yds. or fraction thereof.

2-09 CEMENT

The cement will be Portland Cement of specified Type I that will conform with A.S.T.M. Standard C150 and will be delivered to the site in bulk carload lots: Provided, that at the request of the Engineer, cement for grout and isolated minor items of concrete will be delivered in paper sacks. In order that cement may not become unduly agreed after delivery.

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The subcontractor shall not use cement in the work direct from his freighting or other hauling or transporting operations whenever any cement is available that has been stored more than 60 days after delivery to the subcontractor. Storage bins for bulk cement shall be constructed so that there will be no dead storage and if there is reason to believe that any dead storage exists, the bins shall be emptied completely at least every 60 days. The cement shall be kept in a dry condition at all times.

2-10 WATER

The water used in concrete, mortar, and grout will be reasonably clean and free from objectionable quantities of silt, organic mater, alkali, salts, and other impurities. The turbidity of the water shall not exceed 1,000 parts of suspended solids per million parts of water.

2-11 SAND

a. General: The term “Sand” is used to designate aggregate in which the maximum size of particles is three-sixteenths of an inch.

b. Quality: The sand shall be natural sand, consisting of hard dense, durable particles, and shall be free from injurious amounts of dust, lumps, soft or flaky particles, shale, alkali, organic matter, loan, mica, and other deleterious substances. The maximum percentage of deleterious substances in the sand delivered to the mixer shall not exceed those stipulated in A.S.T.M. Standard C33. The sum of the percentage of all deleterious substances shall not exceed five per cent by weight. The sand shall be free from injurious amounts of organic impurities. Sand producing a color darker than Standard Plate 2, A.S.T.M. Designation C40, shall be rejected only when it fails to pass the requirements of ASTM Designation C-109.

c. Grading: The sand, as batched, shall be well graded and, when tested by means of United States Standard sieves shall conform to the following limits of gradation:

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Sieve No.	Cumulative Percent by Weight Retained on Sieve
4 (3/16 inch)	0 – 5
8	10 – 20*
16	20 – 40
30	35 – 65
50	70 – 85
100	90 - 95

*Not over 40 percent of total weight of sample shall pass any one screen and be retained on next finer screen.

The sand shall have a fineness modulus of not less than 2.40 or more than 3.00. The grading of the sand shall be controlled so that the fineness modulus of at least 6 out of the last 10 consecutive test samples taken at the mixer will not vary more than 0.20 from the average fineness modulus of the 10 test samples.

2-12 COARSE AGGREGATE

a. The term "Coarse Aggregate" is used to designate aggregate ranging in size of particles from three-sixteenths of an inch to 1-1/2 inches or any other designate range of sizes within this range.

b. Quality: The coarse aggregate shall consist of hard, dense, durable, rock particles and shall be free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious substances.

The maximum percentages of deleterious substances in the coarse aggregate delivered to the mixer shall not exceed the following values:

Materials passing a No. 200 Sieve	Percent by Weight
Shale	1.0
Coal	1.0
Clay Lumps	0.5
Other deleterious substances	1.0
Total, maximum allowable	3.0

Crushed material shall be limited to 25% in any one size

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c. Separation: The coarse aggregate shall be separated in two sizes, as follows:

Designation of Size	Range of Size
¾ inch aggregate	3/16 to ¾ inch
1 ½ inch aggregate	¾ to 1 ½ inch

Separation of the coarse aggregate into the two sizes shall be such that, when coarse aggregate of any size is tested by screening on the screen designated in the following tabulation, the percentages of undersize, by weight shall not exceed two percent for the ¾ inch aggregate and 1 ½ inch aggregate.

There shall be no oversize in any sizes of coarse aggregate.

		Size of Square Opening in Screen	
Size	Graduation	Test for Undersize	Test for Oversize
¾" Aggr	25-55 passing 3/8" Scr.	1/8 inch	7/8 inch
1 ½"Aggr	40-60 passing 1" Scr.	5/8 inch	1-3/4 inch

2-13 BATCHING

a. General: Sand and each individual size of coarse aggregate entering the concrete and such means and equipment and its operation shall be subject at all times to the Commission's approval. The amounts of cement, sand, and each individual size of coarse aggregate entering each batch of concrete shall be determined by direct weighing and the amount of water shall be determined by direct weighing. Periodic tests of free water content of aggregate shall be made and batch weights should then be adjusted to correct for variations in the moisture content of aggregate.

b. Equipment: The measuring and weighing equipment shall conform to the following requirements:

(1) Each weighing unit shall include a visible springless dial or equally suitable dial which will register the scale load at any stage of the weighing operation from zero to full capacity.

(2) The equipment shall be capable of ready adjustment for compensating for the varying weight of any moisture contained in the aggregate and for changing the mix proportions.

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(3) Batcher equipment shall be capable of controlling the delivery of material for weighing so that the combined inaccuracies in feeding and measuring during normal operation will not exceed one and one-half percent for water or weighed cement, two percent for sand, ¾ inch and 1 ½ inch coarse aggregate. The accumulated weight differential shall not exceed two percent.

(4) Weighing hoppers shall be constructed so as to permit the convenient removal of overweight material in excess of the prescribed tolerances and acceptable facilities shall be provided for readily obtaining representative samples of materials from the batchers for test purposes.

(5) The operating mechanism in the water-measuring device shall be such that leakage will not occur when the valves are closed and that small increments of water maybe discharged when required for final tempering the concrete in the mixer. There shall be a suitable surge chamber to prevent water-hammer in the lines.

(6) In so far as practicable, each dial and water-measuring device shall be in full view of the operator and the weighing equipment shall be arranged so that the operator may conveniently observe the operator of the bin fates and also the materials discharged into the mixer hopper.

2-14 MIXING

a. The cement, sand, and coarse aggregate shall be so mixed and the quantity of water added shall produce a homogeneous mass of uniform consistency. Dirt and other undesirable substances shall be excluded carefully. All concrete shall be mixed thoroughly in batch mixers of an approved type and size and designed so as to positively insure uniform distribution of all the component materials throughout the mass during the mixing operation. Water shall be added prior to, during, and following the mixer – charging operations. The mixing of each batch shall continue for not less than the number of minutes stated in the tabulation at the end of this paragraph after all materials, except the full amount of water, are in the mixer. The minimum mixing periods specified are predicted on proper control of the speed of rotation of the mixer and of the introduction of the materials, including water into the mixer.

Excessive overmixing requiring the additions of water to preserve the required consistency will not be permitted. If the mixing and charging operations are such that the required uniformity of composition and consistency is obtained in a shorter mixing time than the minimum specified without sacrifice of needed workability, the mixing time may be shortened if and or approved by the Commission.

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Mixers shall not be loaded in excess of their rated capacity. The mixer shall be equipped with a mechanically or electrically operated timing and signaling and metering device for indicating and assuring the completion of the required mixing period and for counting the batches.

REQUIRED MIXING PERIODS

Capacity of Mixer	Time of Mixing
2 cubic yards or less	1 ½ minutes
3 cubic yards	2 minutes
4 cubic yards	2 ½ minutes

b. Temperature of Concrete

(1) Hot Weather: It is desired that concrete when delivered from the mixer shall have a temperature of not more than 80ºF.

(2) Cold Weather: Aggregates shall be free from frost, and water shall be free from ice. The concrete, when discharged at mixer, shall have a temperature not less than 40ºF. for mass concrete and 60ºF. for structural concrete.

2-15 TRUCK MIXING AND TRANSPORTING

a. When a truck mixer, or agitator provided with adequate mixing blades is used to transport the concrete, the mixing time of the central plant may be reduced to minimum of 30 seconds and the mixing completed in the truck mixer or agitator, provided that the size of the batch is not greater than that permitted for truck mixing. This mixing time in the truck mixer or agitator shall be the same as for central plant mixer.

b. When materials are dry-charged into transit mixers not less than 60 nor more than 150 revolutions of the drum or blades at the speed recommended by the manufacturer shall be required.

c. Concrete shall be delivered to the site of the work and its discharge from the hauling container shall be completed as soon as possible, and at no time shall any concrete remain in the truck mixer for a longer period than ¾ hours after introduction of the mixing water, except when permitted by the Engineer.

No concrete shall be placed in the work after its initial set has occurred, and retempered concrete will not be accepted.

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2-16 DEPOSITING CONCRETE

a. General: Concrete shall be deposited in accordance with the Recommended Practice and Standard Specifications for Concrete and Reinforced Concrete of the American Concrete Institute, latest edition, and as outlined herein.

Before beginning placement of concrete, hardened concrete and foreign materials, shall be removed from the inner surface of the mixing and conveying equipment.

Before depositing concrete, debris and water shall be removed from the space to be occupied by the concrete. Any flow of water into an excavation shall be diverted through proper side drains to a sump, or be removed by other approved methods which will avoid washing the freshly deposited concrete.

Place concrete as near as possible in final position to avoid rehandling and continue operation until panel or section is completed. Do not use concrete partially hardened, retempered or contaminated by foreign materials. Care must be taken to prevent the splashing or spilling of concrete against form surfaces of the fouling up of inserts and fixtures in advance of concrete placing.

Compact concrete thoroughly to fill completely around reinforcement, embedded fixtures and into corners of forms. Use vibrators under experienced supervision.

Pour vertical members at least two hours before placing concrete in horizontal construction supported thereon.

Where compacting is difficult or reinforcement congested, place in forms patches of mortar of same cement to sand proportions as used in concrete and at least one (1) inch thick.

When concrete is conveyed by chutes the equipment shall be of a size of insure continuous flow. The chutes shall be metal, or metal lined and shall slope not less than 1 vertical to 2 horizontal. The discharge end of the chute shall be provided with a baffle plate to prevent segregation. If necessary, a spout shall be used between the discharge end and the surface of the concrete. The maximum allowable height of free fall of concrete from bucket or end of chute shall be two (2') feet.

b. Compacting: During and immediately after placing, thoroughly compact and work concrete around all reinforcement, embedded fixtures, and into corners of forms; unless other methods are authorized by the Engineer, use high-frequency internal

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vibrators for this purpose the type and operation of which is subject to the Engineer's approval, with procedure according to the following:

(1) Placement of Layers: Concrete shall be placed in two-foot layers, with each layer thoroughly compacted before the succeeding layer is placed and at such rate that each succeeding layer is placed before preceding layer has reached its initial set.

(2) Extent of Vibration: Concrete shall be internally vibrated through entire depth of each new layer and several inches into layer below. Apply vibration at point of deposit and uniformly throughout the freshly placed concrete, not further apart than the radius over which vibration is visibly effective. External vibration of forms shall be done when and as directed by the Engineer.

(3) Duration of Vibration: Concrete shall be vibrated for a sufficient time to accomplish thorough compaction and complete embedment of reinforcement and fixtures without segregation of mix. Revibration after a waiting period may be done under supervision of the Engineer.

c. The Contractor shall advise the Engineer at least 10 days in advance of the contemplated pouring period, of his intentions and plans with respect to pouring and the use of vibrators, chutes, and pneumatic placing and pumping equipment. The contractor shall obtain written approval of the Engineer before proceeding with the use of such equipment.

2-17 BONDING CONCRETE TO CONCRETE ALREADY IN PLACE

Before depositing new concrete on or against concrete which has hardened, the forms shall be retightened; the surface of the hardened concrete shall be thoroughly cleansed of foreign matter, and laitance, roughened and saturated with water. The surface of the hardened concrete shall be slushed with a coating of neat cement grout before depositing new concrete. The new concrete in the contact zone shall contain an excess of mortar to insure bond.

2-18 CONSTRUCTION JOINTS

a. (1) Columns: Joints in columns shall be made at the underside of floor members and at floor levels. Haunches shall be considered as part of the continuous with the floor and roof. At least two hours shall elapse after depositing concrete in columns or walls before depositing concrete in the floor system.

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(2) Floor: Construction Joints in the floor system shall be located near the middle of the span in slabs, beams, and girders unless a beam intersects the girder at this point, in which case the joint in the girder shall be offset a distance equal to twice the width of the beam. Proper provision shall be made in this case for shear.

The procedure outlined in Section 2-17 shall be followed for bonding new concrete to old concrete. Reinforcement shall continue through the joint. A key shall be provided.

When a construction joint exists in buildings more than 100 feet long, or there is a distance of 100 feet or more between construction joints special reinforcement shall be provided. This shall consist of reinforcing bars located in the face of the member opposite the face containing the main tensile steel. These bars shall be at right angles to the joint and shall extend on both sides of the joint a distance of 40 diameters for deformed bars and 50 diameters for plain bars.

Construction joints shall be kept to a minimum in structures planned as water-tight. Such joints shall have a copper water stop centrally located in the key.

b. Expansion and contraction joints shall be located at points and of type and design indicated in specifications or drawings.

2-19 PROTECTION AND CURING

a. The protection and curing of concrete shall conform to the Recommended Practice and Standard Specifications of the “JCR.”

b. All concrete materials, reinforcement, forms and the ground with which concrete is to come in contact, must be free from frost.

c. No loads shall be placed on concrete for a period of 10 days after depositing or until approval is obtained from the Contracting Officer.

d. In cold weather, concrete when deposited, and for 72 hours thereafter, shall have a temperature of not more than 70ºF. and not less than 50ºF. Cooling of the concrete to outside temperature shall be done at a rate of from 20ºF. to 30ºF. per day. The methods of protection against freezing and loss of moisture shall be determined jointly by the Engineer and the Contractor, but must have the approval of the Engineer.

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2-20 GROUT AND FINISHING

Grout shall be a mix consisting of 1 part Portland Cement and 2 parts fine sand mixed to a creamy consistency.

All dimensions given on drawings are for finished concrete. All allowances shall be made for 1” of grout under all columns, saddles, or pedestals supporting equipment.

In general any special types or methods of finishing will be specified elsewhere for individual cases or will be defined in writing by the Engineer. In the absence of specific instructions to the contrary, roofs, walks, and similar surfaces shall be finished monolithically to proper level with a strike-off board and trowelled with a wooden float, and the recommended practice as set forth in Section 701 to 730 inclusive of Chapter VII of the J. C. R. shall govern for other types of methods of finishing which may be specified.

2-21 EXERIOR AND INTERIOR CONCRETE STAIRS

Construct as detailed on drawings with 3/8 inch radius coves, nosings slightly rounded, treads slightly pitched on exterior stairs for drainage. Concrete shall be at least 2500 lb. Compressive strength or strength as indicated on drawings.

The mix for finish topping shall incorporate clean grits of 1/8 in. to 3/8 in. pea gravel with the addition of 12/30 mixture of carborundum grits, using ¼ in. per sq. ft of surface.

Use wood floats for troweling treads. After removal of forms, patch and repair all honeycomb to the satisfaction of the Contracting Officer.

2-22 WATERPROOFING AND PROTECTIVE TREATMENT

a. In general, no waterproofing will be required. Any special types or methods of waterproofing and protective treatments will be specified elsewhere for individual cases and will be defined in writing by the Engineer. In the absence of specific instructions to the contrary, the recommended practice as set forth in Section 601 to 614 inclusive of Chapter VI of the J.C.R. shall govern.

b. Roof and floor slab concrete shall be proportioned, mixed and placed with a view to inherent water tightness. The quantity of water used per sack of cement shall be the minimum consistent with workability and the requirements for placing.

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3-01 GENERAL SURFACE PREPARATION AND FINISH SPECIFICAITONS

a. Concrete surfaces shall be prepared and finished as herein specified. Interior surfaces of exposed concrete shall be prepared and finished according to the specifications in sections 3-01 through 3-07, as called for on the drawings and/or in the surface finish schedule in sections 3-08 through 3-13.

Surfaces which are pending final specification MUST NOT be treated with ANY concrete hardeners or ANY concrete base paints containing hardeners.

Any small cracks appearing after curing in any surfaces to be covered with an organic coating shall be filled with a putty similar to Amercoat No. 58 putty as manufactured by the American Pipe and construction Company, Los Angeles. The putty shall be applied with a wide blade putty knife in strict accordance with the manufacturer's instructions.

b. Unexposed Surfaces

Immediately after removal of forms, remove all loose material from voids and honey-combed areas, saturate with water and fill with cement mortar by approved concrete construction practice.

c. Complete Preparation of Exposed Surfaces

All exposed surfaces, unless otherwise specified, will be treated as follows:

(1) Forms shall be stripped as soon as possible, subject to approval of the Engineer.

(2) As soon as forms have been stripped from poured concrete surfaces, the surfaces will be ground to remove all fins and other extrusions.

(3) Then the surface will be dampened slightly and a grout rubbed well into the surface voids using burlap sacks. The grout should consist of two (2) parts cement to one (1) part fine sand mixed with enough water to produce a workable mixture.

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(4) After the voids have been filled, the surfaces will be struck with a steel trowel to remove all surplus grout.

(5) The surface should then be allowed to cure for a minimum of twenty-eight (28) days.

d. Preparation of Surfaces to be "Sika-Koted"

Surfaces to be covered with "Sika-Kote," as manufactured by the Sika Chemical Corporation of Passaic, New Jersey, shall be prepared as follows:

(1) Rough grind stripped concrete to remove all fins and other extrusions.

(2) Leave the surfaces absorbent, clean and free from paint, whitewash, dirt, oil or grease.

(3) Patch surface imperfections.

(4) Saturate surface with water so that it is moist – NOT dripped wet.

(5) Carry out any other surface preparation steps outlined in the manufacturer's instructions.

e. Preparation of Surfaces to be Hardened

Surfaces shall conform to lines and dimensions on the drawings.

The surfaces shall be ground to remove all fins and other extrusions and shall be left clean, dry, and free from dirt, oil or grease.

The surface shall also be prepared in any other way specified by the manufacturer of the surface hardener to be applied.

3-02 SPECIAL WALL PREPARATIONS

a. Etching

Only the surfaces that will be painted with an organic coating will be etched.

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The etching shall consist of the application of a solution of ten (10) percent hydrochloric acid until the resultant bubbling ceases. The acid solution may be applied by spray, swab, or mop but in such a manner as to wet the entire surface.

Following the application of the acid, the surfaces shall be thoroughly washed with fresh water and allowed to dry completely before the application of the organic coating.

Precautions <u>must</u> be enforced to avoid soiling the surfaces during and after cleanup.

<u>CAUTION</u>: Safety precautions, including protective clothing and adequate ventilation, shall be observed during etching operations.

b. <u>Degreasing</u>

The degreasing treatment specified herein shall be used where surfaces are greasy after the completion of work or where specified for special finishes.

The degreasing treatment shall be made with Tri-Klene (du Pont) or approved equal applied in strict accordance with the manufacturer's instructions. The surface shall be allowed to dry thoroughly before the application of any covering or coating.

<u>CAUTION</u>: Safety precautions, including protective clothing and adequate ventilation, shall be observed during degreasing operations.

c. <u>Preparation of Walls to be Tiled</u>

Any walls to be tiled shall be degreased as specified in section 3-02-b. In addition, these walls shall receive any other preparation recommended by the manufacturer of the tile to be applied.

d. <u>Preparation of Walls to be Hardened</u>

These walls shall be prepared as specified in section 3-01-e.

e. <u>Preparation of Walls to be Covered with Stainless Steel</u>

The walls to be covered with stainless steel shall be degreased as specified in section 3-02-b.

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f. Preparation of Walls Not to be Painted or Hardened or Covered with Stainless Steel or Tile

These walls shall be prepared as specified in section 3-01-c.

3-02 SPECIAL WALL PREPARATIONS

a. Preparation of Floors to be Painted with an Organic Coating

Concrete floors should be wood floated or troweled to leave a smooth, slightly granular surface which is true and even, conforming to the lines and dimensions on the drawings.

These floors shall be etched as specified in section 3-02-1.

b. Preparation of Floors to be Tiled

The surface shall be rubbed and the small voids filled with mortar. After curing, the surface shall be prepared for tile installation by wire brushing and washing with water.

In addition, any floors to be tiled shall be degreased as specified in section 3-02-b and receive any other preparation recommended by the manufacturer of the tile to be applied.

Precautions to prevent the soiling of the floor before the installation of tile must be enforced.

c. Preparation of Floors to be Covered with Stainless Steel

These surfaces shall be degreased as specified in section 3-02-b.

d. Preparation of Floors to be Hardened

These floors shall be prepared as specified in section 3-01-3.

e. Preparation of Floors Not to be Painted or Hardened or Covered with Stainless Steel or Tile

These floors shall be prepared as specified in section 3-01-c.

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3-04 CEILING PREPARATION

Concrete ceilings shall be prepared and finished exactly as the walls of the same room except where otherwise specified. Wall preparations are described in section 3-02.

3-05 SURFACE HARDENING

a. Hardening of Wall Surfaces

Wall surfaces shall be prepared as specified in section 3-01-c of this specification.

The surface hardener shall be applied to a clean, dry surface which is free of dirt, oil or grease.

If necessary, degreasing as specified in section 3-02-b of this specification shall be carried out.

Surface hardening shall consist of three (3) applications of "Lapidolith" as manufactured by L. Sonneborn Sons, Inc., New York 11, New York or two (2) impregnations of "Sika Hardener," Bulletin S.H., as manufactured by the Sika Chemical Corporation of Passaic, New Jersey. Zinc fluosilicate or sodium silicate may also be used instead of the commercially prepared surface hardeners mentioned above.

CAUTION: In applying any surface hardener, the applicator must be completely protected against the possibility of the surface hardener getting into eyes or on skin, face or clothes. Boric acid should be used for any splashes which do get into the eyes.

b. Application of "Lapidolith" to Walls

"Lapidolith" is applied to vertical concrete surfaces with a long-handled brush or by spraying. If a spray is used, rinse spraying equipment thoroughly with water after use. Three (3) applications are necessary with a drying time of 24 hours between applications. Flow the instructions given by the manufacturer, L. Sonneborn Sons, Inc., New York, 11, New York for solutions and applications.

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c. Application of “Sika Hardener” to Walls

“Sika Hardener,” Bulletin S.H., shall be applied by impregnating the surface liberally and uniformly with the hardener solution using a brush or spray. Prepare hardening solution by dissolving crystals in hot water or use undiluted “Sika Hardener” solution.

Use hardener in the concentration and manner given in the printed directions of the manufacturer, the Sika Chemical Corporation of Passaic, New Jersey.

d. Application of Zinc Fluosilicate

First Coat: A solution of one (1) lb. of crystals per gallon of water.

Second & Third Coats: A solution of two (2) lbs. of crystals per gallon of water.

Application should be made with large brushes. Each application should be allowed to dry thoroughly. After the last application, the surface should be wire-brushed and washed with fresh water to remove crystals.

e. Application of Sodium Silicate

All coats: A solution of one (1) gallon of sodium silicate of about 42.5 deg. Baume gravity to four gallons of water. Successive coats may be stronger than the first coat. Application may be made with large brushes. Each coat should be allowed to dry thoroughly and then be scrubbed with water after it has hardened.

f. Wall Surfaces (Alternate Finish)

Wall surfaces in “cold” areas may have substituted for any hardener finish described in section 3-05-a through 3-05-e, a finish coat as follows:

1. Rough grind stropped concrete to remove all fins and other extrusions.

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2. Apply two (2) brush coats of "Sika-Kote" as manufactured by the Sika Chemical Corporation of Passaic, New Jersey in accordance with directions in the manufacturer's catalog.

3. The concrete should first be wet with water or a thin Sika mix. Then the "Sika-Kote" itself should be applied to fill the voids, paint the surface and tint the surface. The first coat should be rubbed in with a stiff fiber brush to fill all pores.

4. Keep the surface moist for two (2) days by applying a fine spray at frequent intervals.

5. Colors shall be as specified under the surface finish schedule for the particular building, as specified in sections 3-08 through 3-13.

g. Hardening of Floor Surfaces

Floors shall NOT be hardened where paint or an organic coating is to be applied.

Floors shall be prepared as specified in section 3-01-e.

Floor hardening shall consist of the application of two (2) impregnations of "Sika Hardener," Bulletin S.H., or approved equal. Surfaces to be treated must be clean, dry and free from dirt, oil, or grease.

Prepare hardening solution by dissolving crystals in hot water or use undiluted "Sika Hardener" solution. Apply solution liberally and uniformly on surfaces. Use hardener in the concentration and manner given in the printed directions of the manufacturer, the Sika Chemical Corporation of Passaic, New Jersey.

3-06 STAIR TREADS - PLATFORMS

Fill for interior stair treads and platforms shall be Portland Cement mortar of the proportion; 1 part Portland Cement, 1 part sand, 1-3/4 parts coarse aggregate of maximum size ½ inch, with the addition of ¼ lb. of carborundum grits per sq. ft. of surface.

A smooth finish and dense surface shall be contained by steel troweling.

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3-07 CONCRETE SIDEWALKS

Concrete sidewalks shall be used only where indicated on the drawings. All other sidewalks will be penetration macadam and bituminous concrete.

Concrete sidewalks shall be of Class A concrete, four (4) inches thick and conforming to the lines and dimensions indicated on drawings.

Finishing shall be done with a wood float and brooming, followed by wet curing for seven (7) days.

3-08 SURFACE FINISH SCHEDULE – PROCESS BUILDING CPP 601

For specific preparation and application instruction for Amercoat #23 and #33 and Nukemite #40 see the Section 101 Painting Specification, latest revision.

a. Surfaces which will NOT be Painted or Covered Pending Final Specification

The following surfaces will be prepared as specified in section 3-01-c pending final specification.

Walls and Ceilings – Cells, C, D, E, F, G, H, L, M, N, P, and U.

b. Surfaces which will be Painted with Amercoat #33.

The following surfaces will be prepared as specified in the approximate paragraphs of sections 3-01, 3-02, and 3-03 and section 3-04.

Walls and Ceilings – Cells, A, B, J, K, Q, R, S, V, W, Y, and Z,
Waste Tank Rooms
Pump Pits in Access Corridor
Pump Pits in Waste Tank Room
Access Corridor
Sample Galleries
Vent Corridor
Service Corridor

c. Surfaces which will be Painted with Amercoat #23

Floor - Makeup deck at dissolver chutes
Makeup deck at filter hatches
Vent Corridor
Access Corridor

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d. Surfaces which will be covered with Asphalt Tile

Floor - Cell X
- Operating Corridor

e. Surfaces which will be Painted with Nukemite #40

Floor - Sample Galleries

f. Surfaces which will be Hardened or Colored and Hardened

The following surfaces will be prepared as specified in section 3-01-e for hardening or in accordance with section 3-01-d for hardening and coloring for which colors are listed below:

Cell T (Sika #100 White) - Ceiling and Walls

Operating Corridor and Waste Tank Control Room

(Sika #408 Green) - Walls
(Sika #100 White) - Ceiling

The following surfaces will be prepared as specified in section 3-01-3 for hardening.

Floor - Cell T
- Waste Tank Control Room
- Loading Docks
- Makeup deck except as specified in Section 3-08-b

g. Other surfaces

Any other surfaces not to be painted, hardened or covered with stainless steel or tile shall be prepared and finished as specified in section 3-01-c.

3-09 SURFACE FINISH SCHEDULE – LABORATORY BUILDING CPP 602

a. Surfaces which will be Hardened

The following surfaces will be prepared as specified in Section 3-01-e.

Floor - Maintenance Shop
- Product Storage Room

b. Surfaces which will be "Sika-Koted"

The following surfaces will be prepared as specified in section 3-01-d:

Walls - All exposed concrete walls other than those to be covered with stainless steel, tile, organic covering or a surface hardener shall be covered with Sika #408 Green or Sika #231 Buff as specified in Section 102 Painting Specification, latest revision.

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Ceiling - All exposed concrete ceiling that are not otherwise specified for an organic coating or other covering shall be covered with Sika #100 White.

c. Other Surfaces

Any other surfaces, not to be painted, hardened or covered with stainless steel or tile shall be prepared and finished as specified in section 3-01-c.

3-10 SURFACE FINISH SCHEDULE – S.F. SOTRAGE BUILDING CPP 603

a. Surfaces which will not be Painted or Covered

All surfaces not otherwise specified on drawings or in this section will be prepared and finished as specified in section 3-01-c of this specification.

b. Surfaces which will be Painted with an Organic Coating

The following surfaces will be prepared as specified in the appropriate paragraphs of section 3-01, 3-02, or 3-03:

Walls and Floors - Loading and unloading pits
Canal
All basins and all surfaces of beams and columns in the basins.
Platform at cask washer and safety aprons ONLY.

c. Surfaces which will be Hardened

None

3-11 SURFACE FINISH SCHEDULE – WASTE DISPOSAL BUILIDNG CPP-604

a. Surfaces which will be Painted with an Organic Coating

The following surfaces will be prepared as specified in the appropriate paragraphs or sections 3-01, 3-02, or 3-03 and section 3-04:

Walls and Ceilings: - above stainless steel wainscoating:
Evaporator cell
Vessel WM-100 Cell
Vessel WM-101 and WM-102 Cell

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a. Surfaces which will be Painted with an Organic Coating (continued)

Floor, Walls and Ceilings: - Separation and Condensation Equipment Cell (containing units WL-112, WL-106, WL-107,etc.)

Vessel WL-101 and WL-102 Cell

Sample Corridor

Operating Corridor

Pipe Corridor

Access Corridor

Exchanger WM-300, WM-301 and WM-302 Cells

Sample Concrete Boxes on North wall and Roof of 10’ x 30’ Tank Cells

Offgas Hot Cell, Normal Cell and Storage Cell (Off gas Cells with floors at Elev. Minus 27’)

Offgas Filter Cell

Offgas Fan Cell

Main Exhaust Fan Room (Floor and North and West Walls)

Wash Room (Floor only)

b. Surfaces which will be Hardened

The following surfaces will be prepared as specified in Section 3-01-e:

Roof Deck (exposed to the weather and trucking)

Floor of Steel and Transite Building over Operating Room

3-12 SURFACE FINISH SCHEDULE – SERVICE BUILDING CPP 606

The following surfaces will be prepared as specified in section 3-05-g.

Floors - All concrete floors will be hardened

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3-13 <u>SURFACE FINISH SCHEDULE – NON-PROCESS BUILDINGS</u>

Control House – Limited Area CPP 609
Control House – Exclusive Area CPP 610
Well House No. 1
Well House No. 2
Miscellaneous Masonry Buildings
All concrete surfaces of the above listed buildings will be prepared and finished as specified in section 3-01-c.

3-14 <u>SURFACE FINISH SCHEDULE – WATER REPELLENT</u>

The following are to receive one coat of Monoseal Silicone Water Repellant #621:

a. The roof of the sample galleries of CPP-601
b. The roof of the SL filter area at the southeast corner of the Process Building, CPP-601
c. The roof of the extension to the west of the Laboratory Building, CPP-602
d. All other <u>exposed</u> flat top concrete areas.

Monoseal #621 is manufactured by the Monroe Company of Cleveland, Ohio, and should be applied in accordance with the manufacture’s recommendations. It is a transparent, colorless compound which maybe applied over a <u>water base paint</u>.

The following coverages apply:

a. Cement Blocks – 150 to 175 square feet per gallon
b. Smooth Concrete – 200 to 225 square feet per gallon
c. Rough Concrete – 175 to 200 square feet per gallon

And this compound should not be thinned. Drying time is two hours when humidity is normal and air circulation good.

<u>WARNING:</u> Monoseal is inflammable.

Do <u>not</u> use near flame.

Do not apply over surfaces previously treated with oil paints.

Cracks and expansion joints should be filled with asphalt.

APPENDIX B-3

Painting Specification

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FOSTER WHEELER CORPORATION
165 BROADWAY
NEW YORK CITY

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FOR U.S. Atomic Energy Commission				LOCATION Idaho		

SCOPE

This specification is for the Waste Disposal Building, CPP-604, at the Idaho Chemical Processing Plant, Arco, Idaho. It is intended to be supplemental to the "General Painting Specification for all Areas" and may be amended by drawings for the individual contract. This specification is also intended to be used in conjunction with the FF-252 Concrete and Reinforced Concrete Specification and the RC542 Section 101 Painting Specification for the Process Building, CPP-601.

PAINTING AND FINISH SCHEDULE

Area	Floor	Walls	Ceiling
Evaporator Cell (containing units WL-113, WL-300, etc.)	S.S. = stainless steel	O.C.=organic coating	O.C.
Vessel WM-100 Cell	S.S.	O.C.	O.C.
Vessel WM-101 and WM-102 Cell	S.S.	O.C.	O.C.
Separation and Condensation Equipment Cell (containing units WL-112, WL-106 & WL-107)	Amercoat #23	O.C.	O.C.
Vessel WL-101 and WL-102 Cell	Amercoat #23	O.C.	O.C.
Sample Corridor	Nukemite #40	O.C.	O.C.
Exchanger WM-300, WM-301 and WM-302 Cells	Amercoat #23	O.C.	O.C.
Sample Concrete Boxes on North Wall and Roof of 10' x 30' Tank Cells	O.C.	O.C.	O.C.

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Area	Floor	Walls	Ceiling
Off-Gas Hot Cell, Normal Cell and Storage Cell (with floors at minus 27’ – 0”)	Amercoat #23	O.C.	O.C.
Off-Gas Filter Cell	Amercoat #23	O.C.	O.C.
Off-Gas Fan Cell	Amercoat #23	O.C.	O.C.
Operating Corridor	Asphalt Tile	Bennett’s Semi-Gloss Light Green	Sika #100 White
Access Corridor	Amercoat #23	O.C.	O.C.
Pipe Corridor	Amercoat #23	Bennett’s Semi-Gloss Light Green	Sika #100 White
Main Exhaust Fan Room	Amercoat #23	O.C. Concrete Walls at North and West Sides Bennett’s Semi-Gloss Light Green	Sika #100 White
Wash Room	Amercoat #23	Sika #100 White	Sika #100 White
Steel and Transite Building over Operating Corridor	C.H.=Concrete Hardening	Bennett’s Semi-Gloss Light Green	Sika #100 White
Stairwells	C.H.	Sika #100 White	Sika #100 White

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The following are to receive one (1) coat of Monoseal Silicone Sealant #621:

a. The concrete roof of the Waste Disposal Building exposed to the weather.

b. The roof of the 10’ x 30’ tank cells.

c. The roof of the Sample Corridor.

d. The roof of the WM-180 and WM-181 tank cells.

e. The inside vertical wall and exposed floor of WM-180 tank cell.

f. All other exposed flat-top concrete areas.

Where any of the above areas are exposed to trucking as well as weather, a concrete hardener shall be applied first in accordance with the methods described in the FF-252 Concrete and Reinforced Concrete Specification for RC-542. Then the Monoseal #621 shall be applied as recommended by the manufacturer.

NOTE: The product referred to as Sika #100 White in the preceding tabulation is “Sika-Kote” as manufactured by the Sika Chemical Corporation of Passaic, New Jersey. The preparation for and application of this product are described in the FF-252 Concrete and Reinforced Concrete Specification for RC-542.

Wherever the letters, “O.C.,” designating organic coating are used in the preceding tabulation, Amercoat #33 coating will be applied. Both Amercoat #33 and Amercoat #23, which is also specified, are products of the Amercoat Division of the American Pipe and Construction Company, South Gate, California.

Nukemite #40 is a product of the Nukem Products Corporation, Buffalo 20, New York.

Detailed instructions for preparation for and application of Amercoat and Nukemite products are given in the RC-542 Section 101 Painting Specification for the Process Building CPP-601. THESE INSTRUCTIONS SHOULD BE READ AND THOROUGHLY UNDERSTOOD BEFORE ANY APPLICATION WORK IS DONE.

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Concrete hardening should be in accordance with the methods described in the FF-252 Concrete and Reinforced Concrete Specification for RC-542.

Monoseal Silicone Water Repellant #621 is manufactured by the Monroe Company of Cleveland, Ohio, and one coat should be applied in accordance with the manufacturer's recommendations.

No attempt was made in the above tabulation to list the height of stainless steel wainscoting above the floor. It is the intention that the covering specified for the walls will extend from the top of the stainless steel wainscoting of floor to the ceiling.

GENERAL

a. Mild steel or other metals susceptible to acid corrosion in the areas where protective paints are specified shall be painted with the same type paint as specified for the concrete in that area. Metal surfaces shall be cleaned and primed with the vendor's recommended metal primer, followed by the specified number of coats of protective paint.

b. Stainless steel surfaces shall not be painted expect to seal stainless steel to concrete to maintain an impervious surface as at the junction of the walls and the stainless steel floor covering.

c. Adequate ventilation and protective clothing, where required, shall be provided for etching and degreasing operations where these operations are specified.

d. During painting operations, adequate ventilation and precautions for handling toxic inflammable vapors shall be maintained by the Painting Contractor.

PREPARATION OF SURFACES

a. All concrete surfaces shall be prepared as specified in FF-252 Concrete and Reinforced Specification for RC-542, unless otherwise specified.

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b. Concrete ceilings shall be prepared for painting by wire brushing and washing to remove all loose dirt particles.

c. Surface hardeners shall not be used on concrete that is to be protected with asphalt tile. The surface shall be rubbed and small voids filled with mortar. After curing, the surface shall be prepared for tile installation by wire brushing and washing with water. Allow to dry and remove all loose particles and dust. Precautions to prevent soiling the floor during and after cleaning must be enforced.

GENERAL TILE INSTALLATION

Asphalt tile shall be greaseproof tile as manufactured by any reputable tile manufacturer.

Tile shall be laid by coating concrete with cut-back asphalt cement and sealing aluminum foil, asphalt impregnated Kraft paper membrane as manufactured by Reynolds Metal Company with the aluminum side down. The flooring tile is then cemented to the paper side of the membrane with the flooring manufacturer’s cement recommended for the particular tile.

STRUCTURAL STEEL

All the structural steel for this building will be painted with Rust-Oleum #632 Quick Drying Aluminum – SO applied over a shop coat for read lead. Use Rust-Oleum #769 Damp-proof Red Primer – SO for any unprimed surfaces or to touch up abraded surfaces.

One coat should over if properly applied. Drying time is six hours. Use Rust-Oleum #633 Quick Drying Oil as a thinner. No turpentine or other commercial thinners should be used.

All Rust-Oleum products should be used in strict accordance with instructions from the manufacturer, the Rust-Oleum Corporation of Evanston, Illinois.

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APPLICATION OF AMERCOAT PRODUCTS

All Amercoat products should be applied as recommended by the manufacturer, the Amercoat Division of the American Pipe and Construction Company, South Gate, California and preferably under his supervision.

Although Amercoat products are applied with conventional painting equipment, they are not paints and they differ from other coatings in several important respects. Also since they are designed to control severe corrosive conditions, instructions must be carefully observed to obtain a good application job affording the maximum protection.

Several important precautions should be remembered when applying Amercoat:

a. It is extremely important that the recommended coverages of each Amercoat Solution be strictly followed, since the success of this coating depends upon obtaining the proper film thickness.

b. Amercoat Solutions applied by brush dry very rapidly; therefore, they should be applied with a full brush, brushed smooth quickly and allowed to dry before rebrushing the surface.

c. If Amercoat is to be applied in an enclosed area, it is vital that the operator wear an air mask during application.

d. The solvents in all Amercoat materials are inflammable. Therefore, materials should be stored away from any danger of fire. NO APPLICATION WORK SHOULD BE DONE NEAR AN OPEN FLAME AND ALL MATCHES, TORCHES, AND MSOKING SHOULD BE PROHIBITED.

e. Amercoat solvents will evaporate, therefore, cans should be tightly sealed when not in use.

For specific surface preparation and detailed application instructions for both Amercoat #23 and Amercoat #33 see the applicable sections of the RC-542 Section 101 Painting Specification for the Process Building, CPP-601.

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APPLICATION OF NUKEMITE COATINGS

All Nukemite coatings should be applied as recommended by the manufacture, the Nukem Products Corporation, Buffalo 20, New York and preferably under his supervision.

Nukemite #40 is designed as a protective coating on surfaces subject to severe and extreme corrosive conditions and/or abrasive action. However, since it is a protective coating and not an ordinary paint, application instructions must be carefully followed to secure a good application job for maximum protection.

Several important precautions should be remembered when applying Nukemite:

a. All Numemite materials are readily inflammable in the liquid state. Observe all normal fire precautions and provide for ample ventilation in handling until the material has dried.

b. When storing Nukemite materials, keep containers tightly closed and at a recommended normal temperature of approximately 70°F.

c. At temperatures consistently below normal, Nukemite materials will tend to thicken in viscosity. To restore the material to normal smooth flowing consistency, store at temperatures of 70 - 75°F for one day prior to use. DO NOT ATTEMPT TO ACCELERATE THIS PROCESS BY APPLYING DIRECT VIOLENT HEAT.

COATS OF AMERCOAT #23

For best results with Amercoat #23 it is extremely important that the coverages of each Amercoat Solution listed on the following pages be strictly followed. All Amercoat #23 will be applied as follows:

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(Continued)

No. of Coat	Amercoat Solution	Method of Application	Maximum Coverage gal/sq. ft./coat	Color
1	#23 Prime	Brush	250	Gray
2	#23 Body Coat	Spray	100	Oxide Red
3	#23 Body Coat	Spray	100	Gray
4	#23 Seal Coat	Spray	200	Oxide Red
5	#23 Seal Coat	Spray	200	Gray

COATS OF AMERCOAT #33

Amercoat #33 is a single solution coating requiring no primer or use of other Amercoat Coating Solutions. It is supplied ready for use with no thinning required except as noted in the preceding section. Amercoat #33 should be applied at a coverage of 250 square feet per gallon per coat for all coats as follows:

Coat	Method of Application	Color
Prime Coat	Brush	Oxide Red
1st Body Coat	Brush	Gray
2nd Body Coat	Spray	Oxide Red
3rd Body Coat	Spray	Gray
Finish Coat	Spray	White

COATS OF NUKEMITE NO. 40

Proper application of Nukemite materials is extremely important. Proper application not only includes the number of coats of the specified type, but also the manner in which these coats should be applied – surface preparation, drying times, care in application, close inspection, etc.

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No. of Coat	Nukemite Solution	Method of Application	Maximum Coverage gal/sq. ft./coat	Color
1	Prime	Brush	250	Yellow
2	Primer	Spray	250	Red
3	#40 Coating	Spray	250	Blue Gray
4	#40 Coating	Spray	250	Medium Red
5	#40 Coating	Spray	300	Blue Gray

SAFETY CODE

The Idaho Operations Office “Safety Code for Marking Physical Hazards and the Identification of Certain Equipment” as listed on pages 6 – 11 of the RC-542 Section 101 Painting Specification shall apply to the Waste Disposal Building. This Idaho Code is identified as Serial No. 55 under Safety and Fire Protection with an issuance date of July 25, 1951. Further reference is GM-Bulletin 133.

COLOR CODING PIPE

Pipe shall be color coded and labeled in accordance with the Idaho Operations Office Color Code listed in the “General Painting Specification for All Areas.”

APPLICATION OF BENNETT’S SEMI-GLOSS

To apply this paint over concrete, asbestos transite siding or other types of wall surfaces first apply one coat of Bennett’s Pigmented Wall Sealer over the raw surface. Two coats should be used if the concrete is extremely porous. Then apply one coat of Bennett’s Semi-Gloss in the desired color.

APPENDIX B-4

Structural Steel Specification

FOSTER WHEELER CORPORATION
165 BROADWAY
NEW YORK CITY

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GENERAL

1-01 SCOPE

These specifications cover the fabrication and erection of all structural steel, including equipment supports, platforms, walkways, handrails and ladders.

1-02 GENERAL

All structural steel shall conform to the latest revisions of the “Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings” and the “Code of Standard Practice for Steel Buildings and Bridges, Class A” of the American Institute of Steel Construction, except as otherwise indicated.

1-03 PLANS AND DRAWINGS

The drawing shall contain sufficient information to fabricate and erect the structural steel.

1-04 FABRICATION RELEASE

The fabrication shall not be done before written fabrication release is made by Foster Wheeler Corporation.

1-05 PROTECTION

All steel shall be supported during handling, transporting, storing and erecting so that no piece will become bent, twisted or damaged. Material which is so damaged, shall be returned.

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2-01 GENERAL

a. Minimum weights shall be used for all structural steel members where no weights are given.

b. Re-entrant cuts shall be filleted before cutting.

c. Surfaces in contact shall be thoroughly clean at the time of assembly.

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d. After completion of fabrication the steelwork shall be cleaned. Any loose mill scale, rust, grease and foreign matter shall be removed.

2-02 RIVETS AND BOLTS

a. Shop connections shall be riveted unless otherwise noted.

b. Field connections for beams to columns, beams carrying equipment and bracing, shall be riveted. All other field connections shall be bolted.

c. Rivets and bolts shall be ¾" diameter unless otherwise noted. Open holes shall be 13/16" diameter unless otherwise noted. Bolts shall have hex heads and hex nuts.

d. The fabrication shall furnish all necessary field bolts and rivets with ten (10%) percent extra bolts for all field bolted connections, fifteen (15%) percent extra rivets for all field riveted connections, and erection bolts to the amount of fifteen (15%) percent of the total field rivets. The fabricator shall furnish all bolts to connect the equipment to the supporting steel. Anchor bolts shall not be furnished by the steel fabricator.

2-03 ERECTION MARKS

a. Erection marks for beams running east and west shall be painted on the west end; for beams running north and south, on the south end; for all diagonal bracing, on the upper end.

b. Erection marks shall always be painted on the left end of the beam with the right side up. The beams must be erected with the marks right side up and to the left.

c. When members shown with one erection mark are shipped in two or more pieces, each piece shall carry the original mark with the suffix "A", "B", "C", etc.

d. Channels are to be detailed looking at the back and with marks on the left end regardless of its position in the structure.

e. Beams shall be marked "top" where there is any possibility that they may be turned upside down due to slight variations in detail which may not be noticed in the field.

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FOR	USAEC Idaho Chemical Plant			LOCATION	Arco, Idaho	

2-04 INSPECTION

a. All structural steel is subject to the inspection of Purchaser's representatives. Any defective material shall be replaced immediately.

b. The fabricator shall extend all courtesies and facilities to the inspectors to expedite the work.

c. The approval of the inspector shall not in any way relieve the fabricator from his responsibilities as covered by this specification.

2-05 ERECTION

c. Steel shall be erected by Bechtel Corporation.

d. All elevations shown on drawings indicate top of steel.

2-06 WELDING

a. The use of welding is permitted only where indicated in this specification or on drawings. Welding or gas-cutting either in shop or in field shall conform to the American Welding Society's "Code for Arc and Gas Welding in Building Construction," edition of 1941 with its appendices.

2-07 PAINTING

a. Bechtel Corporation shall furnish the paint and labor for field painting.

b. Shop paint shall be one coat of red lead and oil

c. All parts inaccessible after assembly shall have two (2) coats of shop paint before assembly.

d. Contact surfaces shall not be painted but shall be thoroughly cleaned.

e. Steel enclosed in concrete shall NOT be painted.

f. All surfaces shall be dry and clean before painting. Oil and grease shall be cleaned off by washing with a suitable solvent.

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g. Paint shall not be applied to damp or frosted surfaces.

h. Paint shall be well mixed, stirred frequently, thinned and strained if necessary, and brushed or flowed on, according to the nature of the paint used. In painting large surfaces the use of spray painting instead of brushing is recommended.

If spraying equipment is used, only sufficient pressure shall be used to secure adequate atomization. If brushing is used, care shall be taken that all final brush strokes are made in the same direction.

i. All painting shall be made to conform to the "General Painting Specifications."

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MISCELLAENOUS, STEEL AND IRON

3-01 PLATFORMS AND WALKWAYS

Platforms and walkways shall be of the material, conform to the lines and dimensions shown on the Foster Wheeler Corporation drawings. Checker plate or grating shall be detailed, furnished and fabrication by the vendor for erection by Bechtel Corporation.

3-02 LADDERS, HANDRAILS AND MISCELLANEOUS IRONWARE

Ladders, handrails, and miscellaneous ironware shall be of the material and shall conform to the lines and dimensions of Foster Wheeler Corporation drawings. Detailing, furnishing material and fabrication for erection by Bechtel Corporation, shall be done by the vendor.

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REFERENCE SPECIFICATIONS

4-01 INDEX

The following codes, specifications, and drawings shall be considered as an integral part of this specification and shall be followed except as modified by this specification.

1. American Institute of Steel Construction "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings."

2. American Welding Society "Code for Arc and Gas Welding in Building Construction."

3. Foster Wheeler Corporation "General Painting Specifications for Idaho Chemical Process Plant."

4. American Institute of Steel Construction "Code of Standard Practices for Steel Buildings and Bridges, Class A Structural Steel."

5. Foster Wheeler Corporation drawings:

   No. 542-11-B71
   No. 542-11-B72
   No. 542-21-B83
   No. 542-21-B84
   No. 542-21-B85
   No. 542-21-B86
   No. 542-21-B87
   No. 542-21-B88
   No. 542-21-B89
   No. 542-31-B21
   No. 542-31-B22
   No. 542-31-B23
   No. 542-31-B24
   No. 542-31-B25
   No. 542-31-B26

APPENDIX B-5

Concrete Masonry Specification

DIVISON A-1

CONCRETE MASONRY

THE H. K. FERGUSON COMPANY

Prepared By: A.E. Riggs Date: 1-15-59

Checked By: S.L. Shepard Date: 1-26-59

APPROVALS:

By: J.C. O'Neill Date: 4-16-59

By: ____________ Date: ________

U.S. Atomic Energy Commission

By: M.B. Legenski Date: 5-28-59

By: ____________ Date: ________

REVISIONS:

1- By: ____________ Date: ________

2- By: ____________ Date: ________

3- By: ____________ Date: ________

4- By: ____________ Date: ________

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DIVISON A-1

CONCRETE MASONRY

DIVISON A-1

CONCRETE MASONRY

A-1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials, tools, equipment, and services necessary to complete "Concrete Masonry" in accordance with the drawings and as specified herein, unless otherwise specifically excluded.

This division of the specifications includes but is not necessarily restricted to the following items of work:

a. Pumice Block

b. Reinforcing Steel in Pumice Block Walls

c. Masonry embedment of all items furnished under other sections of the specifications and required for the attachment and passing of other work, including:

  (1) Miscellaneous anchors of all kinds

  (2) Sleeves

  (3) Miscellaneous steel frames

  (4) Louver frames and anchors

  (5) Flashings where required.

A-1.02 REFERENCE SPECIFICATIONS

a. Concrete Work: Specification Div. S-3

b. Miscellaneous Iron & Steel: Specification Div. S-7

c. Painting: Specification Div. A-12

A-1.03 MATERIALS

a. Pumice Block shall conform to ASTM Specification C90-52, Hollow Load-Bearing Masonry Units, Grade A, except that water absorption shall not exceed a maximum of 20 pounds per cu. ft., and the moisture content maximum of all total absorption shall not exceed 30% for an average of 5 units. Aggregate shall conform to ASTM Specification C331-53T. The unit shall contain n deleterious matter which will stain adjacent construction or corrode metal. Concrete masonry units shall be of the sizes and shapes required to complete the work as shown on the drawings. No over-all dimension shall differ more than 1/8-inch from the specified standard dimensions.

b. Portland Cement shall conform to ASTM Specification C150-56.

c. Hydrated Lime shall conform to ASTM Specification C207-49, Type S.

d. Sand shall conform to ASTM Specification C144-52T.

e. Admixtures shall be "Red Label Suconem M" as manufactured by Super Concrete Emulsions, Ltd., Los Angeles, California, or an approved equal, added in strict accordance with the manufacturer's instructions.

f. Water shall be free of injurious amount of oil, acid, salts, or organic matter.

g. Calking Compound shall be light cream color, gum consistency, as manufactured by Pecora Paint Co. or an approved equal, and shall conform to Federal Specification TT-C-598 as amended July 26, 1951.

h. Reinforcing Bars shall conform to ASTM Specification A15-57T and A305-56T (Deforming).

i. Ties shall be furnished as required.

j. Joint Reinforcing in masonry joints shall be "Extra Heavy Dur-O-Wall," or an approved equal, widths as required by clock dimensions, and fabricated of welded wire, meeting the requirements of ASTM Specification A82-34 for high tensile steel. The longitudinal wires shall be 3/16" diameter. Deformed side rods shall be electric butt welded to #9 U.S. steel wire gauge cross wires. Joint reinforcing ladders shall be galvanized.

k. Mortar proportions and properties shall conform to ASTM Specification C270-57T, Type M(A-1), 2500 psi. Mortar shall be prepared in approved machine mixers, with dry-mixing time as required for thorough blending and wet-mixing of not less than three minutes. Mortar shall be delivered to masons' mortar boards within 45 minutes and no retempering will be permitted. Admixtures, if used, shall be added in accordance with the manufacturer's recommendations, and as approved by the Contracting Officer in writing.

l. Cell-Filling Concrete shall be proportioned in accordance with the Division "Concrete" of these specifications for 2,500 psi strength, with ¾ inch maximum size aggregate, qualified to fit clearances, and of proper consistency for the work.

A-1.04. ERECTION AND WORMANSHIP

a. General. No masonry shall be erected when the ambient temperature is below 40°F on a rising temperature, or below 45° on a falling temperature, or when there is a possibility of such a condition occurring within 48 hours, unless special provisions are made for heating the materials and protecting the work with the approval of the Contracting officer. All masonry work shall be maintained at an ambient temperature above 50°F for a period of three (3) days after placing. No frozen work shall be built upon, nor shall units having a film of ice or frost on their surfaces be laid in the walls. All masonry shall be laid plumb, true to line, with level, accurately spaced courses and reveals, with corners plumb and true, and with each course breaking joint with the course below. Bond shall be kept plumb throughout. Work required to be built in with the masonry, including steel columns, frames, anchors, and accessories, shall be installed as the reaction progresses. Unless otherwise shown on the drawings or specified, the space around built-in items shall be filled solidly with mortar. Vertical reinforcing in the walls shall be sized and spaced as shown on the drawings and shall be continuous from bottom to top, passing through the bond beams. Walls shall be horizontally reinforced in alternate course lines with galvanized ladder-type reinforcing.

b. Joints. Exposed masonry units shall be laid with joints flush and approximately 3/8-inch wide. All joints shall be tooled slightly concave with suitable tools. Joints shall be tooled in such a manner as to squeeze the mortar back into the joints. No tooling shall be done until after the mortar has taken its initial set. After tooling, the masonry shall be wiped down with burlap.

c. Laying Masonry Units. Pumice masonry units shall be erected where shown on the drawings. Pumice masonry work shall be laid dry, except for joining of new work to existing masonry walls. Each course shall be solidly bedded in mortar with face of outside walls and cross webs of block full buttered. Vertical joints shall break halfway over the course below and shall be butted full. Each course shall be bonded at corners and intersections unless otherwise shown on the drawings. Units terminating against beam or slab soffits shall be wedged tight with slate or clay tile wedges, and the joint shall be dry packed with mortar. Jamb units shall be of shapes and sizes required to bond with wall units and shall be built in where shown on the drawings or as required. Partitions shall be continuous from floor to underside of construction above, unless otherwise indicated on the drawings.

d. Cell Filling and Reinforcing. Block laying shall be scheduled in 4-foot lifts for concrete filling of reinforced vertical cells as indicated on the drawings. Particular care shall be exercised to obtain full mortar joints adjacent to cells to be concrete filled. Cells to be filled shall be swabbed and cleaned of all foreign matter, and reinforcing bars where and as called for shall be installed as indicated on the drawings. Steel bar reinforcing of the sizes indicated on the drawing shall also be placed around all door, window, louver, and all other openings and shall extend a minimum of 24" beyond the corners of the openings. Steel bar reinforcing shall be lapped a minimum of 30 bar diameters. Vertical jamb steel at opening shall run through precast concrete lintels.

   Horizontal joint reinforcing shall be embedded in mortar joints of alternate courses as the work progresses to control shrinkage and movement due to temperature changes and to keep cracks narrow and relatively inconspicuous. Horizontal joint reinforcing shall be placed in the 1st and 2nd bed joints above or below openings, being continuous in the first bed and lapping the opening a minimum of 24 inches at the jambs in the second bed. Joint reinforcing shall also be used in the first bed joints above and below concrete bond beams. Laps shall be a minimum of 6 inches for horizontal ladder reinforcing.

e. Cutting and Patching of masonry work required to accommodate the work of other trades shall be neatly performed by qualified mechanics, using approved power saws.

f. Joints to Existing Work. Before new work is started, all loose mortar shall be removed and the exposed joint thoroughly wetted not less than twelve hours before laying new work. Anchorage and calking at new work to existing exterior walls shall be as detailed on the drawings.

g. Separation Joints between masonry and other types of construction shall be installed using mortar grout, and knife-grade calking compound. Installation shall conform to drawing details.

h. Protection. Surfaces of masonry not being worked on shall be properly protected at all times during the construction.

i. Sills and Lintels. Precast concrete sills or sill blocks and lintels shall be provided and formed to the shapes indicated on the drawings. Concrete materials and forming shall conform to requirements specified in the division “Concrete” of these specifications.

j. Bond Beams. Continuous concrete bond beams shall be formed and reinforced as indicated on the drawings. Concrete materials and forming shall conform to requirements specified in the division “Concrete” of these specifications.

k. Pointing and Cleaning. At completion of the work, all joints shall be pointed and all holes filled. After the pointing has hardened, all exposed masonry surfaces shall be wetted and cleaned with a 10 per cent solution of commercial muriatic acid applied with stiff fiber brushes, leaving the surfaces clean, free of mortar daubs, and with tight joints throughout. The masonry surfaces shall be rinsed free of acid immediately after cleaning.

A-1.05 SAMPLING, TESTING, AND STORAGE

a. Prior to acceptance of masonry units, samples shall be taken at the manufacturer’s plant and tested in accordance with ASTM Method C140-56.

b. The manufacturer shall be required to certify that masonry units delivered to the construction site will be manufactured, cured and dried in the same or equally effective manner as were samples on which the acceptance was based.

c. Sampling and testing as specified will be at the expense of the Commission.

d. Samples of pumice block shall be submitted as required for acceptance testing.

e. Handling and Storage. Masonry units shall be handled in such manner as to prevent undue chipping and breakage. Storage piles, stacks, or bins shall be located to avoid unnecessary traffic. All materials shall be kept dry and sufficiently protected from the weather. Cement, water repellent and lime shall be stored in weatherproof shelters immediately upon delivery to the site.

APPENDIX B-6

Epoxy Paint Specifications

SEE INSTRUCTIONS ON REVERSE SIDE

CONSTRUCTION VENDOR DATA TRANSMITTAL AND DISPOSITION

(07-87)

(1) To: MK-Ferguson of Idaho Company
P. O. Box 1745
Idaho Falls, Idaho 83401

(2) S.S. No. 5-294320-14
(3) Project TANK FARM DIV. I No.
(4) Subcontractor WHEELER ELECTRIC, INC.
(5) Subcontractor Code E & F PAINTING
(6) Date of Submittal 4/11/89

(A) Work may proceed subject to incorporation of any comments in 16 and 17 below.
(B) Revise and resubmit. Work may proceed subject to incorporation of changes noted.
(C) Revise and resubmit. Work may NOT proceed.
(D) Review not required. Work may proceed

(7) Item No.	(8) VDR ID	(9) Qty Encl	(10) Spec/Dwg. Reference	(11) Submittal Resub	Mand Apvl	Or Eq Apvl	Info	(12) Description	(13) Disp Status
12	8L	10	01005-3		X			PAINT COLOR MSDS	A

RECEIVED
APR 17 1989
PROJECT DOC.

(14) Remarks: PLEASE RETURN 4 DISP. COPIES TO MK-FIC

(15) Subcontractor's Signature Lori McCabe Date 4/11/89

(16) For Reviewing Agency

FOR REVIEW: Please review and return your comments to L Spencer, if no comments are returned by APR 24 1988 it will be evidence that the reviewer approves data.

File
Sire
Barker
Machovec
J. Downs

D L Sire / LS 4-20-89
Signature Date

(17) ☐ Additional comments attached.

(18) Received By	Date Receive	Date Forward	Forward To	Qty Encl	Signature
LS	4-12	4-13	N. Mackay	9	L Strain
NJM	4-13-89		L. Grewcer	9	NJM
LS	4-17-89	4-25-89	MK-F	3	L Spencer
			Distribution		

(19) Distribution	ltr	cvr	sets
Vendor Data Con.			
Inspection Dept.			
Procurement			
Const. Engineer			
Subcontractor			
MK Letter #			

MATERIAL SAFETY DATA SHEET

MSDS Number 071
Revision Number 01
Revision Date 05/12/88

KEELER & LONG, INC
856 ECHO LAKE ROAD
P.O.BOX 460
WATERTOWN, CT 06795

Emergency Phone
(203)274-6701

SECTION 1 IDENTIFICATION OF PRODUCT

TRADE NAME: TRI-POLAR PRIMERS
(#6000-RED FERRITE, #6040-WHITE, #6060-LT. GRAY, #6853-GRAY)

CHEMICAL FAMILY: Silicone Alkyd

SECTION 2 HAZARDOUS INGREDIENTS

INGREDIENT		OSHA PEL	ACGIH TLV	CAS NUMBER	PERCENTAGE RANGE (wt)
Barium Metaborate	(1)	NE	0.5 mg/m^3 as Ba	13701-59-2	5-10
Magnesium Silicate	(1)	10 mg/m^3	2 mg/m^3	14807-96-6	25-35
Xylene		100 ppm	100 ppm	1330-20-7	<1.5
Mineral Spirits		500 ppm	100 ppm	8052-41-3	20-25

This product may contain one or more of the following:

Titanium Dioxide	(1)	15 mg/m^3	10 mg/m^3	13463-67-7	15-20
Carbon Black	(1)	3.5 mg/m^3	3.5 mg/m^3	Generic	<1.0

SECTION 3 PHYSICAL DATA

BOILING POINT: (solvent) 156-204°C
VAPOR PRESSURE: (solvent) <10 @ 25°C
VAPOR DENSITY: (solvent) 4.8
(air = 1)
SOLUBILITY IN WATER: Negligible
APPEARANCE AND ODOR: See "Trade Name" for colors
Mineral Spirits odor

WEIGHT/GALLON: 12.3 ±.5
PERCENT VOLATILE: 20-25
(by weight)
EVAPORATION RATE: <0.1
(BuAce=1)
(solvent)

Note: NE = Not Evaluated
NA = Not Applicable

Footnotes: (1) = Regulated as dust hazards. No exposure expected since dusts are "wetted-up" in the product.

Page 1 of 4

MSDS 071-01

A WORK MAY PROCEED SUBJECT TO INCORPORATION OF COMMENTS.
B REVISE AND RESUBMIT. WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES INDICATED.
C [illegible] AND RESUBMIT. WORK MAY NOT PROCEED.
D REVIEW NOT REQUIRED. WORK MAY PROCEED.
REFER TO [illegible] AND GC-3 FOR CONTRACTUAL OBLIGATIONS.
CONTRACT NO. 2-94320-14
BY: [illegible]
DATE 4-25-89

SECTION 4 FIRE AND EXPLOSION DATA

DOT CLASS: Combustible
FLASH POINT (PMCC °F): >100°F

FLAMMABLE LIMITS:
(solvent) LEL: 0.9%
UEL: 6.0%

EXTINGUISHING MEDIA: Foam, Carbon Dioxide, Dry Chemical

SPECIAL FIRE FIGHTING PROCEDURES: Treat as gasoline or oil fire; water in solid hose stream will tend to scatter liquid and spread fire.
Cool exposed equipment and containers with water.
Use air supplied equipment for enclosed areas.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Fire hazard in the form of vapor when exposed to heat or flame.

SECTION 5 HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section 2

EFFECTS OF OVEREXPOSURE: May cause skin or eye irritation, contact dermatitis. Inhalation of high vapor concentrations may have results ranging from headaches and dizziness to unconsciousness, may cause CNS Depression, may irritate respiratory system.
Can be fatal if ingested in large quantities.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY OVEREXPOSURE: Preexisting skin and eye disorders may be aggravated.

PRIMARY ROUTES OF ENTRY: Skin exposure, Inhalation, Ingestion.

EMERGENCY AND FIRST AID PROCEDURES:
Inhalation: remove to fresh air immediately. Call physician. If breathing has stopped, start resuscitation and administer oxygen.
Eyes: flush exposed eyes with water for at least 15 minutes. An ophthalmic exam should be performed if irritation or pain persists after 15 minute irrigation.
Skin: wash the exposed area twice with soap and water. Physician should examine the exposed area if irritation or pain persists.
Ingestion: Dilute with large amounts of water or milk.
Do not induce vomiting.

NOTICE: Reports have associated repeated and prolonged occupational over exposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be HARMFUL or FATAL.

Note: NE = Not Evaluated

SECTION 6 REACTIVITY DATA

STABILITY: STABLE X UNSTABLE___ CONDITIONS TO AVOID: Keep away from heat, sparks, open flame.

INCOMPATIBILITY: Strong oxidants. May dissolve some plastics and rubber.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID : None Known

SECTION 7 SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED: Eliminate all sources of ignition. Dike large spills and pump into salvage tank. Absorb with suitable material. Keep people away, avoid breathing vapors. Ventilate enclosed areas - open windows.

WASTE DISPOSAL METHOD: Dispose in accordance with local, state, and federal regulations.

SECTION 8 SPECIAL PROTECTION INFORMATION

RESPIRATORY:
1. In outdoor or open areas with unrestricted ventilation- Approved mechanical filter respirator to remove solid airborne particulates of overspray during spray application.
2. In restricted ventilation areas- Approved chemical/mechanical filters designed to remove vapors and particulates.
3. In confined areas- Approved air-supplied type respirators.

VENTILATION: Local exhaust. Explosion proof equipment-no smoking.

PROTECTIVE GLOVES: Insoluble type (Neoprene) recommended.

EYE PROTECTION: Safety glasses recommended.

OTHER PROTECTIVE EQUIPMENT: Clean, long legged, long sleeved work clothes.

HYGIENIC PRACTICES: Wash hands before eating, smoking, or using washroom.

Note: NE = Not Evaluated

SECTION 9 SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep containers closed. Keep away from heat, sparks, and open flame. Use adequate ventilation. Prevent spontaneous combustion.

OTHER PRECAUTIONS: Avoid prolonged or repeated skin contact or breathing of vapors and mists. Prohibit eating or smoking. Use spark resistant tools. Do not work alone! Keep away from children!

SECTION 10 HAZARDOUS MATERIALS IDENTIFICATION

Communication of physical properties, health and safety information is a key factor in our product safety program. With this information you can better fulfill your obligation to educate exposed personnel in the proper handling techniques required to maintain safety in the workplace. Listed in this section is NPCA-HMIS classification for this product under normal use.

HMIS CLASSIFICATION CODE

HEALTH:	1
FLAMMABILITY:	2
REACTIVITY:	0

0: Minimal 1: Slight 2: Moderate 3: Serious 4: Severe

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with any use of this information. As these are proprietary formulations, the actual percentage of ingredients have been omitted pursuant to OSHA Federal Hazard Communication Standard.

Note: NE = Not Evaluated

MATERIAL SAFETY DATA SHEET

MSDS Number 024
Revision Number 00
Revision Date 09/25/85

KEELER & LONG, INC
856 ECHO LAKE ROAD
P.O.BOX 460
WATERTOWN, CT 06795

Emergency Phone
(203)274-6701

SECTION 1 IDENTIFICATION OF PRODUCT

TRADE NAME: T-1-Series, Tri-Polar Silicone Enamel
CHEMICAL FAMILY: Silicone Alkyd

SECTION 2 HAZARDOUS INGREDIENTS

INGREDIENT	TLV	CAS NUMBER
Silicone Alkyd Resin	NE	proprietary
Titanium Dioxide	10 mg/m^3 as dust	13463-67-7
Mineral Spirits	100 ppm	8052-41-3

SECTION 3 PHYSICAL DATA

BOILING POINT: (solvent) 156-204°C
VAPOR PRESSURE: (solvent) <10 @ 25°C
VAPOR DENSITY: (solvent) 4.8
(air = 1)
SOLUBILITY IN WATER: Negligible
APPEARANCE AND ODOR: White and tints
Mineral Spirits odor

WEIGHT/GALLON: 10.2 lbs
PERCENT VOLATILE: 29.0
(by weight)
EVAPORATION RATE: <0.1
(BuAce=1)
(solvent)

Note: NE = Not Evaluated

Page 1 of 4

MSDS 024-00

SECTION 4 FIRE AND EXPLOSION DATA

DOT CLASS: Combustible
FLASH POINT (PMCC °F): >100°F

FLAMMABLE LIMITS:
(solvent) LEL: 0.9%
UEL: 6.0%

EXTINGUISHING MEDIA: Foam, Carbon Dioxide, Dry Chemical

SPECIAL FIRE FIGHTING PROCEDURES: Treat as gasoline or oil fire; water in solid hose stream will tend to scatter liquid and spread fire.
Cool exposed equipment and containers with water.
Use air supplied equipment for enclosed areas.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Fire hazard in the form of vapor when exposed to heat or flame.

SECTION 5 HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section 2

EFFECTS OF OVEREXPOSURE: May cause skin or eye irritation, contact dermatitis.
Inhalation of high vapor concentrations may have results ranging from headaches and dizziness to unconsciousness.
Can be fatal if ingested in large quantities.
May be sensitizer.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY OVEREXPOSURE: none known

PRIMARY ROUTES OF ENTRY: Skin exposure, Inhalation, Ingestion.

EMERGENCY AND FIRST AID PROCEDURES:
Inhalation: remove to fresh air immediately. Call physician. If breathing has stopped, start resuscitation and administer oxygen.
Eyes: flush exposed eyes with water for at least 15 minutes. An ophthalmic exam should be performed if irritation or pain persists after 15 minute irrigation.
Skin: wash the exposed area twice with soap and water. Physician should examine the exposed area if irritation or pain persists.
Ingestion: Dilute with large amounts of water or milk.
Do not induce vomiting.

Note: NE = Not Evaluated

SECTION 6 REACTIVITY DATA

STABILITY: STABLE X UNSTABLE___ CONDITIONS TO AVOID: Keep away from heat, sparks, open flame.

INCOMPATIBILITY: Strong oxidants. May dissolve some plastics and rubber.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: None Known

SECTION 7 SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED: Eliminate all sources of ignition, wet down thoroughly with water. Dike large spills and pump into salvage tank. Absorb with suitable material. Keep people away, avoid breathing vapors. Ventilate enclosed areas--open windows.

WASTE DISPOSAL METHOD: Dispose in accordance with local, state, and federal regulations.

SECTION 8 SPECIAL PROTECTION INFORMATION

RESPIRATORY:
1. In outdoor or open areas with unrestricted ventilation- Approved mechanical filter respirator to remove solid airborne particulates of overspray during spray application.
2. In restricted ventilation areas- Approved chemical/mechanical filters designed to remove vapors and particulates.
3. In confined areas- Approved air-supplied type respirators.

VENTILATION: Local exhaust. Explosion proof equipment-no smoking.

PROTECTIVE GLOVES: Insoluble type (Neoprene) recommended.

EYE PROTECTION: Safety glasses recommended.

OTHER PROTECTIVE EQUIPMENT: Clean, long legged, long sleeved work clothes.

HYGIENIC PRACTICES: Wash hands before eating, smoking, or using washroom.

Note: NE = Not Evaluated

SECTION 9 SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep containers closed. Keep away from heat, sparks, and open flame. Use adequate ventilation. Prevent spontaneous combustion.

OTHER PRECAUTIONS: Avoid prolonged or repeated skin contact or breathing of vapors and mists. Prohibit eating or smoking. Use spark resistant tools. Do not work alone! Keep away from children!

SECTION 10 HAZARDOUS MATERIALS IDENTIFICATION

Communication of physical properties, health and safety information is a key factor in our product safety program. With this information you can better fulfill your obligation to educate exposed personnel in the proper handling techniques required to maintain safety in the workplace. Listed in this section is NPCA-HMIS classification for this product under normal use.

HMIS CLASSIFICATION CODE

HEALTH:	1
FLAMMABILITY:	2
REACTIVITY:	0

0: Minimal 1: Slight 2: Moderate 3: Serious 4: Severe

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with any use of this information. As these are proprietary formulations, the actual percentage of ingredients have been omitted pursuant to OSHA Federal Hazard Communication Standard.

Note: NE = Not Evaluated

MATERIAL SAFETY DATA SHEET

MSDS Number 053AB
Revision Number 01
Revision Date 04/05/88

KEELER & LONG, INC
856 ECHO LAKE ROAD
P.O.BOX 460
WATERTOWN, CT 06795

Emergency Phone
(203)274-6701

SECTION 1 IDENTIFICATION OF PRODUCT

TRADE NAME: 3500 KOLOR-POXY SELF-PRIMING SURFACING ENAMEL, PARTS A+B
CHEMICAL FAMILY: EPOXY/AMINE

SECTION 2 HAZARDOUS INGREDIENTS

INGREDIENT	OSHA PEL	ACGIH TLV	CAS NUMBER	PERCENTAGE RANGE (wt)
Alkyl Glycidyl Ethers/ Bisphenol A Diglycidyl Ether	NE	NE	68609-97-2/ 25068-38-6	20-30
Propylene Glycol Monomethyl Ether	NE	100 ppm	107-98-2	1- 5
n-Butyl Acetate	150 ppm	150 ppm	123-86-4	1- 5
*Silicon Dioxide	80mg/m^3/ % SiO_2	0.1mg/m^3	7631-86-9 and/or 14808-60-7	25-35
*Magnesium Silicate	10mg/m^3	2mg/m^3	14807-96-6	7-12
Cycloaliphatic Amine Adduct	NE	NE	Proprietary	10-15
This product may contain one or more of the following:				
*Carbon Black	3.5mg/m^3	3.5mg/m^3	Generic	<15
*Titanium Dioxide	15mg/m^3	10mg/m^3	13463-67-7	<20
Xylene	100 ppm	100 ppm	1330-20-7	1- 5
n-Butanol	100 ppm	C-50 ppm (skin)	71-36-3	1- 5

*Regulated as dust hazards. No exposure expected since dusts are "wetted-up" in the product.
C - denotes ceiling limit.

SECTION 3 PHYSICAL DATA

BOILING POINT: (solvent) 240-260°F
VAPOR PRESSURE: (solvent) 10 @ 77°F
VAPOR DENSITY: (solvent) 3.5
(air = 1)
SOLUBILITY IN WATER: Negligible
APPEARANCE AND ODOR: White, tints, and limited dark colors (solvent)
Ester-like odor

WEIGHT/GALLON: 11.5-14.5 lb (depending on color)
PERCENT VOLATILE: 4-8% (by weight)
EVAPORATION RATE: 1 (BuAce=1)

Note: NE = Not Evaluated
NA = Not Applicable

SECTION 4 FIRE AND EXPLOSION DATA

DOT CLASS: Combustible
FLASH POINT (PMCC °F): >100°F

FLAMMABLE LIMITS:
(solvent) LEL: 1.6%
UEL: 13.1%

EXTINGUISHING MEDIA: Foam, Carbon Dioxide, Dry Chemical

SPECIAL FIRE FIGHTING PROCEDURES: Treat as gasoline or oil fire; water in solid hose stream will tend to scatter liquid and spread fire.
Cool exposed equipment and containers with water.
Use air supplied equipment for enclosed areas.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Fire hazard in the form of vapor when exposed to heat or flame.

SECTION 5 HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section 2

EFFECTS OF OVEREXPOSURE: May cause skin or eye irritation, contact dermatitis, solvents may be absorbed through intact skin.
Inhalation of high vapor concentrations may have results ranging from headaches and dizziness to unconsciousness; may cause CNS depression; may irritate respiratory system.
Can be fatal if ingested in large quantities.
May be sensitizer.
(See Health Hazard Data for individual components for further warnings.)

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY OVEREXPOSURE: Preexisting skin and eye disorders may be aggravated. Preexisting skin or lung allergies may increase the chance of developing increased allergic symptoms.

PRIMARY ROUTES OR ENTRY: Skin exposure, Inhalation, Ingestion, Eye Contact.

EMERGENCY AND FIRST AID PROCEDURES:
Inhalation: remove to fresh air immediately. Call physician. If breathing has stopped, start resuscitation and administer oxygen.
Eyes: flush exposed eyes with water for at least 15 minutes. An ophthalmic exam should be performed if irritation or pain persists after 15 minute irrigation.
Skin: wash the exposed area twice with soap and water. Physician should examine the exposed area if irritation or pain persists.
Ingestion: Dilute with large amounts of water or milk.
DO NOT INDUCE VOMITING.

NOTICE: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be HARMFUL or FATAL.

Note: NE = Not Evaluated

SECTION 6 REACTIVITY DATA

STABILITY: STABLE X UNSTABLE___ CONDITIONS TO AVOID: Keep away from heat, sparks, open flame.

INCOMPATIBILITY: Strong oxidants. May dissolve some plastics and rubber.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide, Carbon Monoxide.

HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID : None Known

SECTION 7 SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED: Eliminate all sources of ignition. Dike large spills and pump into salvage tank. Absorb with suitable material. Keep people away, avoid breathing vapors. Ventilate enclosed areas-open windows.

WASTE DISPOSAL METHOD: Dispose in accordance with local, state, and federal regulations.

SECTION 8 SPECIAL PROTECTION INFORMATION

RESPIRATORY:
1. In outdoor or open areas with unrestricted ventilation- Approved mechanical filter respirator to remove solid airborne particulates of overspray during spray application.
2. In restricted ventilation areas- Approved chemical/mechanical filters designed to remove vapors and particulates.
3. In confined areas- Approved air-supplied type respirators.

VENTILATION: Local exhaust. Explosion proof equipment-no smoking.

PROTECTIVE GLOVES: Insoluble type (Neoprene) recommended.

EYE PROTECTION: Safety glasses recommended.

OTHER PROTECTIVE EQUIPMENT: Clean, long legged, long sleeved work clothes.

HYGIENIC PRACTICES: Wash hands before eating, smoking, or using washroom.

Note: NE = Not Evaluated

SECTION 9 SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep containers closed. Keep away from heat, sparks, and open flame. Use adequate ventilation. Prevent spontaneous combustion.

OTHER PRECAUTIONS: Avoid prolonged or repeated skin contact or breathing of vapors and mists. Prohibit eating or smoking. Use spark resistant tools. Do not work alone! Keep away from children!

SECTION 10 HAZARDOUS MATERIALS IDENTIFICATION

Communication of physical properties, health and safety information is a key factor in our product safety program. With this information you can better fulfill your obligation to educate exposed personnel in the proper handling techniques required to maintain safety in the workplace. Listed in this section is NPCA-HMIS classification for this product under normal use.

HMIS CLASSIFICATION CODE

HEALTH:	2
FLAMMABILITY:	2
REACTIVITY:	0

0: Minimal 1: Slight 2: Moderate 3: Serious 4: Severe

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with any use of this information. As these are proprietary formulations, the actual percentage of ingredients have been omitted pursuant to OSHA Federal Hazard Communication Standard.

Note: NE = Not Evaluated

MATERIAL SAFETY DATA SHEET

MSDS Number 061AB
Revision Number 00
Revision Date 09/25/85

KEELER & LONG, INC
856 ECHO LAKE ROAD
P.O.BOX 460
WATERTOWN, CT 06795

Emergency Phone
(203)274-6701

SECTION 1 IDENTIFICATION OF PRODUCT

TRADE NAME: 3129 Kolor Poxy Clear Sealer, Parts A+B
CHEMICAL FAMILY: Epoxy/Polyamide

SECTION 2 HAZARDOUS INGREDIENTS

INGREDIENT	TLV	CAS NUMBER
P.M. Solvent	100 ppm	107-98-2
Butyl Acetate	150 ppm	123-86-4
Diglycidyl Ether of Bisphenol A	NE	25068-38-6
Polyamide Resin	NE	proprietary
n-Butanol	50 ppm	71-36-3
Aromatic 100	50 ppm	64742-95-6

SECTION 3 PHYSICAL DATA

BOILING POINT: (solvent) 240-260°F
VAPOR PRESSURE: (solvent) 10 @ 77°F
VAPOR DENSITY: (solvent) 3.5
(air = 1)
SOLUBILITY IN WATER: Negligible
APPEARANCE AND ODOR: Clear
Mild ester-like odor

WEIGHT/GALLON: 7.95 lbs
PERCENT VOLATILE: 69.5
(by weight)
EVAPORATION RATE: 1
(BuAce=1)
(solvent)

Note: NE = Not Evaluated

SECTION 4 FIRE AND EXPLOSION DATA

DOT CLASS: Flammable
FLASH POINT (PMCC °F): 78°F

FLAMMABLE LIMITS:
LEL: 1.6%
UEL: 13.1%

EXTINGUISHING MEDIA: Foam, Carbon Dioxide, Dry Chemical

SPECIAL FIRE FIGHTING PROCEDURES: Treat as gasoline or oil fire; water in solid hose stream will tend to scatter liquid and spread fire.
Cool exposed equipment and containers with water.
Use air-supplied equipment for enclosed areas.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Fire hazard in the form of vapor when exposed to heat or flame.

SECTION 5 HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section 2

EFFECTS OF OVEREXPOSURE: May cause skin or eye irritation, contact dermatitis.
Inhalation of high vapor concentrations may have results ranging from headaches and dizziness to unconsciousness.
Can be fatal if ingested in large quantities.
May be sensitizer.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY OVEREXPOSURE: none known

PRIMARY ROUTES OF ENTRY: Skin exposure, Inhalation, Ingestion.

EMERGENCY AND FIRST AID PROCEDURES:
Inhalation: remove to fresh air immediately. Call physician. If breathing has stopped, start resuscitation and administer oxygen.
Eyes: flush exposed eyes with water for at least 15 minutes. An ophthalmic exam should be performed if irritation or pain persists after 15 minute irrigation.
Skin: wash the exposed area twice with soap and water. Physician should examine the exposed area if irritation or pain persists.
Ingestion: Dilute with large amounts of water or milk.
Do not induce vomiting.

Note: NE = Not Evaluated

SECTION 6 REACTIVITY DATA

STABILITY: STABLE X UNSTABLE___ CONDITIONS TO AVOID: Keep away from heat, sparks, open flame.

INCOMPATIBILITY: Strong oxidants. May dissolve some plastics and rubber.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: None Known

SECTION 7 SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED: Eliminate all sources of ignition, wet down thoroughly with water.Dike large spills and pump into salvage tank. Absorb with suitable material. Keep people away, avoid breathing vapors. Ventilate enclosed areas--open windows.

WASTE DISPOSAL METHOD: Dispose in accordance with local, state, and federal regulations.

SECTION 8 SPECIAL PROTECTION INFORMATION

RESPIRATORY:
1. In outdoor or open areas with unrestricted ventilation- Approved mechanical filter respirator to remove solid airborne particulates of overspray during spray application.
2. In restricted ventilation areas- Approved chemical/mechanical filters designed to remove vapors and particulates.
3. In confined areas- Approved air-supplied type respirators.

VENTILATION: Local exhaust. Explosion proof equipment-no smoking.

PROTECTIVE GLOVES: Insoluble type (Neoprene) recommended.

EYE PROTECTION: Safety glasses recommended.

OTHER PROTECTIVE EQUIPMENT: Clean, long legged, long sleeved work clothes.

HYGIENIC PRACTICES: Wash hands before eating, smoking, or using washroom.

Note: NE = Not Evaluated

SECTION 9 SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep containers closed. Keep away from heat, sparks, and open flame. Use adequate ventilation. Prevent spontaneous combustion.

OTHER PRECAUTIONS: Avoid prolonged or repeated skin contact or breathing of vapors and mists. Prohibit eating or smoking. Use spark resistant tools. Do not work alone! Keep away from children!

SECTION 10 HAZARDOUS MATERIALS IDENTIFICATION

Communication of physical properties, health and safety information is a key factor in our product safety program. With this information you can better fulfill your obligation to educate exposed personnel in the proper handling techniques required to maintain safety in the workplace. Listed in this section is NPCA-HMIS classification for this product under normal use.

HMIS CLASSIFICATION CODE

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 0

0: Minimal   1: Slight   2: Moderate   3: Serious   4: Severe

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, expressed or implied, and assume no liability in connection with any use of this information. As these are proprietary formulations, the actual percentage of ingredients have been omitted pursuant to OSHA Federal Hazard Communication Standard.

Note: NE = Not Evaluated

APPENDIX B-7

Spare Evaporator Specifications

CONTRACT AT(10-1)-1445
Div. I, CPP Atm. Protection System
Div. II, CPP Spare PEW Evaporator
Div. III. CPP/WCF Encased Waste Transfer

GVMarkham File

UNITED STATES ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
P.O. BOX 2108
IDAHO FALLS, IDAHO 83401

MAY 23 1974

Mr. F. H. Anderson, General Manager
Allied Chemical Corporation
Idaho Chemical Programs—Operations Office
550 Second Street
Idaho Falls, Idaho

Subject: CEILING EXPENDITURES FOR 1973 GENERAL PLANT PROJECTS

Dear Mr. Anderson:

In regard to completion of remaining 1973 General Plant Projects, I am hereby establishing the following ceiling amounts which must not be exceeded without my prior approval:

PA&D	Project Description	Ceiling Amount
883	CPP Spare PEW Evaporator	$443,000
886	CPP Unirradiated Fuels Storage Facility	163,000
893	CPP-637 PIF Building Upgrade and Addition	221,000
894	CPP Facilities Modification to OSHA Requirements	33,000
897	CPP Electrical Switchgear and Transformer Support Upgrade	39,800

Very truly yours,

R. G. Bradley

R. Glenn Bradley
Manager

C&P

cc: C. K. Leeper, ANC
R. S. Kern, ACC

RECEIVED
MAY 28 1974

110-74

GRADING

C3-01 GRADING: During construction, the Contractor shall be responsible for keeping the construction area graded and existing drainage patterns open to assure that surface water runoff will be channeled away from the work. After all work is completed, the Contractor shall grade the construction areas to the finished grades shown on the drawing.

CONCRETE

S1-01 SCOPE: The Contractor shall furnish all labor and material except Government-furnished concrete listed in the Schedule “X”, equipment, and services to furnish and place all concrete, completed in strict accordance with these specifications and drawings.

S1-02 MATERIALS:

a. Government-Furnished:

(1) Concrete of the required strength (4,000 psi compressive strength at 28 days) will be Government-furnished (in placements of 25 yards or more only) and will be obtainable at the Central Facilities Batch Plant free of charge to the Contractor. Concrete will have a slump between 2-1/2” and 3-1/2” at placement and have 6% ±% air entrainment. Maximum size aggregate shall be 1”. The Contractor shall provide mixers or other transporting equipment to transport the concrete from the batch plant to the job site.

(a) Changes in Proportioning: Mix proportions may be changed to provide best workable mix upon written request from the Contractor and approval of the Contracting Officer when construction methods require such changes.

(b) Testing: Strength of concrete will be determined from compression tests of 28 day standard cylinders. Two or more cylinders may be prepared from each placement by the Contracting Officer.

b. Contractor-Furnished

(1) Concrete: Concrete used in placement of 25 yards or less shall be furnished by the Contractor.

(a) Cement: Cement shall be an approved brand of “portland cement” conforming to ASTM Designation C-150, Type I and Federal Specification SS-C-192.

(1) Inspection: Tested cement is required. The testing shall be performed by a Government agency, designated by the Commission (The Corps of Engineers), who will sample and test the cement in accordance with Federal Test Method Standard No. 158, including the false set limitation as specified. The Contractor shall inform the Contracting Officer in writing regarding his cement procurement, including the mill or mills from which the cement is to be shipped, whether the cement will be delivered in bulk or in sacks, the purchase order number or contract number, and other information that will identify the cement to be used. This information shall be furnished a minimum of 30 days before the first shipment is required.

The Contractor shall arrange with the cement supplier that only cement is furnished which has been so tested and determined to conform to the specified physical requirements, that all cement from the mill shall come from a sealed bin (or bins) at the manufacturer's plant and that the test report is furnished to the Contracting Officer.

(b) Admixtures: Vinsol resin in solution, or Darex or approved equal air entraining agent at the rate of 6% ±% shall be used in all concrete.

(c) Slump: Slump shall be 2-1/2" to 3-1/2".

(d) Mix Design: The Contractor shall submit the mix design for the mix he proposes to use to the Contracting Officer for approval.

(e) Strength: Concrete shall attain a minimum compressive strength of 4,000 psi at 28 days. Strength of concrete shall be determined from compression tests of 28 day standard cylinders specimens. Two or more cylinders may be prepared from each placement by the Contracting Officer, for test purposes. Concrete failing to meet the strength requirements as indicated by the test specimens shall be removed and replaced with concrete of specified strength at no cost to the Government.

(2) Grout: Grout, where shown on the drawings, shall consist of 1 part portland cement and 2 parts sand by volume, except that grout under crane rails, leveling plates, and column and exhaust stack base plates shall be nonshrink type. Nonshrink grout may be job-mixed, or premixed but must be of a mix that is suitable for the type of work for which it is to be used. If job-mixed, the mix and application of the grout shall be in accordance with the recommendations of the manufacturer of the aggregate for nonshrink grout. The aggregate shall be Master Builders, Co., Cleveland, Ohio, "Embeco" or approved equal. Premixed grout shall be the mix recommended by the manufacturer for the type work for which it is to be used. Premixed, nonshrink grout shall be Master Building Co., "Embo" or approved equal.

S1-03 TRANSPORTING OF CONCRETE:

a. Government-furnished ready-mixed concrete shall be transported to the job site in a truck agitator or truck mixer operating at agitator speed. Such transportation shall be the responsibility of the Contractor.

b. Mixers and agitators shall be operated within the limits of capacity and speed of rotation designated by the Manufacturer of the equipment.

c. When a truck mixer or truck agitator is used for transporting concrete that has been completely mixed in a stationary mixer, mixing during transportation shall be at the speed designated by the manufacturer of the equipment as agitating speed.

d. Agitators may be truck mixers or truck agitators. Each agitator shall have attached thereto, in a prominent place, a metal plate or plates on which is plainly marked, for the various uses for which the equipment is designed, the capacity of the drum or container in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades. Truck mixers shall be equipped with means by which the number of revolution of the drum or blades may be readily verified.

e. The agitator shall be capable of maintaining the mixed concrete in a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactory degree of uniformity.

f. Maximum elapsed time from time concrete is received at the Batch Plant until placement in the forms shall not exceed 1-1/2 hours.

S1-04 FORMWORK:

a. General: The Contractor shall provide suitable and adequate formwork conforming to shape, lines, elevations and dimensions of concrete as shown on the drawings. Exposed surfaces shall have a smooth surface, practically free from offsets, fins, and other objectionable defects. The Contractor shall be responsible for setting and maintaining concrete forms so as to insure completed work within the tolerances specified in Paragraph S1-04 I.

b. Responsibility: The Contractor shall be responsible for adequacy and safety of formwork. Completed forms in place must be inspected and approved prior to concrete placement. However, such approval shall in no way release the contractor of his responsibility.

c. Materials: Material for formwork shall consist of wood, metal or other approved material, free from objectionable surface defects that may affect the finished concrete. Type of material is optional with the Contractor unless specific requirements are indicated in the drawings or specifications. All contract forms for exposed surfaces shall be plywood, metal or other approved smooth surface material. Materials for formwork shall conform to the following:

(1) Lumber Forms: For unexposed surfaces and rough work, finished or rough No. 2 common or better, reasonably dry yellow pine or equal may be used, subject to approval.

(2) Plywood Forms: Type B-D grade designation plywood in largest practicable size sheets, to obtain minimum number of joints, may be used for all forms as an alternate to dressed lumber for unexposed concrete work as specified in Paragraph (1) above.

(3) Form Ties: Bolts and rods shall be of adjustable type to permit tightening from outside of forms, and be sufficiently rigid to prevent displacement from mechanical vibration; arranged so that upon removal of forms no metal is within one inch of any exposed concrete surface; twisted wire ties are not permitted for any forms.

(4) Sectional and Patented Forms: Such forms may be used if specified or approved.

d. Construction: All forms shall be braced, tied and supported sufficiently to maintain the desired position during and after placing concrete. Joints shall be sufficiently tight to prevent mortar leakage. Boards for wood forms must be of uniform thickness, evenly matched and tightly placed. Forms shall be designed and constructed for removal without injury to concrete. Openings or other devices shall be provided to permit placing concrete in a manner which will prevent segregation or accumulation of hardened concrete on metal reinforcement above the concrete level. Knotholes and broken places in board contact forms shall be covered with metal patches. Temporary openings shall be provided for adequate cleaning and inspection of formwork. Where indicated, suitable moldings shall be placed in forms to sharp edges or surfaces of concrete members.

e. Surface Treatment: All forms shall be oiled or otherwise treated as specified or approved by the Contracting Officer to facilitate form removal. Oil, if used, shall be light-colored and light-bodied petroleum oil manufactured and sold as form oil. Plastic coated plywood will be permitted.

f. Setting Embedment Items: Place and firmly secure in position anchor bolts, inserts, supports, hangers, pipe sleeves, drain, etc., before concrete is deposited.

g. Removal of Forms: In general, forms may be removed when concrete is hard enough to withstand injury, and members have acquired sufficient strength to safely support their own weight and load thereon, and done in such manner as to insure complete safety of structure.

(1) Under ideal conditions, after placing concrete, the minimum waiting period before the forms may be stripped shall be governed by the following schedule. The use of this schedule shall not operate to relieve the Contractor of responsibility for the safety of the structure.

Stripping of Forms	Minimum Waiting Period After Placing Concrete		
Structural Member	Above 60°F	50°F-60°F	40°F-50°F
Columns and Walls	5 Days	7 Days	10 Days
Side Forms of Beams	5 Days	7 Days	10 Days
Bottom forms of Beams	14 Days	18 Days	28 Days

(2) Forms left in place for moist curing as specified in section S1-07 shall be kept tight for entire curing time.

(3) Live Loads: After removal of forms and prior to required curing time (twenty-eight days for standard portland cement concrete, seven days for high-early strength cement concrete) no live loads shall be placed on the concrete without prior approval.

h. Repairing and Patching Surfaces: Immediately after form removal, removal or cut back rods and ties in manner preventing spalling, chip out to a depth of one inch all honeycomb and other surface defects with chipped edges perpendicular to surface; thoroughly clean these areas of all loose particles and laitance, then thoroughly saturate with clean water and fill with concrete or mortar of the same composition and color to match the adjacent surface. The Contractor shall provide all material required to so repair and patch. Mortar shall be in the proportions of one part Type I cement to two parts sand by weight.

i. Tolerances for Concrete Construction: The intent of this paragraph is to establish tolerances that are consistent with modern construction practice, then governed by the effect that permissible deviations will have upon the structural action or operational function of the structure. Deviations from the established lines, grades, and dimensions will be permitted to the extent set forth herein. Where tolerances are not stated in the specifications of drawings for any individual structure or feature thereof, permissible deviations will be interpreted conformably to the provisions of this paragraph. Notations on the drawings of specific maximum or minimum tolerances in connection with any dimension shall be considered as supplemental to the tolerances specified herein. The Contractor shall be responsible for setting and maintaining concrete forms sufficiently within the tolerance limits so as to insure completed work within the tolerance limits specified herein. Construction exceeding these tolerances shall be remedied or removed and replaced at the expense of and by the Contractor.

(1) Tolerance for Reinforced Concrete Construction:

(a) Variation from the plumb:

(1) In the lines and surfaces of walls	In 10 feet . . ¼ in. In 20 feet max 3/8 in.

(b) Variation from the level or from the grades indicated on the drawings:

(1) In floors & beam soffits	In 10 feet . . ¼ in. In any bay or 20 feet max 3/8 in.
(2) For exposed lintels, sills horizontal grooves, and other conspicuous lines	In 10 feet . . ¼ in. In 20 feet max 3/8 in. . . . ¼ in.

(c) Variation in the sizes, location of sleeves, floor openings and wall openings . . . ¼ in.

(d) Variation in cross sectional dimensions of beams and in the thickness of slabs and walls

Minus	. . . ¼ in.
Plus	. . . 2 in.

(e) Footings:

(1) Variation of dimensions in plant

Minus		. . . 1/2 in.
Plus		. . . 2 in.
(2) Reduction in thickness	Minus	. . . 5%

(f) Hatch: The tolerances in any dimension of the hatch covers . . . 1/8 in.

2. Tolerances for Placing Reinforcement Steel

Variation of protective covering	. . . ¼ in.
Variation from indicated spacing	. . . 1 in.

S1-05 REINFORCEMENT:

a. General: Reinforcement shall be secured in a manner that will prevent displacement or movement when depositing the concrete. All reinforcing bars shall be free from rust, scale, grease, clay and other coatings or foreign substances which would reduce the bonding qualities. Unless shown otherwise on the drawings, placement, spacing and splicing of the reinforcement shall be in accordance with the American Concrete Institute Standard, Building Code Requirements for Reinforced Concrete (ACI 318-71) Chapter 7.

b. Bars: Bars shall be deformed, new billet steel conforming to ASTM Designation A-615, grade 60.

(1) Bar Supports: Supports shall be standard weight basic wires, with plastic shoes, sufficiently heavy to properly carry the steel they support. Wire sizes and number of supports shall conform to specifications for placing accessories as published by the Concrete Reinforcing Steel Institute.

(2) Tie Wire: Tie wire shall be annealed iron wire, of suitable quality for securing reinforcement in place, not less than No. 16 gage.

(3) Marking: All bars shall be identified by standard permanent, mill-imprinted markings showing producing mill, bar size, type steel, and grade of steel (yield strength).

c. Shop Drawings: Shop drawings showing pertinent details of required reinforcement including location, size and length of each bar and unit, bar list bending diagrams and position of accessories shall be furnished by the Contractor.

Fabrication shall not proceed until receipt of approved shop drawings or a letter from the Contracting Officer giving final release.

d. Fabrication: Bend bars cold, accurately formed to dimensions on drawings with bends made around pins of the following sizes:

(1) For Stirrup and Tie Bars: No less than twice the bar diameter.

(2) For All Other Bars No. 7 and Smaller: Six (6) times the bar diameter.

(3) For All Other Bars No. 8 through No. 11: Eight (8) times the bar diameter.

e. Straightening and Rebending: Straightening and rebending in a manner injurious to the material, or the use of bars with kinks or bends not shown on the drawing, will not be permitted; heating of reinforcement will be permitted only upon approval in writing by the Contracting Officer.

f. Bundle and Tag: Bundle and tag all bars in accordance with Manual of Standard Practices for Reinforced Concrete Construction, latest revision thereof, as published by the Concrete Reinforcing Steel Institute. Tag must include bar strength designation.

g. Accessories: Accessories such as bar supports, spacers and ties shall be furnished and arranged in accordance with the Manual of Standard Practice for Reinforced Concrete Construction referred to in Paragraph S1-05 E above. Where specifically indicated on the drawings, bar supports shall not be placed in contact with forms.

h. Cleaning: Remove loose mill and rust scale and other coatings, including ice, which destroy or reduce bond before any reinforcement or accessories are positioned; reinspect and clean reinforcement, if necessary, when there is delay in depositing concrete.

i. Placing: Accurately place all reinforcement and strongly secure against displacement by use of accessories specified above, in a manner keeping all reinforcement away from exposed concrete surfaces according to clearance and coverage indicated below unless shown otherwise on the drawings.

(1) Minimum Clear Space Between Parallel Bars: 1-1/2 times the diameter of round bars but in no case less than 1-1/2 inches.

(2) Minimum Cover for Reinforcement Adjacent to Surface:
3” for footings placed against ground
2” for formed surfaces exposed to weather or in contact with ground
1-1/2” for beams and girders not exposed to weather
1” for walls and slabs not exposed to weather

j. Additional Splicing Not Shown on the Drawings: Additional splicing not shown on drawings, when necessary, shall be made in accordance with details approved by the Contracting Officer. All bars must be lapped sufficiently and in accordance with ACI 318 to develop the strength of the bars by bond, and securely wired. No welding of reinforcing steel shall be accomplished unless approved by the Contracting Officer. Stagger splices in adjacent bars.

k. Inspection: Inspection shall be made before the forms are closed. The contractor must give a minimum of twenty-four hours notice prior to concrete placement to allow sufficient time for inspection.

S1-06 PLACING CONCRETE:

a. General: Concrete shall be transported and placed as rapidly as practical by means preventing the segregation or loss of ingredients. Unnecessary rehandling shall be avoided.

b. Preparation: Before placing concrete, the Contractor shall remove all dirt, debris and water from forms, trenches and excavations; check position and secure reinforcement; and obtain approval of the Contracting Officer as to forms, areas, reinforcement, etc.

c. Removal of Water: Any flow of water into an excavation shall be diverted through proper side drains to a sump or removed by other approved methods which will avoid washing freshly deposited concrete.

d. Placing Methods: Deposit concrete mixture continuously in approximately horizontal layers, in a manner to prevent displacing reinforcement and the accumulation of concrete on the forms or the reinforcement above the level of the fresh concrete, and the formation of seams or planes of weakness within the section.

(1) Dropping Concrete: Maximum allowable free vertical drop shall be 5’-0” but concrete dropped through reinforcement (as in columns and walls from this height, or under conditions causing segregation) shall be avoided. For drops greater than 5’-0” a confining device shall be used.

(2) Chuting: Equipment used shall be of such size and design as to insure continuous flow in the chutes; chutes shall be metal or metal lined wood with sections set at approximately the same slope to assure a continuous uniform flow throughout the length of the chute. The slope of the chute shall not be less than one (1) vertical to three (3) horizontal nor more than (1) vertical to one (1) horizontal. Maintain the spout as near the surface as practicable. In intermittent operations, when manual movement of concrete in chute is not possible, discharge material from chute into approved type hoppers. Thoroughly clean all chutes, spouts and hoppers before and after each run. Discharge debris and wash water outside the forms. Chuting of concrete shall be permitted only after prior written approval.

e. Consolidation: During and immediately after placing, all concrete shall be consolidated and worked to provide thorough placement around all reinforcement, embedded fixtures, and into corners of forms. Unless otherwise approved, the Contractor shall accomplish consolidation by the use of high frequency internal vibrators, with minimum capacity of 6,000 impulses per minute. Type and operations of vibrators requires approval. Consolidation procedure shall conform to the following:

(1) Placement of Layers: Concrete layers shall not exceed two feet in thickness. Each layer shall be thoroughly vibrated before the succeeding layer is placed. Timing of placement shall be such that each succeeding layer is placed before preceding layer has reached its initial set.

(2) Extent of Vibration: Vibration shall extend through entire depth of each new layer and several inches into preceding layer. Vibration shall be applied at point of

deposit and uniformly throughout the freshly placed concrete, with application points no further apart than the radium over which application is visibly effective.

(3) Duration of Vibration: Vibration shall continue sufficiently to accomplish thorough consolidation and complete embedment of reinforcement and fixtures without segregation of mix.

(4) Limitations:

(a) Vibrators will not be used as a means of moving fresh concrete to a desired placement area. This action will be accomplished by correct initial placement augmented by the use of hand shovels.

(b) The Contractor shall provide a sufficient number of vibrators so that compaction can be started immediately after the concrete has been deposited in the forms, but in no case less than two vibrators involving placement of 20 cubic yards or more. In addition, at least one spare vibrator shall be maintained at the site at all times.

f. Placement in Cold Weather:

(1) General: Provisions shall be made by the Contractor so that adequate equipment is available for protecting the concrete during any freezing or near freezing weather for the period specified in S1-07.

(2) Conditions of Materials and Equipment:

(a) Concrete materials, reinforcement, forms, fillers and the ground with which concrete is to come in contact, must be free from frost; if placements are made during freezing weather, the ground upon which the concrete is to be placed shall be heated for at least 12 hours before concrete is deposited.

(3) Concrete Temperature: At time of placement, temperature of the concrete shall be not less than 50°F nor more than 70°F. during the first three days after the concrete is placed, the temperature of the concrete shall be maintained between 50°F and 90°F.

(4) Protection: The Contractor shall provide adequate protection for all exposed surfaces of place concrete for at least seven (7) days after the concrete is placed. This protection shall consist of temporary enclosures, tarpaulins or other approved methods. If tarpaulins are used, they shall be of an approved fire resistant type.

g. Placement Against Soil: Base material under slabs and foundations shall be wetted down before the concrete is placed.

S1-07 CURING:

a. Intent: To provide all concrete with adequate protection from injurious action by sun, rain, wind, flowing water, frost, freezing, mechanical injury and premature drying out.

b. Schedule: Concrete work shall be cured using the following methods.

(1) Floor Slabs and Hatch Cover: Combination curing, hardening, and sealing membrane.

(2) Construction Joint Surfaces: Moist curing.

(3) All others: Moist or membrane curing.

c. Method of Curing: The Contractor shall effectively protect concrete surfaces against early or excessive evaporation of water by one of the following methods, used as specified in Section S1-07 B.

(1) Moist Curing: The Contractor shall maintain all exposed surfaces in a continuously moist condition for the period specified in Paragraph S1-07 D. Wood forms left in place shall be kept sufficiently wet at all times to prevent openings at the joints and drying of the concrete.

(2) Membrane Curing: An approved proprietary membrane curing compound may be used on exposed concrete surfaces. The compound shall allow subsequent painting or dampproofing of the surfaces and shall be Sonneborn Buildings Products, Inc., “Sonosil” or approved equal. Curing compounds shall be applied in strict accordance with the directions of the manufacturer of the compound.

(3) Curing, hardening and Sealing Membrane: Membrane shall be applied to the “green” concrete as soon as the concrete has been finished troweled and the surface water dissipated. Surface shall be capable of supporting without damage, the equipment and personnel required to apply the membrane. The membrane shall be a combination curing, hardening and sealing compound, applied in strict accordance with the manufacturer’s recommendations. Membrane shall be Tri-Kote 18 manufactured by T.K. Products Inc., Minneapolis, Minnesota or equal.

d. Minimum Curing Periods: Minimum curing periods shall be 14 days.

e. Temperature Requirements: Protect all concrete in such manner as to prevent temperature of surrounding air from falling below 50°F for a minimum of 14 days.

f. Protection:

(1) After the specified curing period (14 days), concrete shall not be allowed to cool faster than at a rate of 20°F per 24-hour period until outside temperatures have been attained.

(2) Open type or oil pot salamanders are prohibited for temporary heating purposes. Where possible heaters shall be located outside of the enclosures and heated air

ducted into the enclosure. Combustion gases from heaters shall not be allowed to come in contact with fresh concrete surfaces. Combustion gases from heaters shall be directly vented to the exterior of the temporary enclosures used for protection purposes.

(3) Heaters shall not be placed directly upon green concrete.

(4) In all practicable cases, live steam shall be provided in lieu of dry heat. When dry heat is necessary, moist curing or adequate membrane curing shall also be provided for the specified curing period.

(5) During hot weather, all surfaces shall be protected form direct sunlight for a minimum period of 48 hours when the air temperature is expected to exceed 90°F within 48 hours after placement.

(6) During windy periods, wind breakers or other suitable devices shall be provided to prevent dust, dirt, etc., from contaminating the surface of fresh or green concrete.

S1-08 CONCRETE FINISHES:

a. General: Exposed surfaces and surfaces to be dampproofed, shall have all fins and irregular projections removed immediately after removal of forms. Cavities produced by form ties, honeycomb, voids, broken corners, broken edges and other similar defects, shall be thoroughly cleaned and fully pointed with mortar or an epoxy. Materials for such repair shall be provided by the Contractor. Use of neat-cement to adsorb excessive surface water is prohibited.

b. Floor slabs: Slabs shall have a steel trowel finish. After the concrete has been properly placed, rodded, vibrated and roughly leveled, it shall be screened off to the proper elevation. The use of a tamper or jitter-bug to work the fines up to the surface will not be allowed. After screening and covering of coarse aggregate, the surface shall be made uniform by means of a wood float operated with a circular motion. After floating, the surface shall be tested for uniformity by use of a steel straight edge. Variation from desired finished elevation shall not exceed ¼ inch in 10 feet. Surface shall then be finished with a steel trowel. Use of a neat-cement to adsorb excessive surface water is prohibited.

c. Broom Finishes on Hatch Covers: A broom finish shall be placed on the exposed surface of the hatch covers immediately after pouring.

d. Interior Wall Finishes: The interior walls shall be finished in accordance with the general section of this specification. A final finish shall be in accordance and compatible with the decontaminable painting manufacturer’s recommendation for concrete surface preparation prior to painting.

e. Protection of Surfaces: The Contractor shall be held responsible for fully protecting all finished concrete surfaces anywhere from such damage as chipping, nicking, scratching, discoloring, smearing, etc., caused by continuation and completion of other work which will leave such surface finished in a condition other than specified previously herein.

S1-09 HARDENER AND SEALER FOR TOP OF HATCH OCVER: Top of hatch cover shall be treated with a hardener and sealer. The Contractor shall use a combination compound as specified in Section S1-07 to cure, harden and seal. Compound shall be Tri-Kote 18 or equal, applied as recommended by the manufacturer.

S1-10 CONSTRUCTION JOINTS:

a. General: Work shall be planned to require a minimum number of construction joints. Number, location and type of joint shall be approved by the Contracting Officer. All such joints shall be provided with a shear key, and be shaped as shown on the drawings, with reinforcing continuing through the joint.

b. Joint Preparation: Bonding surfaces of concrete of horizontal joints shall be roughened while still "green" by means of water jets, wet sand blasting, or other approved methods to exposed embedded aggregate. Before placing additional concrete, joint shall be cleaned and saturated with water for eight hours. Horizontal joints shall be covered to a depth of ½" with Contractor-furnished grout before additional concrete is placed.

c. Cure: Joint surface shall be most cured only.

S1-11 WATERSTOP: Waterstops shall be BFG Blue Vinyl (Poly vinyl chloride), Lok-Rib Center Bulb style size indicated on the drawings, manufactured by B. F. Goodrich Company, Akron, Ohio, or equal. Water-stops sections shall be joined together by heating the ends until molten and then bonding them together to form a water tight joint.

S1-12 REPAIR OF CONCRETE: All porous and fractured concrete shall be repaired by the dry-pack or the concrete replacement method. Before any mortar or concrete is placed, the damaged area shall be thoroughly cleaned and treated with a bonding agent. The bonding agent shall be Sonneborn Building Products, Inc., "Sonobond" or approved equal and shall be applied in strict accordance with the directions of the manufacturer. If the use of an epoxy material is approved, the preparation and placement shall be in strict accordance with the manufacturer's directions.

S1-13 CONCRETE CAULKING: For concrete caulking, see the Painting Section of these specifications.

S1-14 CONCRETE MANHOLE:

a. General: The Contractor shall furnish all labor and material, except Government-furnished material, to construct the replacement manhole for the existing pump pit. The manhole shall be constructed to the size and shape shown on the drawings. The manhole shall be a precast unit capable of easy erection.

b. Concrete: The concrete and reinforcement minimum design shall be in accordance with the concrete section of these specifications.

c. Ladder Rungs: The manhole shall be equipped with cast-in-place ladder rungs. The rungs shall be so placed as to provide for uniform spacing between rungs for the length of the manhole with the distance not to exceed 12 inches between rungs. The ladder shall be designed and placed in accordance with OSHA Subpart D.

d. Construction: The manhole shall be constructed as backfill progresses. The manhole shall be placed so as to have the ladder rung in a straight vertical line with the rung evenly spaced. The existing manhole lid shall be used on the new manhole.

S1-15 SHOP DRAWINGS AND DATA SUBMITTALS: The following shall be submitted to the Contracting Officer:

a. Location and firm from which cement will be procured.

b. Source of aggregate.

c. Reinforcement shop drawings.

d. Catalog data on concrete hardener and sealer.

e. Catalog data on water stops.

f. Catalog data on bonding agent.

g. Copy of design calculation for manhole over existing cell.

h. Shop drawing showing manhole sections and assembly complete with ladder, rungs, and certification that OSHA standards are met.

DAMPPROOFING

S2-01 SCOPE: The Contractor shall furnish all labor, materials and services necessary to dampproof the entire below grade exterior concrete face of the walls in accordance with these specifications and as shown on the drawings.

S2-02 GENERAL: Dampproofing shall not be applied when the temperature is below 40°F or 40°F and falling. The work shall be done by workmen experienced in the application of dampproofing material.

S2-03 MATERIAL: Dampproofing material shall be an asphaltic compound water-repellent protective coating. Service temperature limits shall be -10°F to +180°F. Material shall be hydrocide No. 648, Sonneborn Sons, Inc., or approved equal.

S2-04 APPLICATION: Surfaces to be treated shall be coated with two coats of protective coatings. Surfaces to receive coatings shall be smooth, clean and dry. Holes, joints, and cracks shall be pointed flush and smooth with mortar and high spots ground level. Coverage shall be thorough, well-bonded to the wall surface, and applied uniformly, using not less than one gallon per 75 square feet per coat. Coating shall be applied by brush or heavy-duty spray equipment. Twenty-four hours minimum drying time shall be provided between coats. Forty-eight hours minimum drying time after second coat shall be provided before backfilling. Dampproofing material shall not be applied for a period of 14 days after curing compound is applied.

S2-05 VENDOR DATA SUBMITTAL: Catalog data showing dampproofing.

STRUCTURAL STEEL AND MISCELLANEOUS METALS

S3-01 SCOPE: The Contractor shall furnish all the material, labor and services required to provide and install anchor bolts, leveling plates, carbon and stainless steel inserts and miscellaneous metals in accordance with these plans and specifications.

S3-02 CARBON STEEL: All carbon steel structural shapes and plates shall conform to the American Society for Testing Materials (ASTM), Designation A 36, and be free of any loose scale, weld spatter, rust, oil flux or foreign matter.

S3-03 STAINLESS STEEL: Stainless steel structural shapes and plates shall conform to the American Society for Testing Materials (ASTM), Designation A276, Type 304, and shall be free of any weld spatter, oil, flux or foreign matter.

S3-04 ANCHOR BOLTS: Anchor bolts shall be of the sizes and lengths shown on the drawings, complete with nuts, as specified. Bolts shall be stainless steel in accordance with S3-03. All bolts shall be set in place complete with stainless steel nuts.

S3-05 SLEEVES: Sleeves shall be furnished and installed in concrete work at all locations and elevations as shown on the drawings.

a. Conduit: Conduit sleeves shall be threaded on each end and shall be fabricated from UL approved rigid galvanized conduit. Temporary caps shall be standard galvanized pipe caps.

b. Pipe: See piping drawings and specifications.

S3-06 WELDING: Welding provisions specified herein apply to the materials and items specified in Section S3 of these specifications only. Welding shall be done in accordance with the American Welding Society "Standard Code for Arc and Gas Welding in Building Construction" D1.0-63, and sections 1.17 and 1.23 in the Manual of Steel Construction.

a. Welding Carbon Steel to Stainless Steel: All welding of carbon steel to stainless steel material shall be done with electrodes conforming to ASTM Designation A 298 Classification E-309 Cb-15 (lime coated only). The edges or surfaces of the parts to be joined by welding shall be cleaned of all slag, oil, grease, and rush or scale. Each completed bead or layer shall be thoroughly cleaned, using only a stainless steel hammer and brush, before laying down successive layers or beads.

S3-07 SHOP PRIMER: All carbon steel except steel to be embedded in concrete, shall be given one coat of primer before shipment. Steel to be used in the hatch and hatch support which will have an exposed surface shall be given one coat of rust inhibitive metal primer. Carbon steel to be used to support of future equipment inside the new structure shall be painted with one coat of decontaminable primer. The primer shall be Carbonzinc 11 or Dimetcote 6 or approved equal, applied in accordance with the manufacturer's written recommendation. The Contractor shall indicate, in writing to the Contracting Officer, that the primer used is compatible with the decontaminable finish paint and caulking system. The shop primer application shall be in accordance with the Painting Section of these specifications.

STAINLESS STEEL LINER

S4-01 SCOPE: The Contractor shall furnish all materials, labor and equipment required for complete installation of stainless steel liner as indicated on the drawings and as hereinafter specified.

S4-02 GENERAL: Stainless steel liner shall be installed as indicated on the construction drawings. The liner shall be anchored to walls and floor by welding to embedded carbon and stainless steel structural plates or angles; in addition, some liner sheets shall be bolted to concrete anchors inserted into existing wall as detailed on drawings. All liner sheets shall be seal welded to make the liner watertight and to seal all joints.

S4-03 WORK INCLUDED: The work includes, but is not limited to, the following:

a. New evaporation cell.

b. New access tunnel.

c. Pump pit floor liner.

S4-04 WORK NOT INCLUDED: The following work is not included in this section of these specifications:

a. Concrete embedded support frames.

b. Special supports for various appurtenances.

S4-05 MATERIALS:

a. Sheets: All material for liner sheets shall conform to ASTM Specification A 167-69, Type 304. The sheets shall be 11 gage with a standard 2B finish.

b. Filler Metal: Filler metal for welding stainless steel to stainless steel shall be ER-308 as specified in AWS A5.9-69.

c. Filler Metal: Filler metal for welding stainless steel to carbon steel shall be E309-15 or 16 and ER-309 as specified in AWS A5.9-69.

S4-06 INSTALLATION AND FINISH:

a. Lining sheets shall be precut to suit spacing of the embedded structural steel. Sheets shall be fabricated to allow a 1/8-inch gap between adjacent sheets to permit smooth joints and attachment to embedded material.

b. Intersection of embedded material shall be in accordance with design drawings and flush before attachment of liner plates. The embedded material may be spot welded to the floor reinforcement steel and set at final floor grade prior to pouring concrete. The embedded material may then be used as guide to obtain the desired slope in the floor.

c. All linear plates shall be welded watertight in accordance with drawing details. Welding procedures and operators shall be qualified in accordance with Section IX of the 1971

Edition of the ASME Boiler Construction Code. All procedures shall be submitted for approval.

d. Welds shall be full penetration and filler metal shall be deposited so as to give a smooth, uniform and continuous bead as flush as practical with the surface of the base material.

S4-07 WELDING PROCEDURE: All welding of stainless steel for the liner sheets shall be by the tungsten inert gas welding process, GTAW using a 1/16" diameter thoriated tungsten electrode with Type ER-309-15 filler wire. Filler wire diameter shall be 0.062 inch.

S4-08 PREPARATION OF BASE MATERIAL: The edges or surfaces of the parts to be joined by welding shall have the edges prepared by machining, saw cutting and/or metal shearing.

S4-09 NATURE OF ELECTRIC CURRENT: The current for inert gas welding shall be direct current straight polarity.

S4-10 WELDING TECHNIQUES: The following welding techniques shall be adhered to:

a. Shielding Gas: Helium or argon (welding grade). Argon or helium of 99.99 percent purity shall be employed. Argon plus 2 percent oxygen is a satisfactory cover gas.

b. Joint Fitup: The ends to be fillet welded shall be cut square and shall be closely fit to the embedded structural steel members so that there is a 1/8 inch gap between plates. The weld deposit shall be such that adjacent plates are joined and secured to the embedded angle.

S4-11 INTERPASS CLEANING: All slag, flux or foreign materials remaining on any bead shall be removed by chipping, grinding or brushing before the next bead is deposited. Grinding shall be done with rubber or resin bonded alumina or silicon carbide grinding wheels used only for stainless steels. Brushing shall be done with a stainless steel wire brush not previously used on other materials.

S4-12 DEFECTS: Any cracks or blow holes that appear on the surface of any bead of welding shall be removed by chipping or grinding with tools as described in the above paragraph, before depositing the next successive bead of welding.

Defects in the root pass or succeeding passes shall be repaired by careful grinding for at least one inch on both sides of the defect until the crack or otherwise defective area has been removed. Where a short centerline or crater crack penetrates the thickness of the base metal, the cracked area shall be ground out.

The ground out areas shall be rewelded by inert gas welding (TIG).

S4-13 STAINLESS RELIEVING: Joints shall not be stress relieved after welding.

S4-14 INSPECTION: All welds shall be inspected for the following surface defects:

- Cracks of any description in the weld or base metal.
- Clay inclusions, oxide inclusions or gas holes.
- Cold laps in the deposited weld metal.

- Undercutting at the edges or cover passes. No part of the finished face of the weld shall be below the surface of the adjoining base metal.
- Overlap of weld metal on the base metal.
- Weld craters.
- Weld spatter.

The Contracting Officer will inspect to insure that all welding is as specified. The Contracting Officer's approval does not relieve the Contractor from the responsibility to provide a satisfactory installation in accordance with specification requirements.

S4-15 TESTING OF FINISHED WELDING:

a. All welds in the liner shall be checked for defects by the dye penetrant method per ASTM-E-165.

b. All linear discontinuities and aligned penetrant indications revealed by the dye penetrant test shall be repaired as required in Paragraph S4-12 of this specification. Repaired welds shall then be rechecked by the dye penetrant method to insure that the corrected weld is satisfactory.

S4-16 FINISHED SURFACE CLEANING: After welds have been inspected and accepted as satisfactory, they shall be acid washed with a 3 to 5 percent solution of nitric acid to remove all ion stains. The entire surface of the liner shall then be washed with clean, clear tap water.

S4-17 VENDOR DATA: The Contractor shall supply for approval prior to fabrication, the following:

a. Material certifications on all stainless steel base metal and weld filler materials installed.

b. Weld procedure.

c. Welder certification in accordance with Section IX of the ASME Boiler and Pressure Vessel Code.

d. Dye penetrant inspection procedure.

RCRA PART B PERMIT APPLICATION

FOR THE

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

Volume 14
INTEC Liquid Waste Management System

Section C
Waste Characteristics

October 2003

CONTENTS

EXHIBITS

TABLES

APPENDICES

ACRONYMS

ACMM	Analytical Chemistry Methods Manual
AEA	Atomic Energy Act
ALARA	as low as reasonably achievable
APHA	American Public Health Association
APS	Atmospheric Protection System
ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
CPP	Chemical Processing Plant
DEQ	(Idaho) Department of Environmental Quality
DOE	Department of Energy
DOT	Department of Transportation
DQO	data quality objective
EMCAP	Environmental Management Consolidated Audit Program
EPA	Environmental Protection Agency
ETS	Evaporator Tank System
FR	(WGS) Facility Representative
g	gram
gal	gallon
HEPA	high efficiency particulate air
hr	hour
HWMA	Hazardous Waste Management Act
HWN	hazardous waste number
IDAPA	Idaho Administrative Procedures Act
INEEL	Idaho National Engineering and Environmental Laboratory
ILWMS	INTEC Liquid Waste Management System

INTEC	Idaho Nuclear Technology and Engineering Center
kg	kilogram
L	liter
lb	pound
LDR	Land Disposal Restriction
LET&D	Liquid Effluent Treatment and Disposal
M&O	management and operating
mg	milligram
MSDS	Material Safety Data Sheet
NA	not applicable
NIOSH	National Institute for Occupational Safety and Health
NRC	Nuclear Regulatory Commission
NWCF	New Waste Calcining Facility
PEW	Process Equipment Waste
PEWE	Process Equipment Waste Evaporator
PK	process knowledge
ppm	parts per million
ppmw	parts per million weight
PWL	Process Waste Liquid
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RAL	Remote Analytical Laboratory
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SVOC	semi-volatile organic compound
TBP	tributyl phosphate
TC	Toxicity Characteristic

TCLP	Toxicity Characteristic Leaching Procedure
TFF	Tank Farm Facility
TOC	total organic carbon
TSS	total suspended solids
UHC	underlying hazardous constituent
VOC	volatile organic compound
VOG	vessel offgas
WAC	waste acceptance criteria
WAP	Waste Analysis Plan
WDDF	Waste Determination and Disposition Form
WGS	Waste Generator Services
WTS	waste technical specialist
WWH	Westside Waste Holdup (Tanks)

C. WASTE CHARACTERISTICS

This section has been prepared for the Idaho Nuclear Technology and Engineering Center (INTEC) Liquid Waste Management System (ILWMS) located at the Idaho National Engineering and Environmental Laboratory (INEEL). Three process codes are associated with the regulated hazardous waste management units in the ILWMS. The process codes are S02, tank storage; T01, tank treatment; and X99, other miscellaneous treatment. The purpose of this section is to describe the process and rationale utilized by the management and operating (M&O) contractor to determine the physical and chemical characteristics of the wastes managed at these units. This section describes hazardous wastes and only the hazardous components of mixed wastes regulated by the Resource Conservation and Recovery Act (RCRA), Idaho Administrative Procedures Act (IDAPA), and the Code of Federal Regulations (CFR).

The ILWMS includes the Process Equipment Waste Evaporator (PEWE) system, the Liquid Effluent Treatment and Disposal (LET&D) facility, and the Evaporator Tank System (ETS). The ETS will be addressed in a modification to the final partial permit, when issued. The ILWMS includes tanks and ancillary equipment in Buildings CPP-604, CPP-641, CPP-649, CPP-659 Annex, CPP-601, CPP-1618, CPP-1619, and associated valve boxes.

Detailed descriptions of the PEWE system and the LET&D facility are provided in Section D of this Part B Permit Application. The regulated tanks and ancillary equipment to be permitted as the ILWMS are listed below:

- VES-WL-132, CPP-604 Evaporator Feed Sediment Tank (regulated under IDAPA as a storage/treatment tank)
- VES-WL-133, CPP-604 Evaporator Feed Collection Tank (regulated under IDAPA as a storage/treatment tank)
- VES-WL-102, CPP-604 Surge Tank for VES-WL-133 (regulated under IDAPA as a storage/treatment tank)
- VES-WL-109, CPP-604 Evaporator Head Tank (regulated under IDAPA as a storage tank).
- EVAP-WL-129, CPP-604 Evaporator Unit, including VES-WL-129, VES-WL-130, HE-WL-307, and HE-WL-308 (regulated under IDAPA as a miscellaneous unit with treatment/storage tanks)
- VES-WL-134, CPP-604 Process Condensate Surge Tank (regulated under IDAPA as a storage tank)

- EVAP-WL-161, CPP-604 Evaporator Unit, including VES-WL-161, VES-WL-162, HE-WL-300, and HE-WL-301 (regulated under IDAPA as a miscellaneous unit with treatment/storage tanks)
- VES-WL-131, CPP-604 Process Condensate Surge Tank (regulated under IDAPA as a storage tank)
- VES-WL-108, CPP-604 Process Offgas Condensate Knock Out Pot (regulated under IDAPA as a storage tank)
- VES-WL-111, CPP-604 Bottoms Collection Tank (regulated under IDAPA as a storage/treatment tank)
- VES-WL-101, CPP-604 Bottoms Collection Tank (regulated under IDAPA as a storage/treatment tank)
- VES-WL-103, VES-WL-104, and VES-WL-105, CPP-641 Westside Waste Holdup Tanks (regulated under IDAPA as storage/treatment tanks)
- VES-WM-100, VES-WM-101, and VES-WM-102, CPP-604 Tank Farm Tanks (regulated under IDAPA as storage/treatment tanks)
- VES-WG-100, VES-WG-101, VES-WH-100, and VES-WH-101, CPP-601 Deep Tanks (regulated under IDAPA as storage/treatment tanks)
- VES-WL-135 (DVB-OGF-D5), VES-WL-136 (DVB-OGF-D8), VES-WL-137 (CPP-649), VES-WL-138, VES-WL-139, VES-WL-142, VES-WL-144 and VES-WL-150 (CPP-604), Process Waste Liquid Collection System (regulated under IDAPA as storage tanks)
- VES-WL-106, VES-WL-107, and VES-WL-163, CPP-604 Process Condensate Collection Tanks (regulated under IDAPA as treatment/storage tanks).

The regulated tanks and ancillary equipment specific to the LET&D facility are listed below:

- VES-WLK-197, CPP-1618 Acid Fractionator Waste Feed Head Tank (regulated under IDAPA as a storage tank)
- FRAC-WLL-170, CPP-1618 Acid Fractionator, including FRAC-WLL-170, HE-WLL-391, HE-WLL-396, HE-WLL-398, and VES-WLL-198 (regulated under IDAPA as a miscellaneous unit with treatment/storage tanks)
- FRAC-WLK-171, CPP-1618 Acid Fractionator, including FRAC-WLK-171, HE-WLK-392, HE-WLK-397, HE-WLK-399, and VES-WLK-199 (regulated under IDAPA as a miscellaneous unit with treatment/storage tanks)
- VES-WLL-195, CPP-1618 Acid Fractionator Bottoms Tank (regulated under IDAPA as a storage tank)

- VES-NCR-171, CPP-659 Annex LET&D Nitric Acid Recycle Tank (regulated under IDAPA as a storage tank)
- VES-NCR-173, CPP-659 Annex LET&D Nitric Acid Recycle Head Tank (regulated under IDAPA as a storage tank).

The PEWE system and LET&D facility are part of an overall liquid waste treatment train at the INTEC. The system is comprised of initial storage and accumulation tanks, followed by storage/transfer, and treatment tanks. The overall ILWMS reduces the volume of waste sent to the Tank Farm Facility (TFF). The nitric acid is returned to the original process, where it reenters the primary stage of the treatment process. The reuse of nitric acid recovered in the LET&D facility is consistent with both the RCRA regulations that encourage reuse, as well as principles of pollution prevention. Rather than continuing to purchase and use "new" nitric acid, the used acid is an effective substitute for commercial product, and ultimately results in less RCRA hazardous waste generation.

Before waste is transferred to the Evaporator Feed Tank (VES-WL-133), process samples are taken from the CPP-601 Deep Tanks (VES-WG-100, VES-WG-101, VES-WH-100, and VES-WH-101), the CPP-641 Westside Waste Holdup (WWH) Tanks (VES-WL-103, VES-WL-104, and VES-WL-105), and the New Waste Calcining Facility (NWCF) Tanks (VES-NCD-123, VES-NCD-129, VES-NCC-119, and VES-NCC-122), as necessary, to ensure optimum performance of the units. Process samples may also be taken at VES-WL-106, VES-WL-107, and VES-WL-163. Process samples are analyzed to ensure that the PEWE and LET&D systems operate to minimize corrosion of the vessels and maintain system efficiency. If undesirable concentrations of process parameters are detected, then facility personnel may blend the waste with waste of lesser ionic concentration or add specifically identified commercial chemicals to make the waste more amenable to treatment. In some cases, recovered nitric acid may be added to tank systems to maintain acidity and promote the formation of a passive protective layer against corrosion on the stainless steel.

C-1 CHEMICAL AND PHYSICAL ANALYSES: [IDAPA 58.01.05.012 and 008; 40 CFR §§ 270.14(b)(2) and 264.13(a)]

The INTEC units described in this permit application are used to manage a variety of wastes generated from INEEL activities. Typical waste streams managed by the ILWMS include:

- Liquids generated incidental to conducting debris treatment, decontamination, and descaling activities on INEEL equipment, piping, and valves
- Rain water and snow melt that infiltrate into sumps and other containment areas

- Water from radioactive fuel storage basins and pools
- Mop water and other cleaning liquids generated incidental to cleanup activities conducted in radiological areas
- Analytical residues, excess samples, and expired analytical standards generated by sampling and analytical laboratory activities
- Solutions from preventative maintenance and corrective maintenance leak tests on process piping and valves
- Aqueous service wastes, such as steam condensate
- ILWMS treatment residuals that may require further processing
- Other waste streams not currently identified that conform to the ILWMS waste acceptance criteria and process tolerance limits identified in Sections C-2(a)(1) and D-8(b)(5), respectively.

These units may also accept waste from off-Site generators for storage or treatment, provided the waste has been verified in accordance with the waste analysis plan (WAP) requirements of IDAPA 58.01.05.008 [40 CFR § 264.13(c)] at an approved on-Site location. The waste types that may be stored or treated in these units include the following:

- Hazardous waste as defined and regulated as hazardous under IDAPA 58.01.05.005 (40 CFR Part 261, Subparts C and D),
- Mixed waste as defined and regulated as hazardous under IDAPA 58.01.05.005 (40 CFR Part 261, Subparts C and D) and radioactive as defined and regulated under the Atomic Energy Act (AEA),
- Low-level radioactive waste defined by U.S. Department of Energy (DOE) Orders,
- Industrial wastes that by regulatory interpretation are neither hazardous nor radioactive material, but which the DOE has determined require special handling or management prior to disposal.

Radionuclides that contribute the majority of the activity for wastes managed in the ILWMS include Y-90, Sr-90, Cs-137, Ba-137m, Pu-238, Sm-151, Pu-241, Pm-147, Eu-155, Eu-154, Pu-239, Am-241, Co-60, Ni-63, Cs-134, Sb-125, H-3, Pu-240, Tc-99, Cd-113m, Te-125m, Pa-233, Np-237, Eu-152, Zr-93, Cm-244, Fe-55, Nb-93m, Nb-94, Ru-106, Rh-106, Cs-135, U-234, Ce-144, and Pr-144. The units that comprise the ILWMS are capable of handling high-level, transuranic, and low-level radioactive wastes. Activities of typical wastes range from <20 nCi/g to 50,000 nCi/g. The exposure rates associated with these process solutions routinely exceed 100 mrem/hr and can pose a potentially serious hazard to workers at the INEEL if appropriate protective measures such as time, distance, and shielding are not applied. As a result the INEEL is requesting the use of alternate handling and sampling techniques as proposed in this permit application.

Before being received into the ILWMS, wastes undergo RCRA characterization in accordance with IDAPA 58.01.05.006 (40 CFR § 262.11). The characterization is based on process knowledge and/or analytical data. Due to the radiological nature of wastes managed in the ILWMS, characterization and the assignment of Environmental Protection Agency (EPA) hazardous waste numbers (HWNs) occur through the use of acceptable knowledge, which involves both process knowledge (PK) and/or chemical/physical testing of the waste. Listed HWNs are applied based on knowledge of the processes. *A Regulatory Analysis and Reassessment of U.S. Environmental Agency Listed Hazardous Waste Numbers for Applicability to the INTEC Liquid Waste System*, INEEL/EXT-98-01213, Rev. 1, February 1999 identifies the listed HWNs associated with the INTEC liquid waste system. Characteristic HWNs may be applied by testing the waste according to the methods set forth in Subpart C of 40 CFR Part 261, or according to an equivalent method approved by the Director of the Idaho Department of Environmental Quality, or by applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.

The RCRA Part A Permit for the PEWE and LET&D systems lists 28 EPA HWNs. Of the 28 HWNs identified, 5 are listed HWNs and 23 are characteristic HWNs. Except for the CPP-641 Westside Waste Holdup Tanks (VES-WL-103, VES-WL-104, and VES-WL-105), units that comprise the ILWMS manage land disposal restricted waste liquids that exhibit the characteristics of corrosivity and toxicity, and contain one or more listed constituents. Transfer lines from the Westside Waste Holdup Tanks include sections of tile-encased lines. Because of compatibility concerns regarding waste acids and the grout used for the tile-encasement, these tanks are prohibited from managing wastes exhibiting the characteristic of corrosivity (EPA HWN D002).

Although the feed solutions to the PEWE and LET&D do not exhibit the characteristic of ignitability, the EPA HWN D001 is identified on the Part A since small quantities of low total organic carbon (TOC) ignitables may enter the system as a result of laboratory analytical activities. Sampling and analysis has demonstrated that when these small quantities of ignitable waste are aggregated with other wastes in the CPP-601 Deep Tanks to facilitate treatment, the characteristic of ignitability is lost. However, the HWN D001 is tracked through the ILWMS to account for these ignitable materials and any underlying hazardous constituents (UHCs) to ensure proper cradle-to-grave management of mixed and hazardous wastes.

C-1b Waste in Tank Systems: [IDAPA 58.01.05.008; 40 CFR §§ 264.191(b)(2) and 264.192(a)(2)]

The wastes managed in the ILWMS tank systems described in this permit application, with the exception of the CPP-641 WWH Tanks (VES-WL-103, VES-WL-104, and VES-WL-105), are all very similar in composition. In general, the ILWMS treats and stores acidic, aqueous liquid wastes that contain small quantities of heavy metals and organics (exhibit the characteristic of toxicity) and/or contain listed hazardous waste constituents identified on the Part A submitted with this application. These wastes are generated from a variety of INEEL activities including building and equipment decontamination, laboratory analysis, debris treatment, and research and development. The CPP-641 WWH Tanks do not manage corrosive liquids. A brief description of each of the tank systems to be permitted, and typical wastes managed, are detailed below. A more detailed description of each tank system is provided in Section D, "Process Information," of this permit application.

CPP-601 Deep Tanks (VES-WG-100, VES-WG-101, VES-WH-100 and VES-WH-101)

VES-WG-100, VES-WG-101, VES-WH-100, and VES-WH-101 are collection points for wastes generated from CPP-601 cell floor sumps, process samplers, process equipment drains, decontamination activities, and laboratory analyses conducted in CPP-602 and the Remote Analytical Laboratory (RAL). These aqueous waste streams are normally acidic and may contain small quantities of organics, including low TOC ignitables from laboratory sample preparation and cleaning activities.

CPP-641 Westside Waste Holdup Tanks (VES-WL-103, VES-WL-104, and VES-WL-105)

Historically, VES-WL-103, VES-WL-104, and VES-WL-105 collected aqueous wastes generated from CPP-620, CPP-627, and CPP-637 laboratory research and development and acted as a diversion point for service waste such as steam condensate. Wastes that exhibit the characteristic of corrosivity (EPA HWN D002) are precluded from the WWH Tanks due to compatibility concerns related to the grout used in some sections of tile-encased transfer lines from these tanks.

These tanks have been emptied to the maximum extent allowed by the transfer pumps, without causing damage to the pump bearings, and no transfers of waste to this system are taking place. The WWH tank system has tentatively been identified as a potential replacement for the CPP-601 Deep

Tanks. When/if the CPP-601 Deep Tanks are decommissioned, the WWH Tanks, vaults, and transfer lines will be upgraded. These upgrades would include replacement of the tile-encased transfer lines with piping that has secondary containment compatible with corrosives, lining of the vaults with stainless steel, an upgrade of the instrumentation, a sampler upgrade, and vessel offgas improvements.

New Waste Calcining Facility (NWCF) Tanks
(VES-NCD-123, VES-NCD-129, VES-NCC-119, and VES-NCC-122)

VES-NCD-123, the Decon Holdup Tank, and VES-NCD-129, the Decon Collection Tank, are located in CPP-659 and support decontamination facility activities. These tanks primarily collect acidic, aqueous decontamination solutions from debris treatment, including high efficiency particulate air (HEPA) filter leaching activities, and equipment decontamination. These tanks are described in detail in the Hazardous Waste Management Act (HWMA)/RCRA Storage and Treatment Permit for the INTEC, Volume 18, October 2001.

Tanks VES-NCC-119, the Fluoride Hot Sump Tank, and VES-NCC-122, the Non-Fluoride Hot Sump Tank, are also located in CPP-659 and support operation of the Evaporator Tank System (ETS) as well as NWCF decontamination activities. During operation of the ETS, evaporator bottoms are routed to VES-NCC-119. Condensed evaporator overheads are collected in VES-NCC-122. These tanks also receive acidic, aqueous liquid decontamination solutions generated in the NWCF as a result of equipment repair or preventive maintenance. Wastes collected in VES-NCC-119 are usually transferred to the TFF. If the fluoride concentration is determined to be below the corrosive limit, or can be blended with other wastes to conform to tolerance limits, or can be complexed to alleviate corrosion concerns, then the solution may be transferred to the PEWE system. Wastes collected in VES-NCC-122 are typically sent to the PEWE for volume reduction. These tanks will be permitted with the ETS.

Process Waste Liquid (PWL) System
(VES-WL-135, VES-WL-136, VES-WL-137, VES-WL-138, VES-WL-139, VES-WL-142, VES-WL-144, and VES-WL-150)

The PWL tanks are located in CPP-604, CPP-649, and associated valve boxes. The PWL system receives condensate from the Atmospheric Protection System (APS) and the Main Stack Sump as well as waste solutions from CPP-604/-605 floor sumps or drains, and sampler drains. These aqueous solutions are typically generated on an irregular basis and are transferred directly to the PEWE Feed Sediment/Feed Tanks, VES-WL-132 or VES-WL-133.

Sumps SU-WL-140, -143, -145, -146, -147 and -148 do not contain tanks. These sumps are not used routinely. The exclusive purpose of these sumps is to contain liquids during immediate responses to discharges of hazardous wastes.

Sump SU-WL-140 is located in the South Cell of the Rare Gas Plant (RGP). The RGP is no longer active. Therefore, there are no sources of waste that would be collected in this sump.

Sump SU-WL-143 is located in the RGP Pump Pit. Since the RGP is no longer active, there are no sources of waste that would be collected in this sump.

Sump SU-WL-148 is located at the INTEC main stack. In the event of equipment failure, condensate from the main stack could collect in this sump.

Sumps SU-WL-145 and SU-WL-146 are part of the secondary containment and leak detection system in the PEWE Condensate Collection Cell.

Sump SU-WL-147 is part of the secondary containment and leak detection system in the PEWE EVAP-WL-161 Cell.

CPP-604 Tank Farm Tanks (VES-WM-100, VES-WM-101, and VES-WM-102)

VES-WM-100, VES-WM-101, and VES-WM-102 typically provide storage capacity for PEWE bottoms. If necessary, these tanks can also be used to store PEWE feed solutions by routing liquids through valve box C-40.

Evaporator Feed Sediment Tank (VES-WL-132)

VES-WL-132 may receive waste from all of the tank systems previously described in this section as inputs to the ILWMS. In addition, VES-WL-132 may receive snow melt or other liquids from TFF sumps, basin water from CPP-666, or waste from other INEEL facilities via the truck unloading bay at CPP-1619.

VES-WL-132 functions as a settling basin for solids that would otherwise settle out in the Evaporator Feed Collection Tank, VES-WL-133. When the feed stream enters VES-WL-132, it encounters a baffle-and-weir system. The solids settle out of the solution as it flows under the baffle and over the weir. Since the cessation of fuel processing activities in the early 1990’s, solids are no longer considered a problem in the feed solutions. However, in the unlikely event that VES-WL-132 was to completely fill, solids would be carried over into VES-WL-133. As VES-WL-132 approached its capacity, solids would be detected as a result of plugging in the vessel's instrument lines. VES-WL-132 would then be immediately bypassed, diverting feed solutions directly to VES-WL-133. Once full of solids, VES-WL-132 is designed to be remotely removed/replaced. The full sediment tank will be managed as a RCRA solid waste and disposed in accordance with all applicable regulations. However, if the solids content in PEWE feed remains low, the INEEL may elect not to install a new feed sediment tank.

Evaporator Feed Collection Tank (VES-WL-133)

VES-WL-133 receives waste from all the sources previously identified in this section as inputs to the ILWMS. Waste from several of these inputs may be blended to promote optimum operability of the unit. VES-WL-133 serves both evaporators, EVAP-WL-129 and EVAP-WL-161. Wastes are transferred from VES-WL-133 to either the Evaporator Head Tank, VES-WL-109, or directly to EVAP-WL-129.

Surge Tank for VES-WL-133 (VES-WL-102)

The current function of this tank is to provide surge capacity for VES-WL-133.

Evaporator Head Tank (VES-WL-109)

VES-WL-109 provides a constant head for feed solution to evaporator EVAP-WL-161. Feed is pumped to this tank from the Evaporator Feed Collection Tanks, VES-WL-133 or VES-WL-102. VES-WL-109 has an overflow that returns to either VES-WL-133 or VES-WL-102.

Process Condensate Surge Tank (VES-WL-134)

VES-WL-134 collects acidic condensate from evaporator EVAP-WL-129 overheads. VES-WL-134 provides the capability for the evaporators to be operated in series. For series operation, EVAP-WL-129 is operated until VES-WL-134 is full. This tank then provides feed for EVAP-WL-161.

VES-WL-134 may also be used to store concentrated acidic LET&D bottoms for reuse in other INTEC operations.

Process Condensate Surge Tank (VES-WL-131)

VES-WL-131 collects acidic condensate from evaporator EVAP-WL-129 and/or EVAP-WL-161 overheads. When full, the contents of this tank are transferred to one of the Process Condensate Collection Tanks, VES-WL-106, VES-WL-107, or VES-WL-163.

Process Condensate Collection Tanks (VES-WL-106, VES-WL-107, and VES-WL-163)

VES-WL-106, VES-WL-107, and VES-WL-163 store acidic condensate from Process Condensate Surge Tank, VES-WL-131. This aqueous condensate may be either re-fed to the PEWE or transferred to the LET&D facility for recovery of nitric acid.

Bottoms Collection Tanks (VES-WL-101 and VES-WL-111)

VES-WL-101 and VES-WL-111 primarily collect concentrated acidic PEWE evaporator bottoms from EVAP-WL-129 and EVAP-WL-161. Valve box C-40 allows transfers between these tanks and other facilities including the TFF, ETS, and CPP-659.

Process Condensate Knock Out Pot (VES-WL-108)

The function of the Process Condensate Knock-Out Pot is to remove entrained acidic condensate remaining in the vessel offgas (VOG) for the PEWE process condensate collection and surge tanks. From this point, PEWE condensate VOG passes to the plant VOG system. Any liquid removed drains back to VES-WL-131 or VES-WL-133.

Acid Fractionator Waste Feed Head Tank (VES-WLK-197)

VES-WLK-197 receives PEWE acidic condensate from the CPP-604 Process Condensate Collection Tanks, VES-WL-106, VES-WL-107, and VES-WL-163. This vessel acts as the feed tank to LET&D fractionators, FRAC-WLL-170 and FRAC-WLK-171.

Acid Fractionator Bottoms Tank (VES-WLL-195)

VES-WLL-195 collects concentrated acidic LET&D bottoms from fractionators FRAC-WLL-170 and FRAC-WLK-171. These bottoms are primarily comprised of concentrated nitric acid (10-13 molar) solution.

Nitric Acid Recycle Tank (VES-NCR-171)

VES-NCR-171 stores the concentrated nitric acid recovered by the LET&D facility. This acid may be used elsewhere at the INTEC for decontamination or waste treatment.

Nitric Acid Recycle Head Tank (VES-NCR-173)

VES-NCR-173 acts as a constant head feed tank for transfers of LET&D recovered nitric acid to other INTEC processes. Concentrated nitric acid is airlifted from the Nitric Acid Recycle Tank, VES-NCR-171, to VES-NCR-173 for this purpose.

C-1g Waste in Miscellaneous Treatment Units: [IDAPA 58.01.05.008; 40 CFR § 264.601(a)(1)]

The miscellaneous treatment units covered by this Part B permit application include the PEW evaporators, EVAP-WL-129 and EVAP-WL-161, and the LET&D facility fractionators, FRAC-WLL-170 and FRAC-WLK-171. The ETS will be permitted as a modification to the final partial permit for this application. The ETS currently operates under interim status.

As noted previously in Section C-1b, the ILWMS is part of an overall liquid waste treatment train. Aqueous liquids generated from INEEL decontamination, waste treatment, and other activities are processed in the PEWE to reduce the volume of mixed waste sent to the TFF for storage. The LET&D facility further reduces this volume by recovering approximately 99% of the nitric acid contained in condensed PEWE overheads. This nitric acid is then used elsewhere on-Site for treatment and decontamination activities in lieu of purchasing commercial grade nitric acid, effectively minimizing the quantity of waste generated from INEEL activities. The final component(s) of the ILWMS treatment train will be identified in the preferred treatment alternative selected by the DOE. PEWE bottoms will be stored in the TFF, or other compliant storage unit, until this ultimate treatment and disposal alternative has been identified, permitted, and constructed. A brief description of each of the miscellaneous treatment units to be permitted and typical wastes managed are detailed below. A more detailed description of each miscellaneous treatment unit is provided in Section D, "Process Information," of this permit application.

Process Equipment Waste Evaporator Unit (EVAP-WL-129, includes VES-WL-129, VES-WL-130, HE-WL-307 and HE-WL-308)

The function of EVAP-WL-129 is to reduce the volume of waste sent to the TFF. The evaporator is composed of a flash column, VES-WL-129, a mist eliminator, VES-WL-130, a reboiler, HE-WL-307, and a condenser, HE-WL-308. Feed pumps draw waste from the Evaporator Feed Collection Tank, VES-WL-133, and transfer the waste to the evaporator. The evaporator uses steam to heat the feed in a reboiler. This feed is circulated from the reboiler through the flash column, where vapor is separated from the liquid. Liquid drops to the bottom of the flash column and is recycled back to the reboiler. Constituents of the feed that have a lower boiling point than the system temperature produce a vapor. Any constituents with a higher boiling point remain in the liquid and are recirculated through the evaporator.

The vapor phase rises in the flash column, encounters a baffle, and then passes through a coarse wire mesh to remove entrained liquid droplets from the vapor. The vapor continues through the mist eliminator, which contains a fine wire mesh to remove additional entrained liquid droplets (light constituents and water). Finally, the vapor flows through a condenser where acidic vapor is condensed and collected in VES-WL-131. Any non-condensable vapor is routed to the plant VOG system.

Process Equipment Waste Evaporator Unit (EVAP-WL-161, includes VES-WL-161, VES-WL-162, HE-WL-300 and HE-WL-301)

EVAP-WL-161 is similar to EVAP-WL-129 in both design and operation. One minor difference is that EVAP-WL-161 is gravity fed from an Evaporator Head Tank, VES-WL-109, rather than receiving waste directly from feed pumps. Evaporator EVAP-WL-161 is composed of a flash column, VES-WL-161, a separator, VES-WL-162, a reboiler, HE-WL-300, and a condenser HE-WL-301. The operation of this evaporator is virtually identical to that described above for EVAP-WL-129.

LET&D Acid Fractionator (FRAC-WLL-170, includes HE-WLL-398, HE-WLL-396, and VES-WLL-198)

The LET&D treatment process reduces the volume of liquid waste by fractionating condensed acidic PEW evaporator overheads into saturated steam/offgas and acid. The fractionators separate the waste solution into water (overheads) and nitric acid (bottoms). Fractionator FRAC-WLL-170 includes a reboiler, HE-WLL-398, a condenser, HE-WLL-396, and a liquid separator, VES-WLL-198. The feed is heated to its boiling point by introducing steam to the reboiler. The vapor from the boiling liquid rises through several stacked sieve trays (perforated plates) in FRAC-WLL-170. The sieve trays installed in the fractionator column mix the vapors and liquid. As the descending liquid contacts the rising vapor on each tray, nitric acid condenses and remains in solution. Due to its higher boiling point, the nitric acid collects in the bottom of the fractionator, while water, with a lower boiling point, is discharged as steam.

The saturated steam offgas generated from the fractionation process is drawn through the condenser, where it is partially condensed, producing a reflux stream and steam offgas. This mixture then flows through a liquid separator where the reflux is removed and returned to the top of the acid fractionator. The reflux flows downward, providing liquid for the upper trays. The remaining steam flows through the separator, passes through a superheater and HEPA filters, and is exhausted to the atmosphere via the INTEC Main Stack.

LET&D Acid Fractionator (FRAC-WLK-171, includes HE-WLK-399, HE-WLK-397, and VES-WLK-199)

Fractionator FRAC-WLK-171 is identical in design and operation to FRAC-WLL-170. FRAC-WLK-171 includes a reboiler, HE-WLK-399, a condenser, HE-WLK-397, and a liquid separator, VES-WLK-199.

A more detailed description of ILWMS tank systems and miscellaneous treatment units is provided in Section D of this Part B permit application.

C-2 WASTE ANALYSIS PLAN: [IDAPA 58.01.05.008 and 012; 40 CFR §§ 264.13(b) and (c), and 270.14(b)(3)]

The regulations under RCRA, as implemented through IDAPA 58.01.05.008 (40 CFR § 264.13), require a WAP for regulated waste management units. This WAP identifies what waste characterization information is needed, the nature and extent of information required, the method(s) by which the information is gathered, and the quality assurance/quality control (QA/QC) goals.

The process outlined in this WAP is implemented for characterization of all mixed/hazardous wastes or potentially hazardous wastes managed at the INTEC units described herein. Wastes subject to this plan include wastes generated from INEEL operations, treatment residues generated from INEEL RCRA-regulated waste management activities, and off-Site wastes that have been verified in accordance with the WAP requirements of IDAPA 58.01.05.008 [40 CFR § 264.13(c)]. As such, this WAP is intended for inclusion in day-to-day waste management operations.

This WAP is established to ensure that all data used for waste characterization is scientifically valid, defensible, and of known precision and accuracy. This objective relies on the identification of appropriate parameters and rationale, analytical methods, sampling methodologies, and quality control.

The objectives of this WAP are as follows:

- Ensure that sufficient information is available to provide safe handling, storage, and treatment of waste materials
- Define the parameters for characterization and the rationale for selection
- Establish consistent sampling, sample management, analytical methods, parameter selection, and controls for wastes received and generated
- Provide a description of the waste stream characterization and approval process from the point of waste generation through final disposition of the waste
- Establish unit-specific waste acceptance criteria (where necessary) for treatment units to ensure that sufficient information is available to determine whether the wastes considered for storage at the respective units meet the requirements established in this permit application
- Provide additional requirements for the characterization and acceptance of ignitable wastes
- Define Land Disposal Restriction (LDR) requirements applicable to wastes managed in the miscellaneous treatment, and storage units
- Verify that EPA HWNs for wastes stored or treated are acceptable per the EPA HWNs listed in the Part A.

This WAP will be revised whenever test methods are changed or whenever regulations change that affect the WAP.

C-2a Parameters and Rationale: [IDAPA 58.01.05.008; 40 CFR §§ 264.13(b)(1) and (2)]

Tables C-1 and C-2 outline the parameters for analysis and corresponding rationale that are employed to perform hazardous waste determinations in accordance with IDAPA 58.01.05.006 (40 CFR § 262.11) and to assess LDR requirements. The parameters and rationale presented in these tables are selected to ensure compliance with RCRA and unit-specific waste acceptance requirements and to guarantee safe, compliant treatment and storage. Not all of the parameters identified in Tables C-1 and C-2 are selected for each waste stream. Only the specific parameters applicable to each waste stream proposed for storage or treatment in the ILWMS are evaluated.

Table C-1. Test Methods for Waste Analysis Parameters and Rationale

PARAMETER	TEST METHOD(S)[a]	RATIONALE
Toxicity characteristic	1311 Toxicity Characteristic Leaching Procedure (TCLP) or process knowledge	Determine the waste and LDR status.
Metals: antimony arsenic barium beryllium cadmium chromium lead mercury nickel selenium silver thallium	3005A, 3010A, 3050B, 3051, 3052, 6010, 7470, 7471 or process knowledge	Determine if the waste is characteristically hazardous for toxicity. Determine reasonably expected underlying hazardous constituents (UHCs).
Volatile and semi-volatile organic compounds	5030B, 5035, 8015, 8082, 8260B, 3510C, 3550B, 3600C, 8270C or process knowledge	Determine whether the waste is characteristically toxic for organic compounds or whether listed waste constituents can be detected. Identify reasonably expected UHCs.
Flash point	1010, 1020, ASTM D93-80, D3828-81 or process knowledge	Determine if waste is characteristically ignitable.
Corrosivity/Acidity, pH or Corrosivity toward steel	ACMM 7012[b], 9040B, 9045C, 9441A or process knowledge	Determine if the waste is characteristically corrosive.

Table C-1. Test Methods for Waste Analysis Parameters and Rationale (continued)

PARAMETER	TEST METHOD(S)[a]	RATIONALE
Reactivity (cyanides, sulfides, water reactive, chemical stability, shock sensitive)	C003[c], 9010B, 9013, 9014, 9030B, 9031, 9034, or process knowledge	Determine if waste is characteristically reactive and prevent mixing of incompatible wastes in tank and treatment systems.
Free liquids	9095A Paint Filter Liquids Test, visual inspection or process knowledge	Determine whether the waste is a solid or a liquid.
Total organic carbon (TOC)	9060 or process knowledge	Determine whether organics may be present in measurable quantities.

ASTM = American Society for Testing and Materials
ACMM = Analytical Chemistry Methods Manual

a. Methods are from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, unless otherwise stated.
b. G. L. Booman, M. C. Elliot, R. B. Kimball, F. O. Cartan, J. E. Rein, “Determination of Free Acid in the Presence of Hydrolyzable Ions,” Analytical Chemistry, 30 No. 2 (February 1958), pp. 284-287.
c. Arthur D. Little, Inc., Sampling and Analysis Methods for Hazardous Waste Combustion, EPA-600/8-84-002, NTIS No. PN84-1555845, February 1984.

Table C-2. Test Methods, Parameters, and Rationale for LDR Status

PARAMETER	TEST METHOD(S)[a]	RATIONALE
Toxicity characteristic	1311 Toxicity Characteristic Leaching Procedure (TCLP) or process knowledge	Determine waste and LDR status for toxicity.
Metals: antimony arsenic barium beryllium cadmium chromium lead mercury nickel selenium silver thallium	3005A, 3010A, 3050B, 3051, 3052, 6010, 7470, 7471 or process knowledge	Determine LDR status for toxicity. Evaluate mercury subcategory and UHCs.
Volatile and semi-volatile organic compounds	5030B, 5035, 8015, 8082, 8260B, 3510C, 3550B, 3600C, 8270C or process knowledge	Determine listed waste and LDR status for toxicity. Evaluate UHCs.
Flash point	1010, 1020, ASTM D93-80, D3828-81 or process knowledge	Determine LDR status for ignitability.
Corrosivity/Acidity, pH or Corrosivity toward steel	ACMM 7012[b], 9040B, 9045C, 9441A or process knowledge	Determine LDR status for corrosivity.

Table C-2. Test Methods, Parameters, and Rationale for LDR Status (continued)

PARAMETER	TEST METHOD(S)[a]	RATIONALE
Reactivity (cyanides, sulfides, water reactive, chemical stability, shock sensitive)	C003[c], 9010B, 9013, 9014, 9030B, 9031, 9034, or process knowledge	Determine LDR status for reactivity and subcategory.
Total organic carbon (TOC)	9060 or process knowledge	Determine wastewater or nonwastewater category
Total suspended solids (TSS)	160.1[d] or process knowledge	Determine wastewater or nonwastewater category

ASTM = American Society for Testing and Materials
ACMM = Analytical Chemistry Methods Manual

a. Methods are from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, unless otherwise stated.
b. G. L. Booman, M. C. Elliot, R. B. Kimball, F. O. Cartan, J. E. Rein, "Determination of Free Acid in the Presence of Hydrolyzable Ions," Analytical Chemistry, 30 No. 2 (February 1958), pp. 284-287.
c. Arthur D. Little, Inc., Sampling and Analysis Methods for Hazardous Waste Combustion, EPA-600/8-84-002, NTIS No. PN84-1555845, February 1984.
d. *Methods for Chemical Analysis for Water and Wastes*, EPA-600/4-79-020.

Wastes are characterized and LDR requirements are determined at the point of generation by facility personnel with assistance from other contractor organizations, as needed, by analyzing the waste or by applying process knowledge. The following are examples of process knowledge:

- Raw materials used – knowledge of the type, quantity, and concentration of raw materials used in the system combined with detailed knowledge of the generating process may provide enough information to adequately characterize the waste.
- Process description – pertinent details of the process generating the waste and the chemicals used in the process must be described. The more complex the process, the more information would be required.
- Chemical/material composition specifications – chemical specifications may be available from the purchase specifications of a particular chemical, from product information provided by the manufacturer, or from the labels for the particular chemical in question. For pure chemicals whose contents and characteristics are well known (e.g., nitric acid), standard chemical reference materials may supply the required information. Standard

material composition reference tables may supply the required information for metals, plastics, and other materials manufactured to certain grades, alloy specifications, etc., whose material contents and characteristics are well known (e.g., Type 304 stainless steel).

- Material Safety Data Sheets (MSDSs) – chemical specifications and related information are available on these standard reference materials. MSDSs may be provided by the manufacturer or acquired through available MSDS databases.

- Process reference materials including laboratory notebooks, strip charts, correspondence, chemical analyses, and analytical reports.

- Analytical reports from non-SW-846 chemical analyses or information from similar processes.

If process knowledge is adequate to ensure that a particular constituent is not present in the waste, then analysis for that constituent will not be performed. For instance, if the waste comes from a well-defined aqueous process, and no organic chemicals are associated with that process, then analysis for volatile or semi-volatile organics will not be conducted. Similarly, if there is no reason to suspect pesticides or herbicides, analysis for those substances will not be conducted. If process knowledge is not sufficient to eliminate a particular parameter, then that parameter will undergo selection for testing.

Specific parameters selected for RCRA characterization analysis are determined on a case-by-case basis. Facility personnel select the appropriate parameters based on knowledge of the waste source, unit-specific waste acceptance criteria, and characterization requirements to identify RCRA-regulated wastes. This ensures that the appropriate parameter selection will be matched with the correct analytical method(s) to generate the data required for subsequent management of the waste within the ILWMS.

All process knowledge determinations and RCRA characterization analytical results are documented in the facility operating record.

Since the PEWE and LET&D systems are segments of an overall treatment train, LDR requirements identified at the point of generation are carried through the entire ILWMS. Compliance with the treatment standards specified in IDAPA 58.01.05.011 (40 CFR § 268) will be evaluated following treatment in the treatment alternative selected by the DOE. Required LDR notifications will be prepared prior to shipment of any treatment residuals for final disposal.

C-2a(1) Waste Acceptance Criteria

Any wastes accepted at the waste management units addressed in this application must meet the WAC as defined below. Prior to being accepted at these units, a WGS Facility Representative (FR), with assistance from an assigned WGS Waste Technical Specialist (WTS), evaluates each waste to ensure the WAC have been met. The waste acceptance process is described in detail in Section C-2a(2) of this WAP. The WAC are dependent on the waste form, EPA HWNs specified on the Part A, method of characterization, waste characteristics, and packaging. Waste generators or INTEC point-of-generation personnel, in cooperation with WGS, are responsible for performing necessary characterization in accordance with the methods specified in this section (See Tables C-1 and C-2).

The following wastes are prohibited from the waste management units addressed in this permit application:

- Wastes designated with EPA HWNs not identified on the Part A permit application for the specified receiving treatment and/or storage unit
- Incompatible wastes within the same tank system or wastes not compatible with the tank system in which they are stored
- Wastes with no free liquids
- Wastes with high solids content that cannot be separated from the liquid portion
- Foaming agents
- High TOC subcategory ignitables (EPA HWN D001 with $\geq$ 10% total organic carbon)
- Liquids with a pH $\leq$ 2 (WWH Tanks only)
- Ethylene
- Glycerol
- Mineral Oil
- Sodium Glycerite
- Stoddard Solvent
- Unstable, shock-sensitive, and Department of Transportation (DOT)-defined pyrophoric materials
- Unknown wastes

- Wastes containing DOT Class 1 explosives or Class 4 Division 4.1 flammable solids meeting the definition of a wetted explosive, as identified in 49 CFR 173 Subpart C
- Active pathogens, infectious, or etiologic agents
- Wastes that do not comply with the 40 CFR 268.3 dilution prohibition
- Wastes that generate liquid treatment residuals possessing constituents that do not comply with the WAC of downstream treatment, storage, or disposal units (e.g., the LET&D facility). This assessment is performed on a case-by-case basis.

C-2a(2) Waste Acceptance Process

When an activity is expected to generate a new waste, or upon the generation of a waste, a WGS FR is contacted for guidance and a Waste Determination and Disposition Form (WDDF) is completed if the waste stream does not match an existing profile. The WDDF provides the preacceptance certification needed prior to accepting on-Site wastes.

The first two parts of the WDDF are prepared by the generator with assistance from WGS and other organizations, as necessary, to document the characteristics, pertinent details, and probable waste type of the proposed waste based on process knowledge from the generator. The first two parts of the WDDF include:

Section I: Process Knowledge Evaluation - This section includes information provided by the generator based on their knowledge of the processes and materials involved in generating the waste. Process knowledge is used in addition to or in place of sampling and analysis to determine if a waste is RCRA hazardous and to classify it in order to meet treatment, storage, and disposal requirements. If the waste is clearly not a RCRA-regulated hazardous waste, it is managed in accordance with its properties (e.g., low-level, industrial, etc.).

Section II: Probable Waste Type - This section is used to make a preliminary determination of the waste type and probable waste codes that apply based on an evaluation of the information provided by the generator in Section I.

The third part of the WDDF is completed by the WTS to finalize the planned waste determination and disposition of the proposed waste. This part of the WDDF includes:

Section III: Waste Determination and Disposition - This section is completed by determining the regulatory and procedural requirements of the waste stream from information included in the first two sections.

The WDDF is a dynamic document that is subject to revision. As a best management practice, an annual review and recertification is required for all active waste streams. The generator is also required to notify WGS of any process changes. WGS evaluates the changes with the generator to determine potential effects on the waste characterization. If it is determined that the characterization of a given waste stream changes, the WDDF is revised to reflect the change. An example of a typical WDDF is included as Appendix C-1.

Exhibit C-1 presents a flow diagram of the waste acceptance process for on-Site waste. Waste generated off-Site must be verified in accordance with the waste analysis plan (WAP) requirements of IDAPA 58.01.05.008 [40 CFR § 264.13(c)] at an approved on-Site facility before it can be accepted at any of the units addressed in this application. An initial process knowledge evaluation of the waste stream is conducted to determine if the waste is from a recurring stream with an approved waste profile on file. If the stream has an approved profile on file, the process and waste are evaluated to ensure the waste is consistent with the approved profile. All approved waste stream profiles are reevaluated in accordance with Section C-2d, “Frequency of Analysis,” of the waste acceptance process.

If the waste is determined to be RCRA-regulated, based on the initial data obtained from the hazardous waste determination, the WTS performs an LDR evaluation and then evaluates the TSDF options available. Once an appropriate TSDF is identified, the WTS arranges for additional waste characterization, as needed, for acceptance to the TSDF. Waste characterization data and supporting documentation are maintained and made available for both generators and TSDFs.

If the waste stream does not meet the acceptance criteria for the intended unit(s), another TSDF is identified (either on- or off-Site) that can compliantly accept the waste. Compliance with “acceptance criteria” implies compliance with the requirements of the unit-specific Part A permit application, Section D, and adherence to the list of prohibited items in Section C-2a(1).

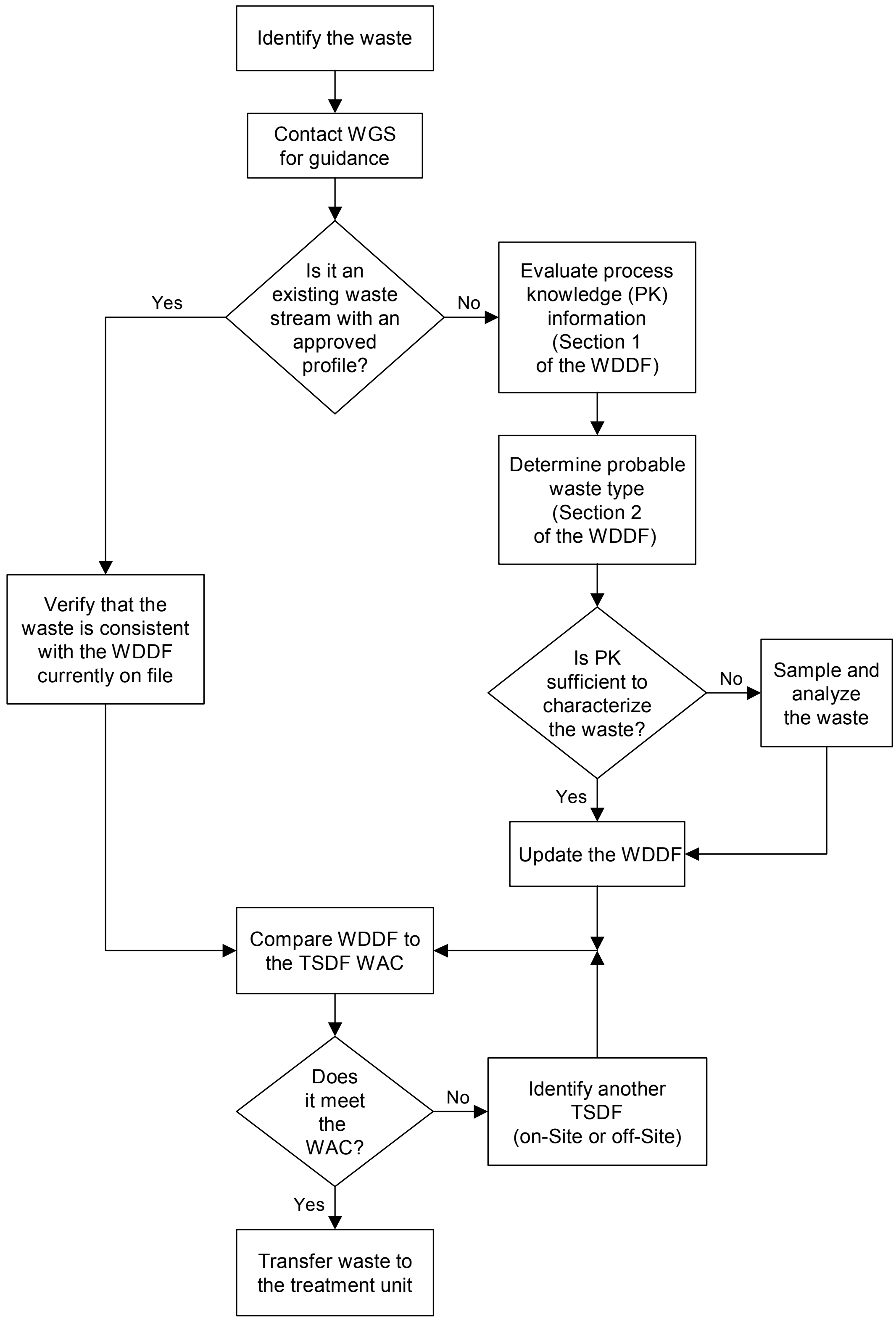

Exhibit C-1. Waste Acceptance Flow Diagram for On-Site Waste.

When submittal of a new WDDF is required, in accordance with Section C-2d, "Frequency of Analysis," a new waste acceptance evaluation is conducted. Recertification of existing waste streams requires written and signed documentation from the generator stating that the waste stream and corresponding WDDF remain the same as presently approved by the WTS. Recertification also requires that there have been no significant changes in the process generating the waste, the physical and chemical properties of the waste, or the LDR status of the waste per IDAPA regulations. Recertification of waste streams for the ILWMS is conducted annually.

Liquid wastes to be received at the waste management units addressed in this application may be received from other INEEL locations. In these instances, the wastes will normally be unloaded in the CPP-1619 truck unloading station and transferred to the PEWE system. The same characterization and waste acceptance methodology will be applied for wastes received into the ILWMS, regardless of the point of generation.

Wastes transferred within the INTEC perimeter are not subject to DOT shipping requirements. However, shipping and receipt of waste from outside the INTEC are subject to DOT shipping requirements.

LDR Requirements

Point-of-generation facility personnel provide waste characterization information and use this information to complete LDR notifications, per IDAPA 58.01.05.011 (40 CFR § 268.7). In cases where facility personnel determine that an LDR waste does not meet the applicable treatment standard(s) set forth in IDAPA 58.01.05.011 (40 CFR § 268, Subpart D), or exceeds the applicable prohibition level(s) set forth in IDAPA 58.01.05.011 (40 CFR § 268.32) or Section 3004(d) of RCRA, facility personnel provide written notice in accordance with IDAPA 58.01.05.011 [40 CFR § 268.7(a)(1)(ii)].

In cases where facility personnel determine that a restricted waste is being managed that can be land-disposed without further treatment, facility personnel submit written notice stating that the waste meets (or is exempt from) applicable treatment standards set forth in IDAPA 58.01.05.011 (40 CFR § 268, Subpart D) and the applicable prohibition level(s) set forth in IDAPA 58.01.05.011 (40 CFR § 268.32) or Section 3004(d) of RCRA. The notice must be in accordance with IDAPA 58.01.05.011 [40 CFR § 268.7(a)(2)].

Required LDR notices are provided by point-of-generation facility personnel. The notifications are reviewed by facility personnel prior to waste treatment and are entered into the treatment unit's operating log. Since the PEWE and LET&D systems are segments of an overall treatment train, LDR requirements identified at the point of generation are carried through the entire ILWMS. Compliance with the treatment standards specified in IDAPA 58.01.05.011 (40 CFR § 268) will be evaluated following treatment in the treatment alternative selected by the DOE. Required LDR notifications will be prepared prior to shipment of any treatment residuals for final disposal.

C-2b Test Methods: [IDAPA 58.01.05.008; 40 CFR § 264.13(b)(2)]

Waste Analysis

Analytical methods employed are primarily taken from *EPA's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846, Third Edition or later). In those cases where method-defined parameters[1] are required by regulation, SW-846 methods are always employed. Examples of method-defined parameter methods, where the analytical result is wholly dependent on the process used to make the measurement, include the use of the toxicity characteristic leaching procedure (TCLP) to

[1]The use of an SW-846 method is mandatory for the following Resource Conservation and Recovery Act (RCRA) applications contained in 40 CFR Parts 260 through 270:

- Section 260.22(d)(1)(i) - Submission of data in support of petitions to exclude a waste produced at a particular facility (i.e., delisting petitions)
- Section 261.22(a)(1) and (2) - Evaluation of waste against the corrosivity characteristic
- Section 261.24(a) - Leaching procedure for evaluation of waste against the toxicity characteristic
- Section 261.35(b)(2)(iii)(A) - Evaluation of rinsates from wood preserving cleaning processes
- Sections 264.190(a), 264.314(c), 265.190(a), and 265.314(d) - Evaluation of waste to determine if a free liquid is a component of the waste
- Sections 264.1034(d)(1)(iii) and 265.1034(d)(1)(iii) - Evaluation of organic emissions from process vents
- Sections 264.1063(d)(2) and 265.1063(d)(2) - Evaluation of organic emissions from equipment leaks
- Section 266.106(a) - Evaluation of metals from boilers and furnaces
- Sections 266.112(b)(1) and (2)(i) - Certain analyses in support of exclusion from the definition of a hazardous waste for a residue which was derived from burning hazardous waste in boilers and industrial furnaces
- Sections 268.7(a), 268.40(a), (b), and (f), 268.41(a), 268.43(a) - Leaching procedure for evaluation of waste to determine compliance with land disposal treatment standards
- Sections 270.19(c)(1)(iii) and (iv), and 270.62(b)(2)(i)(C) and (D) - Analysis and approximate quantification of the hazardous constituents identified in the waste prior to conducting a trial burn in support of an application for a hazardous waste incineration permit
- Sections 270.22(a)(2)(ii)(B) and 270.66(c)(2)(i) and (ii) - Analysis conducted in support of a destruction and removal efficiency (DRE) trial burn waiver for boilers and industrial furnaces burning low risk wastes, and analysis and approximate quantification conducted for a trial burn in support of an application for a permit to burn hazardous waste in a boiler and industrial furnace. Federal Register, Thursday, November 20, 1997, Vol. 62, No. 224, 62079.

prepare a leachate, flash point, pH, corrosivity tests, and paint filter liquids. The cited test methods will be performed at the laboratories per controlled implementing procedures.

The U.S. EPA provides for a degree of flexibility in the use of SW-846 and other approved methods. This flexibility is dependent on the maintenance of precision, accuracy (or bias), recovery, representativeness, comparability, and sensitivity (detection, quantitation, or reporting limits) relative to the data quality objectives for the intended use of the analytical results. "If an alternative analytical procedure is employed, then EPA expects the laboratory to demonstrate and document that the procedure is capable of providing appropriate performance for its intended application. This demonstration must not be performed after the fact, but as part of the laboratory's initial demonstration of proficiency with the method. The documentation should be in writing, maintained in the laboratory, and available for inspection upon request by authorized representatives of the appropriate regulatory authorities" (SW-846, Chapter Two, "Choosing the Correct Procedure").

Joint EPA/NRC guidance[2] for mixed waste also provides flexibility in sample sizes with method-defined parameter methods, as long as the resulting test is sufficiently sensitive to measure the constituents of interest at the regulatory levels prescribed in the TCLP. Other variances to published testing and sampling protocols are permissible under 40 CFR §§ 260.20-21, but must be approved prior to implementation by the Director of the Department of Environmental Quality (DEQ).

The EPA allows for the use of recognized methods other than those prescribed in SW-846. "Whenever methods from SW-846 are not appropriate, recognized methods from source documents published by the EPA, American Public Health Association (APHA), American Society for Testing and Materials (ASTM), the National Institute for Occupational Safety and Health (NIOSH), or other recognized organizations with appropriate expertise should be used, if possible" (SW-846, Chapter One).

Because of the broad range of acceptable methods available for testing specific constituents, and with the rapid incorporation/deletion of methods, not all of the SW-846 methods are specified in Tables C-1 and C-2. Only the currently defined parameter methods are specified.

Certain waste streams are generated at the INTEC that require remote handling and are subject to full RCRA characterization requirements. The remote sample handling requirements and specific process stream requirements may cause deviations in some required analyses systems. For example, the

[2] *Federal Register*, Thursday, November 20, 1997, Vol. 62, No. 224, 62079.

EPA has determined that "if the analyst can demonstrate that the test is still sufficiently sensitive (in the case of reduced sample size in a TCLP extraction) to measure the constituents of interest at the regulatory levels specified in the TCLP and representative of the waste stream being tested" then the sample size can be legitimately decreased[3]. Sample size becomes a critical factor, especially with respect to radiation exposure hazards, and therefore, must be a factor for consideration in any sampling or analytical activity.

The analyses may be performed at INEEL laboratories or at approved off-Site laboratories. Laboratories contracted by the management and operating (M&O) contractor to perform outside work are audited periodically, to ensure that each laboratory's quality control procedures and standard practices manuals meet the requirements for laboratories conducting EPA test procedures. If the laboratory has not been audited, or has failed to conform to the audit criteria, that laboratory is not authorized by the M&O contractor to conduct waste characterization analysis.

Process Knowledge

The EPA/Nuclear Regulatory Commission (NRC) guidance emphasizes the use of process knowledge to determine if a radioactive waste is hazardous, as a way to avoid unnecessary exposures to radioactivity. Examples of the types of process knowledge information used to characterize wastes for the ILWMS are presented in Section C-2a of this permit application. The INEEL documents process knowledge through WDDFs (waste stream profiles), correspondence, and memoranda maintained in the Document Management System. As a best management practice, the characterization documentation for all active waste streams is reviewed and each stream recertified annually to ensure the information maintained remains accurate and complete.

All waste characterization information, including documentation of process knowledge, is maintained in the facility operating record.

C-2c Sampling Methods: [IDAPA 58.01.05.008 and 005; 40 CFR § 264.13(b)(3), Part 261 Appendix I]

Facility personnel, in conjunction with WGS, and other organizations as needed, are responsible for initially characterizing wastes before they are received into the PEWE system. Personnel can use

[3] Federal Register, Thursday, November 20, 1997, Vol. 62, No. 224, 62079.

process knowledge and/or testing to adequately characterize waste. As part of characterization, the appropriate sampling method is selected based on knowledge of the waste material matrix (e.g., solid, liquid, sludge, radiological component) and radiation exposure considerations, as well as the specific analyte of interest. Facility personnel are also responsible for arranging all sampling and laboratory support and for sample shipments. Sampling personnel document the sampling activities and chain of custody.

Representative waste samples are obtained in accordance with the sampling approaches described in Chapter Nine of *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846, current edition). Samples are collected using appropriate equipment and methods identified in, but not limited to, the following sources:

- EPA Test Methods for Evaluating Solid Waste, SW-846, Chapter 10, "Sampling Methods," Third Edition
- 40 CFR 261, Appendix I, "Representative Sampling Methods"
- Annual Book of ASTM Standards, American Society for Testing and Materials, Current issue
- Characterization of Hazardous Waste Sites - A Methods Manual, Volume II, Available Sampling Methods, EPA-600/4-84-076, 2nd Edition, December 1984
- "Characterizing Heterogeneous Wastes: Methods and Recommendations," EPA/600/R-92/033, February 1992
- EPA Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Wastes: A Guidance Manual, April 1994
- Other recognized methods from source documents published by the EPA, American Public Health Association, American Society for Testing and Materials, the National Institute for Occupational Safety and Health, or other recognized organizations with appropriate expertise.

Sampling methods that deviate from approved or other recognized methods must be approved prior to implementation by the Director of the DEQ.

C-2c(1) Standard Sampling Methods

Samples from the ILWMS are typically collected through double hypodermic-needle (double-needle) samplers, sample nozzles, or spigots. Both double-needle samplers and sample nozzles utilize airflow to induce a vacuum that draws liquids from the system into sample vials/containers. Due to the radioactive nature of wastes handled in the ILWMS, much of the tank and miscellaneous treatment systems are constructed below ground for shielding purposes. In order to comply with DOE orders to maintain personnel exposure to radiation as low as reasonably achievable (ALARA), these sampling methods are employed in lieu of mechanical devices such as pumps. Mechanical devices would require the generation of large quantities of decontamination solutions to perform preventive maintenance, require confined space entries, and result in personnel exposure to high radiation. Utilizing airflow sampling devices has resulted in fewer sampling failures and dramatically reduces exposure hazards to sampling personnel. Some gravity-flow spigot samplers are located in areas where access and reduced exposure hazard allow. Appendix C-2 contains a report from Science Applications International Corporation entitled, "Final Report for Organics Partitioning Resulting from Operation of an INTEC Double-Needle Sampler, Revision 1," dated September 24, 2002. This study compares organic concentrations obtained from double-needle and spigot sampling techniques to determine whether potential stripping of organics occurs. The results of these tests indicate that INTEC sample collection and handling procedures do not significantly effect the concentration of volatile or semi-volatile organic constituents in the waste stream.

Liquid sampling is conducted in accordance with approved sampling and operating procedures. In general, where standard samples are collected, the following basic sampling procedure is used:

- Obtain samples using precleaned sample equipment, in accordance with the applicable method.
- Fill sample containers. Uniquely identify and label each sample, and document necessary information in the field record (e.g., location, time, characteristics).
- Properly clean and decontaminate the exterior of the sample containers and the sampling hardware.
- Complete the chain-of-custody forms and retain a record copy.
- Deliver the samples and associated forms to the laboratory.

Sampling procedures for certain mixed wastes may deviate from the standard sampling protocols, due to the hazards associated with radioactive materials. For example, due to radiological concerns, the use of remotely operated sample transfer systems may limit the size of sample containers, prevent sealing of the transfer receptacle, or preclude chain-of-custody and other documentation from directly accompanying the samples. However, all sampling procedures are consistent with the stated goals of SW-846, to collect representative samples and to maintain their physical and chemical integrity.

Equipment used to sample waste is disposable or designed for decontamination. Contaminated disposable equipment is managed appropriately. Equipment that can be cleaned and reused is thoroughly decontaminated before reuse or storage. Decontamination solutions are managed appropriately.

C-2c(1)(a) Field Records

Records provide direct evidence and support for the necessary technical interpretations, judgments, and discussions concerning project activities. These records, particularly those anticipated to be used as evidentiary data, directly support current or ongoing technical studies and activities, and provide the historical evidence needed for later reviews and analyses.

Field records may consist of bound field notebooks, sample collection forms, personnel qualification and training forms, sample location maps, equipment maintenance documentation, chain-of-custody forms, and/or sample analysis request forms. Records may include, but are not limited to the following, as applicable:

- Sample Collection - To ensure maximum utility of the sampling effort and resulting data, documentation of sampling protocol, as performed in the field, is essential. Sample collection records may contain the names of persons conducting the activity, sample number, sample location, date and time the sample was taken, equipment used, climatic conditions, documentation of adherence to protocol, and unusual observations.

- Chain-of-Custody Records - The chain of custody involving the possession of RCRA characterization samples from the time they are obtained until they are disposed or shipped off-Site are documented, and may include the project name, signatures of samplers, sample number, date and time of collection, grab or composite sample designation, signatures of individuals involved in sample transfer; and if applicable, the air bill or other shipping number.

- Quality Control (QC) Samples - Documentation for generation of QC samples, such as trip and equipment rinsate blanks, duplicate samples, and any field spikes, are maintained.

- Deviations - All deviations from participated sampling and analysis protocols are recorded in the site logbook or project records.

- Reports - A copy of any report issued and any supporting documentation are retained.

C-2c(2) Quality Control

Defensible and valid data are obtained through implementation of the processes controlling characterization and/or sampling and analysis. Such processes include the use of field and laboratory control samples, data validation, sampling performance assessments, and as necessary, corrective action(s) as identified in this section.

C-2c(2)(a) Field Control Samples

Control samples are QC samples that are intended to monitor the performance of the sampling system. In accordance with this WAP, the following field control samples may be collected:

- Field duplicates
- Equipment rinsate
- Trip blank-sample.

C-2c(2)(b) Laboratory Quality Control

Laboratories maintain QA programs to ensure the quality of data produced. Depending on the data end use and overall data quality objectives (DQOs), the laboratory QC samples may include:

- Matrix spike
- Matrix duplicate
- Matrix spike duplicate
- Laboratory blanks

- Control standards.

Off-Site laboratories must be INEEL approved. This approval process requires off-Site laboratories to pass stringent audit criteria included in the DOE Environmental Management Consolidated Audit Program (EMCAP). The EMCAP maintains audit checklists for such laboratory activities as general laboratory practices, quality assurance management systems, organic/inorganic data quality, radiochemistry data quality, electronic data management, hazardous and radioactive materials management, and industrial hygiene. These checklists are available to all facilities within the DOE complex via the internet, promoting thorough and consistent evaluation of all analytical facilities. Once approved, laboratories are audited at regular intervals to ensure performance and QA/QC standards are met.

C-2c(2)(c) Data Validation

Depending on the data end use and overall project DQOs, data validation may include evaluation of the following subjects:

- Completeness of laboratory records with regard to processing of all required samples and analyses
- Implementation of appropriate procedures
- Evaluation of sample analytical data to required detection and quantity
- Evaluation of QC analytical data to applicable control criteria
- Comparison of sample holding times to the required holding times prescribed by this WAP.

All deviations from the applicable guidance are documented and corrective actions implemented as necessary.

C-2c(2)(d) Sampling Performance Assessment

A key function of a QC program is the periodic assessment of activities for conformance to required protocols. Sampling performance assessments may evaluate the following activities:

- Completeness of Field Reports - This evaluation determines that a complete record exists for each field activity and that the procedures specified by this WAP or the documents implementing this WAP were executed.

- Identification of Valid Samples - This review involves the evaluation and interpretation of field records to detect problems affecting the representativeness of samples.

All resultant concerns are documented and corrective actions implemented as necessary.

C-2c(2)(e) Corrective Action

Corrective action measures can be divided into two categories as follows:

- Project Corrective Action - Corrective actions are performed when the project objectives are not met, when conditions adverse to quality have been identified, or when an assessment of data reveals questionable or unknown data quality. Conditions adverse to quality are identified promptly, and corrected as soon as possible. When significant conditions adverse to quality are identified, the causes are determined, and corrective actions to prevent their recurrence are performed and documented.

- Laboratory Corrective Actions - The laboratory possesses a QA plan identifying analytical acceptance criteria and what actions to take when these criteria are not satisfied.

C-2c(3) Process Sampling

Process samples are collected on a routine basis prior to transfers from waste collection tanks to the PEWE and LET&D systems. Process samples are analyzed for specified parameters to ensure ILWMS tolerance limits are met and to promote optimum operability of the miscellaneous treatment units. In some instances it may be possible to blend wastes or introduce additives, such as complexing agents, to bring constituents within the unit tolerance limits provided in Section D-8b(5) of this Part B permit application.

Table C-3 identifies where and when process sampling is conducted and identifies the parameters that may be examined for samples from each location. Process samples may also undergo analyses for total radiation or specific radionuclides. These parameters are not listed in Table C-3.

Process samples are collected using the same standard sampling methods identified in Section C-2c(1). Process sampling is conducted to optimize system performance, not for RCRA characterization of

Table C-3. ILWMS Typical Process Sampling Locations

LOCATION	TIME	SAMPLER TYPE	PARAMETERS	RATIONALE
Deep Tanks VES-WG-100, VES-WG-101, VES-WH-100, VES-WH-101	Prior to each transfer to the PEWE system	Double-needle	Acidity,	Indicator of a representative process sample. Inhibit formation of precipitates. Ensure compatibility.
			Flashpoint,	Ensure waste is not ignitable.
			Aluminum,	Ensure adequate quantity to complex fluorides.
			Chlorides,	Ensure within tolerance range[a].
			Fluorides,	Ensure within tolerance range[a].
			Aluminum:Fluoride ratio,	Ensure that fluorides are adequately complexed.
			Mercury,	Determine mercury loading.
			Nitrates,	Indicator of nitric acid content. Ensure vessel passive layer is maintained.
			Sulfates,	Ensure within tolerance range[a].
			Total organic carbon	Ensure compliance with Subparts AA/BB.

Table C-3. ILWMS Typical Process Sampling Locations (continued)

LOCATION	TIME	SAMPLER TYPE	PARAMETERS	RATIONALE
WWH Tanks VES-WL-103, VES-WL-104, VES-WL-105	Prior to each transfer to the PEWE system	Double-needle	pH,	Determine acid requirements. Ensure compatibility.
			Specific gravity,	Promote operational efficiency.
			Chlorides,	Ensure within tolerance range[a].
			Fluorides,	Ensure within tolerance range[a].
			Sulfates	Ensure within tolerance range[a].
NWCF Tanks VES-NCD-123, VES-NCD-129,	Prior to each transfer to the PEWE system	Double-needle	Acidity,	Indicator of a representative process sample. Inhibit formation of precipitates. Ensure compatibility.
			Specific gravity,	Indicator of a representative process sample. Promote operational efficiency.
			Aluminum,	Ensure adequate quantity to complex fluorides.
			Chlorides,	Ensure within tolerance range[a].
			Fluorides,	Ensure within tolerance range[a].
			Aluminum:Fluoride ratio,	Ensure that fluorides are adequately complexed.
			Mercury,	Determine mercury loading.
			Sulfates,	Ensure within tolerance range[a].
			Total organic carbon	Ensure compliance with Subparts AA/BB.

Table C-3. ILWMS Typical Process Sampling Locations (continued)

LOCATION	TIME	SAMPLER TYPE	PARAMETERS	RATIONALE
VES-NCC-119, VES-NCC-122	Prior to each transfer to the PEWE system unless process knowledge indicates no changes to the wastes (e.g., during ETS processing)	Double-needle	Acidity,	Indicator of a representative process sample. Inhibit formation of precipitates. Ensure compatibility.
			Flashpoint,	Ensure waste is not ignitable.
			Specific gravity,	Indicator of a representative process sample. Promote operational efficiency.
			Aluminum,	Ensure adequate quantity to complex fluorides.
			Chlorides,	Ensure within tolerance range[a].
			Fluorides,	Ensure within tolerance range[a].
			Aluminum:Fluoride ratio,	Ensure that fluorides are adequately complexed.
			Mercury,	Determine mercury loading.
			Sulfates,	Ensure within tolerance range[a].
			Total organic carbon	Ensure compliance with Subparts AA/BB.

Table C-3. ILWMS Typical Process Sampling Locations (continued)

LOCATION	TIME	SAMPLER TYPE	PARAMETERS	RATIONALE
Process Condensate Collection Tanks VES-WL-106, VES-WL-107, VES-WL-163	Prior to each transfer to the LET&D unless process knowledge or prior analytical results indicate that the waste is unacceptable for the LET&D	Nozzle	Acidity, Aluminum, Fluoride, Total organic carbon	Indicator of a representative process sample. Inhibit formation of precipitates. Ensure compatibility. Ensure adequate quantity to complex fluorides. Ensure within tolerance range[a]. Ensure compliance with Subparts AA/BB.
LET&D Bottoms Tank VES-WLL-195	Infrequently, to validate nitric acid concentration	Nozzle	Acidity, Chlorides, Fluorides, Nitrates	Validate concentration of nitric acid. Determine chloride carryover. Determine fluoride carryover. Validate concentration of nitric acid.

a. ILWMS tolerance limits are provided in Section D-8b(5).

wastes. Therefore chain of custody and RCRA QC procedures are not followed for process samples. In addition, duplicate samples and field blanks are not generally utilized during process sampling activities. However, laboratory QA/QC procedures will be followed at all times to ensure the performance of analytical instrumentation and the validity of sample results. If process sampling results are inconsistent with the waste characterization information provided by the generator or indicate that the waste generating process may have changed, then the waste is recharacterized.

C-2d Frequency of Analyses: [IDAPA 58.01.05.008; 40 CFR § 264.13(b)(4)]

Waste stream characterizations are reviewed and recertified annually to ensure continued accuracy of the information provided. Typical waste streams managed by the ILWMS are generated several times a year from highly controlled processes in which the waste composition remains consistent for the duration of the year. Recharacterization is required when:

- The process generating an established waste stream changes
- The waste characteristics are highly variable from batch to batch
- There is reason to suspect a change in the waste based on inconsistencies in the packaging or labeling of the wastes, or there are inconsistencies between the waste verification results and the waste characterization data provided by the generator
- Facility personnel reject the waste because it is inconsistent with the profile for that waste.

Facility personnel can require additional waste analysis to substantiate waste characterization data prior to acceptance of a waste**.**

C-2f Additional Requirements for Ignitable, Reactive, or Incompatible Wastes: [IDAPA 58.01.05.008; 40 CFR §§ 264.13(b)(6), 40 CFR 264.17]

Each waste stream proposed for treatment or storage in the units addressed in this application is evaluated for all applicable RCRA characteristics by WGS personnel as part of the waste characterization process. Small quantities of low TOC ignitables (EPA HWN D001) may enter the ILWMS through the CPP-601 Deep Tanks as a result of laboratory sample preparation and cleaning activities. Sampling and analysis has demonstrated that when these small quantities of ignitable waste are aggregated with other wastes in the CPP-601 Deep Tanks to facilitate treatment, the characteristic of ignitability is lost. However, the HWN D001 is tracked through the ILWMS to account for these ignitable materials and any underlying hazardous constituents (UHCs) to ensure proper cradle-to-grave management of mixed and hazardous wastes. As identified in Table C-3 of Section C-2c(3), process samples are taken from the CPP-601 Deep Tanks prior to each transfer to the PEWE system and tested for flashpoint to ensure the feed stream is not ignitable.

Incompatibility determinations are based on the characterization data developed by WGS during initial characterization activities. The storage and miscellaneous treatment units operate in accordance with defined procedures that demonstrate how these data are used to prevent incompatible wastes, including reactives, from contacting one-another. The tables in Appendix V of 40 CFR 264/265 and 49 CFR § 177.848 are examples of resources that may be used to determine compatibility. In addition, the quantity and concentration of wastes or chemicals to be commingled are considered for compatibility determinations.

In order to protect equipment and promote effective treatment, chemical additives may be introduced into the ILWMS. Chemicals added include:

- Nitric acid – recovered from the LET&D facility or purchased as a commercial product to inhibit the formation of precipitates and to ensure passive layer formation on stainless-steel vessels and piping
- Aluminum nitrate – purchased as commercial product to complex fluorides, reducing corrosion to the system
- Sodium hydroxide (rust remover) – purchased as a commercial product for descaling equipment.

Other chemical commercial products, including oxalic acid and potassium permanganate, may be used during decontamination activities. These chemicals are not added to promote treatment of wastes and are therefore not considered tank treatment (T01).

The chemical additives described above are typically added to tank systems through decontamination headers/lines or through preventative maintenance areas. Mixing occurs via air sparge, mechanical mixers, or recirculation. Chemical addition is controlled through standard operating procedures, which specify the quantity/concentration of each chemical to be added and require review and approval by a system engineer. These controls maintain compatibility and provide adequate protection of equipment.

The WTS evaluates for the characteristic of reactivity during the waste characterization process. If, based on the information provided by the source generating the waste, the waste is a new, unused chemical product that is either a P- or U-listed waste for which reactivity is the basis for listing, the waste is considered a reactive waste. If the waste is a mixture that contains P- or U-listed constituents for which reactivity is the basis for listing, the waste is evaluated to determine if the waste matrix will be a reactive waste. Consideration must be given to concentration, purity, and processes in which the chemicals have been previously employed, the matrix in which they may be combined, specific characteristics of the chemicals (i.e., volatility, mobility, reaction to water and/or other solvents, viscosity, density, pH, etc.), cumulative chemical effects, and the time the chemical constituents have been in contact with each other. The ILWMS will not manage wastes that exhibit the characteristic of reactivity, EPA HWN D003.

The safety analysis documentation for the ILWMS indicates that, under the proper conditions, two potentially explosive reactions could occur. These reactions are tributyl phosphate (TBP) with nitric acid and hexone with nitric acid. Due to the temperature requirements necessary for these reactions, the only units described in this Part B permit application that could potentially sustain these reactions are the PEW evaporators and the LET&D fractionators.

Conditions necessary for a TBP/nitric acid reaction include appropriate TBP concentration and elevated temperature (studies have shown that this reaction does not become extremely exothermic until the solution reaches 186° C).

The quantity of TBP in the ILWMS is extremely small. Since the end of fuel reprocessing activities at the INTEC in the early 1990's, no TBP has been added to the system. In addition, all liquids in the INTEC TFF have already been evaporated at least once, further reducing the volume of TBP.

Both the PEWE and LET&D facilities operate at much lower temperatures than are necessary to sustain a TBP/nitric acid reaction. Standard operating temperatures for these facilities are 108° C for the PEW evaporators and 118° C for the LET&D fractionators. Deviations from these operating temperatures result in waste feed cutoffs and/or shutdown of the system well before a temperature of 186° C can be reached.

In order for a hexone/nitric acid reaction to occur, similar conditions must exist. A reaction can only be sustained if an adequate concentration of hexone is present and necessary temperature requirements are met. The flashpoint of hexone in water at the elevation of the INEEL is 133° F (56° C) at a concentration of 2000 mg/L.

Like TBP, hexone is present in INTEC liquid wastes in only minimal concentrations. However, since the operating temperatures of the PEW evaporators and LET&D fractionators are high enough to sustain a hexone/nitric acid reaction, under the appropriate conditions, the concentration of TOC allowed in the feed to the ILWMS is limited to 1100 mg/L. To ensure conservatism, all TOC is assumed to be hexone. This tolerance limit is identified in Section D-8b(5) of this permit application for both the PEWE and LET&D facilities.

Furthermore, the LET&D facility is operated as an open system. The LET&D fractionators are maintained at a pressure of –20 in. water column. Both the TBP/nitric acid and the hexone/nitric acid scenarios require a closed system to sustain a reaction. The conditions in the LET&D facility preclude either reaction from occurring. If a vacuum cannot be maintained, the treatment process is automatically shut down.

Therefore, the risk of explosive TBP/nitric acid reactions is eliminated due to low reactant concentrations, inadequate temperature, and open vessel conditions in the LET&D fractionators. Similarly, hexone/nitric acid reactions cannot occur due to low reactant concentrations, which are further regulated by administrative controls, and open vessel conditions on the LET&D fractionators.

C-3 WASTE ANALYSIS REQUIREMENTS PERTAINING TO LAND DISPOSAL RESTRICTIONS [IDAPA 58.01.05.011; 40 CFR § 268]

The Hazardous and Solid Waste Amendments to RCRA authorize the land disposal of certain types of wastes only if LDR treatment standards are met. Information provided in this section describes the additional characterization requirements for assessing LDR applicability and compliance with the treatment standards before land disposal.

C-3a Waste Characterization

The ILWMS is a highly acidic waste treatment system. The system is designed and operated as part of an overall liquid waste treatment train. Maintaining an acidic condition is necessary in order to keep metals and radioactive isotopes in solution and prevent chloride- and fluoride-induced corrosion. The waste undergoing treatment is a known restricted waste due to corrosivity, toxicity characteristics for metals, and previous receipt of listed waste into the system.

LDR applicability is determined for each waste at the point of generation based on the EPA HWNs assigned to individual waste streams. Before receipt into the ILWMS, wastes undergo initial characterization for EPA HWN applicability and LDR requirements. Once LDRs are identified, they remain applicable through treatment and/or disposal of the final waste form. This final waste form will depend on the ultimate treatment alternative selected by the DOE. Final assessment and compliance with LDR treatment standards will take place before land disposal by evaluating the final waste form. This assessment will take place on-Site and appropriate LDR notifications will be completed as described in Section C-2a(2) of this permit application. LDR documentation will be provided to the disposal facility in accordance with IDAPA 58.01.05.011 (40 CFR § 268.7).

The characterization process for purposes of LDR is the same as that employed during the initial characterization process noted in past sections. Facility personnel, with the assistance of WGS, and other organizations as needed, conduct hazardous waste determinations before management of the waste. The hazardous waste determination includes, where applicable, characteristic and listed EPA HWN determinations in addition to identification of wastewater and non-wastewater treatability groups, UHCs, LDR subcategories, and LDR treatment standards applicable to the waste.

During the initial characterization process, facility personnel select parameters and rationale for testing based on the rationale presented in Table C-2 and on the applicable LDR requirements found within IDAPA 58.01.05.011 and 40 CFR § 268 or process knowledge. If the waste is determined to be subject to the LDR requirements, facility personnel determine if the waste is a wastewater or non-wastewater and also determine applicable subcategories. Total organic carbon (TOC) and total suspended solids (TSS) analyses may be used to conduct wastewater/non-wastewater determinations, in cases where process knowledge is not adequate. Additional information on the characterization process is found in Sections C-1 and C-2.

Waste generated at the ILWMS from activities such as maintenance and spill cleanup will undergo a hazardous waste determination based on testing and/or process knowledge as outlined within this document before it is returned to the PEWE or managed elsewhere. If the waste is determined to be subject to LDR requirements, facility personnel will determine if the waste is a wastewater or non-wastewater and applicable subcategories using the parameters shown in Table C-2 or process knowledge.

C-3b Sampling and Analytical Procedures

Sampling and analysis will follow the same approach as outlined within Sections C-2 through C-2c. Test methods used to assess LDR treatment standards will be based on total analysis unless otherwise specified in IDAPA 58.01.05.011 (40 CFR §§ 268.40 through 268.48).

C-3c Frequency of Analysis

Compliance with all LDR requirements will be demonstrated and documented prior to disposal of the final waste form. As previously mentioned, the final waste form will be determined by the final treatment alternative selected by the DOE. All LDR compliance documentation will be maintained in the facility operating record.

C-3d Additional requirements for treatment facilities

C-3d(2) Analysis of treatment residues

Treatment residues produced by the units described in this permit application include: 1) PEWE overhead condensate that is subsequently processed in the LET&D facility; 2) PEWE bottoms that are returned to the TFF; and 3) LET&D bottoms that are primarily comprised of recovered nitric acid and used elsewhere at the INTEC in lieu of purchasing commercial-grade nitric acid. Analyses of these treatment residuals for the purposes of RCRA characterization are conducted infrequently because these units are part of an overall treatment train. The LET&D facility was specifically designed and constructed of materials to process PEWE overhead condensate. Since the LET&D is the next step in the treatment train, characterization of PEWE overhead condensate is not routinely performed. However, process sampling of treatment residuals is normally conducted to ensure optimum operation of the overall treatment process.

Once the final treatment alternative is identified by the DOE, wastes returned to the TFF will be processed. Treatment residuals produced from this process will be analyzed for all applicable LDR treatment standards. Compliance with all LDR requirements will be documented prior to land disposal. LDR documentation will be maintained in the facility operating record. Until such time that a final treatment alternative is identified, PEWE bottoms will continue to be transferred to the TFF for storage.

C-3d(3) Sampling and analytical procedures

Since the ILWMS does not produce the final waste form (i.e., the form that can be land disposed), sampling and analysis procedures for determination of LDR treatment standard compliance do not exist. The final evaluation [as noted above in C-3d(2)] will take place when the final waste form is produced.

C-3d(4) Frequency of analysis

The permit application for the ultimate treatment alternative selected by the DOE will describe the frequency of analysis for demonstrating compliance with LDR treatment standards.

C-4 PEWE SYSTEM, SUBPART AA, SUBPART BB AND SUBPART CC APPLICABILITY [IDAPA 58.01.05.008; 40 CFR §§ 264.1030, 264.1050, and 264.1080]

Per IDAPA 58.01.05.008 (40 CFR § 264.1031) an air stripping operation is a desorption operation employed to transfer one or more volatile components from a liquid mixture into a gas (air) either with or without the application of heat to the liquid. The CPP-601 Deep Tanks are continuously sparged for criticality control. The Deep Tanks are the only tanks continuously sparged at INTEC. Sparging of these tanks is only performed to ensure suspension of any solids, preventing the possibility of a criticality event from occurring in the tanks. Since sparging is not employed for the purpose of transferring volatile components from a liquid mixture into a gas, this activity does not meet the definition of an air stripping operation. However, the practice of sparging (for the purpose of criticality control) may be perceived as an air stripping activity. The INEEL has evaluated solutions discharged to the Deep Tanks to determine if these tanks would require monitoring and controls (i.e., organic concentration in the tanks exceed 10 ppmw and the total organic emissions exceed 3 pounds per hour and 3.1 tons per year).

INTEC Analytical Laboratories (CPP-684, CPP-630, and CPP-602) are the primary contributor (> 90%) to the Deep Tanks. Other sources of organics into the ILWMS include decontamination and debris treatment solutions such as oxalic acid and organic contamination (i.e., grease and oil) on debris treated in CPP-659. The major organic reagents sent to these tanks by the Analytical Laboratories are acetone and isopropanol. Isopropanol can be converted to the more volatile acetone once in the Deep Tanks. Morrison and Boyd show a mechanism for the conversion of secondary alcohols, such as isopropanol, to ketones, such as acetone, in the presence of acid and a strong oxidizer.[4] In addition, a popular means of acetone production is by the catalytic dehydration of isopropanol.[5] Even though acetone and isopropanol are volatile, they are also water miscible. The miscibility of these two organic compounds make them difficult to air load (sparge). Balance of Plant (RCRA) sampling activities of the Deep Tanks has shown acetone to be the primary volatile organic constituent identified.

The Analytical Laboratories currently dispose of less than 40 liters of VOCs to the Deep Tanks during a one-year time period. This quantity in the Deep Tanks is approximately two orders of magnitude lower than the 3.1 ton per year limit as shown in the following calculation.

40 L of acetone per year at 0.7899 g/mL = 31.6 kg of acetone per year

31.6 kg of acetone per year at 2.2 lbs per kg = 69.5 pounds acetone per year

69.5 pounds acetone per year at 2000 lbs per ton = 0.035 tons acetone per year

In order to avoid a one time exceedance of the 3 pound per hour limit, the Analytical Laboratories ensure that no greater than 1.73 liters (3 pounds) of acetone/isopropanol are disposed to the Deep Tanks within a one hour time period (based on the assumptions that all the isopropanol is converted to acetone, and the acetone is completely and instantly air loaded by sparging). Analytical Laboratories have systems in place to limit the volume of acetone/isopropanol disposed to the Deep Tanks. Excess amounts of VOCs and non-radioactive VOCs in the analytical laboratories are disposed of in Satellite Accumulation Areas.

Sampling of the other PEWE inputs has shown the maximum TOCs to be less than 300 μg/mL (ppm). The remainder of this section addresses the main system and no other tank vents. The process design capacity as stated in the RCRA Part A permit is 12,000 gallons per day (this equates to 500 gallons per hour). This limit on processing feed rate will allow the PEWE to operate within Subpart AA and BB limits. The overheads from the PEWE system are transferred to the LET&D facility. The following calculations demonstrate that the PEWE system and the LET&D facility are in compliance.

---

[4] Morrison and Boyd, Organic Chemistry, 3rd Edition, Allyn and Bacon, Inc., 1973.

[5] Frank C. Whitmore, Organic Chemistry, 2nd Edition, D. Van Nostrand Company, Inc., 1951.

40 CFR 264 Subpart AA Applicability

The PEWE system is subject to IDAPA 58.01.05.008 and 40 CFR 264 Subpart AA. 40 CFR 264 Subpart AA regulates hazardous wastes with organic concentrations greater than 10 ppm, by weight. The limit given in 40 CFR 264.1032(a)(1) is 3 lb/hr emission of organics to the environment.

The following calculation identifies the maximum amount (in ppm) of total organic carbon (TOC) that could be released to the environment and not exceed the limit of 3 lb/hr given in 40 CFR 264.1032(a)(1).

3 lbs (454 g/lb) = 1362 g = 1,362,000 mg;

average feed rate = 500 gal/hour;

(500 gal/hr) (3.785 liters/gal) = 1890 L/hr

(1,362,000 mg/hr) / (1890 L/hr) = 720.6 milligrams/L = 720.6 ppm

In addition, before liquids are transferred to VES-WL-133, sampling data on TOC are required from sources that could contain TOC (the Deep Tanks, for example) to prevent exceeding the requirements of 40 CFR 264 Subpart AA.

The LET&D facility offgas system TOC emissions are controlled per the following calculations and methodology:

3 lbs (454 g/lb) = 1362 g = 1,362,000 mg;

maximum feed rate = 550 gal/hour;

(550 gal/hr) (3.785 liters/gal) = 2,079 L/hr

(1,362,000 mg/hr) / (2,079 L/hr) = 655.1 milligrams/L = 655.1 ppm

To account for any potential sampling problems or analysis deviation, the limit has been set at 550 ppm. The maximum feed rate is 550 gallons per hour, and the minimum feed rate is design-limited to 275 gallons per hour, which would allow up to 1,100 parts per million (ppm) organics in the feed, assuming that all the organics are carried out in the offgas.

Wastes in the process condensate collection tanks (VES-WL-106, -107, and –163) are sampled for TOC before being transferred to the LET&D facility. Historical sample results of the LET&D feed have been in the range of 30 to 80 ppm for TOC.

If sample analyses for TOC were greater than 1,100 ppm, the solution would not be fed to the LET&D and would be recycled back to the PEWE system for reprocessing. The maximum TOC sample analysis of 1,100 ppm limits the feed rate of the LET&D to 275 gallons per hour. A TOC sample analysis of 550 ppm allows the LET&D to operate at 550 gallons per hour. The feed rate is adjusted linearly between 550 ppm and 1,100 ppm. If the feed rate is adjusted to less than the LET&D minimum feed rate of 275 gal/hr, based upon the TOC content of the feed, the system recycles the solution back to the PEWE system.

The feed rate in the LET&D is maintained to ensure TOC emissions are less than 3 lb/hr to ensure compliance with this regulation.

40 CFR 264 Subpart BB Applicability

IDAPA 58.01.05.008 (40 CFR 264 Subpart BB) applies to equipment that contains or contacts hazardous wastes with organic concentrations of at least 10% by weight. Sampling of the PEWE system inputs have shown the maximum TOC contained in the waste to be less than 300 ppm.

Conversion factors: 1 gal. = 3.78 liters; 1 gallon = 8.34 lb; 1 lb = 454 g

720.6 µg/mL = 720.6E-6 g / 10E-3 L = 7.19E-4 lb TOC/ lb solution

Since the TOC is less than 10 percent by weight, the requirements of 40 CFR 264 Subpart BB do not apply.

40 CFR 264 Subpart CC Applicability

The requirements of this subpart do not apply per the following exemption as specified in 40 CFR 264.1080(b)(6): A waste management unit that is used solely for the management of radioactive mixed waste in accordance with all applicable regulations under the authority of the Atomic Energy Act and the Nuclear Waste Policy Act.

APPENDIX C-1

INEEL Waste Determination and Disposition Form

General Instructions:

WASTE STREAM NAME: ______________________ **MATERIAL PROFILE NUMBER:** ______________

WDDF NUMBER (OPTIONAL): ______________________ CHARGE #: ____________

<table>
<tr><th colspan="12">WASTE STREAM CONTACTS</th></tr>
<tr><th>Contact:</th><th>Name</th><th>E-Mail</th><th>Phone</th><th>Pager</th><th>MS</th><th>Contact:</th><th>Name</th><th>E-Mail</th><th>Phone</th><th>Pager</th><th>MS</th></tr>
<tr><td>Generator:</td><td></td><td></td><td></td><td></td><td></td><td>Technical Specialist:</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Facility Rep.:</td><td></td><td></td><td></td><td></td><td></td><td>Independent Reviewer:</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

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

1. Waste Generation Location: Facility: Building/Room: Area: If applicable: Container #: Type/size:

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

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

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: ☐ Solid ☐ Organic Liquid ☐ Aqueous Liquid ☐ Sludge ☐ Aerosol ☐ Gas Cylinder ☐ Multi-Layered

7. Sources used for process evaluation (e.g. MSDS, operational logs, procedures, analyses):

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.

<table>
<tr><th colspan="2">Liquids</th><th colspan="2">Solids</th><th colspan="2">All</th></tr>
<tr><td>a. pH (aqueous only):
☐ < 2 ☐ ≥ 12.5
☐ > 2 or < 12.5 Exact</td><td>Method:
☐ NA</td><td>h. Asbestos:
If yes, is it friable?</td><td>☐ Yes ☐ No ☐ NA
☐ Yes ☐ No ☐ NA</td><td>n. PCBs: If Yes, provide concentrations (actual & source) in composition table.
PCBs Bulk Product? (40 CFR 761.62)?</td><td>☐ Yes ☐ No ☐ NA
☐ Yes ☐ No ☐ NA</td></tr>
<tr><td>b. Flash Point: ☐ NA</td><td>Method:</td><td>i. Pyrophoric (Water Reactive)</td><td>☐ Yes ☐ No ☐ NA</td><td>o. Sulfide ≥ 500 mg/kg</td><td>☐ Yes ☐ No ☐ NA</td></tr>
<tr><td>c. Total suspended solids <1%</td><td>☐ Yes ☐ No ☐ NA</td><td rowspan="2">j. Flammable Solid</td><td rowspan="2">☐ Yes ☐ No ☐ NA</td><td>p. Cyanide ≥ 250 mg/kg</td><td>☐ Yes ☐ No ☐ NA</td></tr>
<tr><td>d. Is total organic carbon <1%</td><td>☐ Yes ☐ No ☐ NA</td><td>q. Oxidizer</td><td>☐ Yes ☐ No ☐ NA</td></tr>
<tr><td>e. Fuming Acid/Acid Gases</td><td>☐ Yes ☐ No ☐ NA</td><td>k. Free liquids: If Yes, quantity volume %</td><td>☐ Yes ☐ No ☐ NA</td><td>r. Treatment Residue</td><td>☐ Yes ☐ No ☐ NA</td></tr>
<tr><td>f. Pyrophoric (Air Reactive)</td><td>☐ Yes ☐ No ☐ NA</td><td>l. RCRA Debris (>60 mm) (≥ 50% by visual inspection) or non-RCRA Rubble</td><td>☐ Yes ☐ No ☐ NA
☐ Yes ☐ No ☐ NA</td><td>s. Explosive
t. Radioactive</td><td>☐ Yes ☐ No ☐ NA
☐ Yes ☐ No ☐ NA</td></tr>
<tr><td>g. Water Reactive</td><td>☐ Yes ☐ No ☐ NA</td><td>m. Pyrophoric (Air Reactive)</td><td>☐ Yes ☐ No ☐ NA</td><td>u. Halogens (Cl, F, Br)</td><td>☐ Yes ☐ No ☐ NA</td></tr>
</table>

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

WASTE STREAM NAME: ______________________ **MATERIAL PROFILE NUMBER:** ______________

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

12. Radioisotopes: Are radioisotopes present? ☐ ***Yes,*** *If Yes, refer to attachment* ☐ ***No,*** *If No, include signed form 435.02*

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:

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.

Generator Name Typed/Printed	Signature	Date
WGS Facility Representative Name Typed/Printed	WGS Facility Representative Signature	Date

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:	
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:	
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.)	
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: Attachment Included: ☐ Yes ☐ No	
C. DISPOSITION AND DATA GAP EVALUATION: (ATTACHMENT INCLUDED: ☐ YES ☐ NO)	
1. Proposed Disposition (storage, treatment, disposal pathway):	STP ID (mixed only):
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.	
At Initial Storage Location: ☐ Yes ☐ No	Immediately Prior to Shipment: ☐ Yes ☐ No
2. What is the verification frequency?	

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.

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	☐ 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.

WGS Technical Specialist Name Typed/Printed	WGS Technical Specialist Signature	Date
WGS Independent Reviewer Name Typed/Printed	WGS Independent Reviewer Signature	Date
Low Level Waste Hazardous Waste Determination Review Name Typed/Printed	Low Level Waste Hazardous Waste Determination Review Signature	Date

Additional Narrative Information (As Needed):

APPENDIX C-2

"Final Report for Organics Partitioning Resulting from Operation of an INTEC Double Needle Sampler," Revision 1, September 24, 2002

INEEL/EXT-03-00774

Final Report for Organics Partitioning Resulting from Operation of an INTEC Double Needle Sampler

Mike Heiser
and
Science Applications International Corporation

June 2003

Idaho National Engineering and Environmental Laboratory

Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-99ID13727

SAIC SCIENCE TECHNOLOGY APPLICATIONS RESEARCH CENTER

FINAL REPORT FOR ORGANICS PARTITIONING RESULTING FROM OPERATION OF AN INTEC DOUBLE NEEDLE SAMPLER

Revision 1
September 24, 2002

Prepared for :
Bechtel BWXT Idaho, LLC
Idaho National Engineering and Environmental Laboratory
Idaho Falls, ID 83415

Prepared by:
Science Applications International Corporation
950 Energy Drive
Idaho Falls, ID 83401
Contract No. 00000127, Release No. 1

Acronym List

cc	cubic centimeter
EE	End Effector
g	gram
GC/MS	Gas Chromatograph/Mass Spectrometer
IDEQ	State of Idaho Department of Environmental Quality
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
l	liter
LDUA	Light Duty Utility Arm
M	Molar
mg	milligram
ml	milliliter
N	Normal
ng	nanogram
NWCF	New Waste Calcining Facility
PEWE	Process Equipment Waste Evaporator
psig	pounds per square inch gage
ppb	part per billion
ppm	part per million
RCRA	Resource Conservation and Recovery Act
STAR	Science Technology Applications Research (Center)
TCA	1,1,1-Trichloroethane
TFF	Tank Farm Facility
TOC	total organic carbon
µl	microliter
VOC	volatile organic constituents

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1.0 BACKGROUND

The double needle sampler testing is a continuation of previous test series that investigated the fate of organic species in the Process Equipment Waste Evaporator (PEWE) system at the Idaho Nuclear Technology and Engineering Center (INTEC). This test series was designed to investigate the effects of operation of the double needle sampling systems on volatile organic constituents in an acidic feed matrix.

The PEWE, located in CPP-604, reduces the volume of mixed waste sent to the Tank Farm Facility at the INTEC. The PEWE system consists of feed tanks for accumulation of waste solutions, two evaporator trains for processing the waste solution, a bottoms collection vessel, and condensate collection vessels. The waste solutions are transferred from the feed tanks to the evaporator vessel, where the solution is heated and circulated through the evaporator. The overhead vapors generated in the evaporator are condensed and transferred to the PEW condensate collection tanks. The condensate is accumulated in the condensate collection tanks for further processing at the Liquid Effluent Treatment and Disposal Facility, CPP-1618. The remaining solution is circulated through the evaporator until procedurally designated limits are met, at which time the solution is transferred to the bottoms collection vessel. The bottoms are eventually transferred to the Tank Farm Facility for storage.

Although extensive process information is available regarding wastes processed in the PEWE, there is less information regarding hazardous organic constituents. Hazardous organic species have been discharged to the PEWE system as a result of past operating practices. Studies were conducted to determine the fate of the organic compounds in the INTEC Tank Farm,[1] but these studies did not address the effects of the evaporation process on the fate of the organics. SAIC has conducted four bench-scale evaporator and two Light Duty Utility Arm tests to evaluate the fate of spiked organics in a high and low molarity nitric acid simulated feeds. The results of these tests indicated that INTEC sample collection and handling procedures do not significantly effect the concentration of volatile organic or semi-volatile organic constituents in the waste stream.[2]

1.1. Previous Organic Partitioning Tests

In 1998 a series of organic partitioning tests were initiated at SAIC's Science Technology Applications Research (STAR) Center located in Idaho Falls, Idaho. These tests were designed to support the Idaho National Engineering and Environmental Laboratory (INEEL) INTEC permitting, regulatory, and closure decision makers. Primary test objectives included:

- Quantify organic partitioning that results from STAR Center bench-scale evaporator operation,
- Quantify organic losses that result from operation of the Light Duty Utility Arm (LDUA) sampler end effector, and
- Determine organic losses that may be attributed to INTEC sampling procedures.

1.2. Conclusions from Previous Organic Partitioning Tests

Test series conclusions were based on quantitative data analysis as well as qualitative observations. Results provided a representation of the fate of organics in the PEWE system and LDUA sample end effector.

1.2.1. Bench-Scale Evaporator Conclusions

Analytical data revealed that up to 75% of the volatile organics and 40% of the semi-volatile organics spiked to the PEWE feedstock were destroyed, decomposed, reacted, or volatilized prior to evaporator processing. This percentage may be dependent upon the physical properties (e.g. vapor pressure) of each compound.[2]

Bench-scale PEWE bottoms were virtually free of volatile organic compounds. Given that the bench-scale feedstock was spiked with 3-4 orders of magnitude higher volatile organic constituent (VOC) concentrations than found at INTEC, it is reasonable to conclude that detectable VOC concentrations will not be present in the TFF and were not introduced to the calciner. It is likely, however, that semi-volatile compounds processed through the PEWE will be present in the TFF and calciner feed.

Analytical data did not conclusively indicate that INTEC sample collection and handling procedures effect VOC or SVOC concentrations. Figures 1-1 and 1-2 below present simplified partitioning mass balances, from bench-scale evaporator operation, of volatile and semi-volatile organics.[2]

Figure 1-1: PEWE Volatile Organic Partitioning
[Basis = 100 mass units]

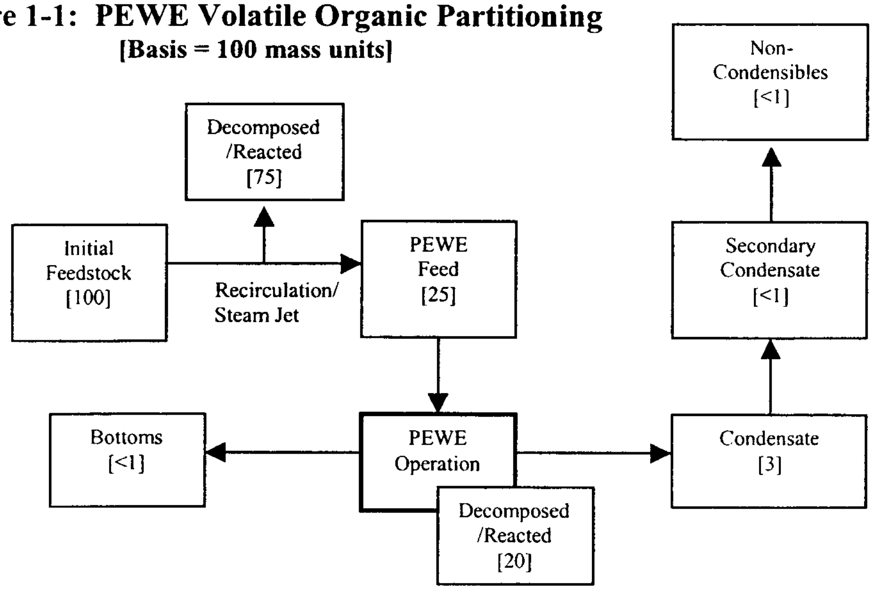
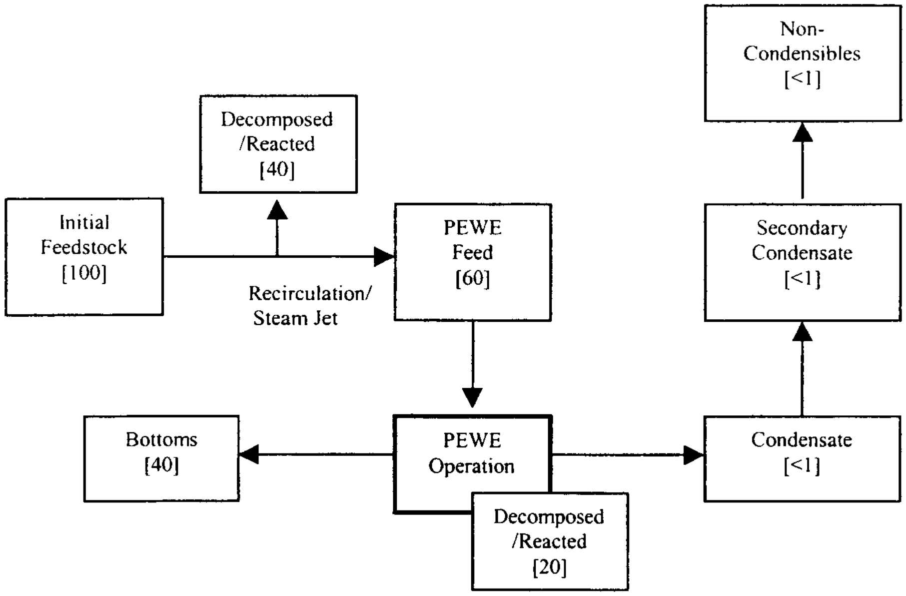


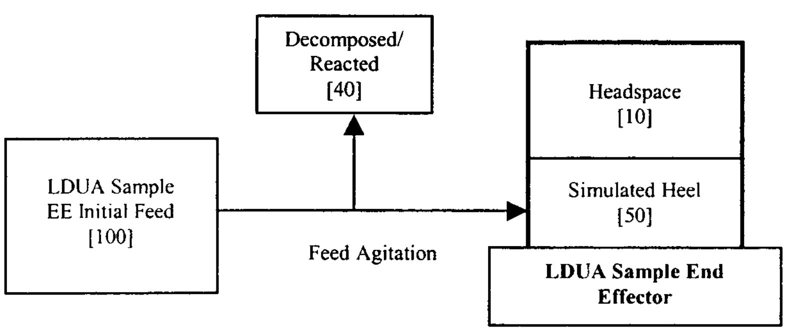
Figure 1-2: PEWE Semi-Volatile Organic Partitioning
[Basis = 100 mass units]



1.2.2. LDUA End Effector Conclusions

Analytical data indicated that LDUA sample EE operating vacuums effect volatilization of organic species in simulated tank heel residue. Each operating vacuum yielded consistent data resulting in a good material balance about the end effector. The data indicated that the higher the operating vacuum, the greater the resulting volatile organic volatilization. Based on LDUA testing, it was recommended that the end effector be operated at the lowest operating vacuum allowed by the heel matrix. Figure 1-3 below presents a simplified volatile organic balance about the LDUA sample EE.[2]

Figure 1-3: LDUA Sample EE Volatile Organic Partitioning
[Basis = 100 mass units]



An independent evaluation of INTEC analytical procedures (Analytical Chemistry Methods) compared to SW-846 specified methods was conducted to identify variances, should they exist, between the analytical protocols. Identified variances were satisfactorily addressed by the INTEC Remote Analytical Laboratory thereby establishing analytical equivalency.

2.0 TEST OBJECTIVES

In February 2001, the results of previous organic partitioning testing were presented to the State of Idaho Department of Environmental Quality (IDEQ). At this time, the IDEQ requested that additional testing be performed to statistically quantify potential losses of volatile organic species that may be attributed to the double needle sampling systems currently utilized at INTEC. As such, the double needle sampler testing was designed to determine the effects of operation of the double needle sampling systems on volatile organic species that have potentially been introduced into the PEWE system.

3.0 BENCH-SCALE PROCESS EQUIPMENT

The bench-scale PEWE system was been designed and constructed at the SAIC Science and Technology Applications Research (STAR) Center to model typical PEWE system operations. The bench-scale system consists of a feed tank, evaporator vessel with an attached thermosiphon reboiler, bottoms collection tank, condensate collection tank, and tank sampling station.

Testing of the double needle sampler system utilized the feed tank, sample station, and vessel off-gas systems only. An image of the STAR Center bench-scale evaporator system is presented as Figure 3-1 and a flow diagram of the bench-scale system is shown in Figure 3.2. The only modification to the bench-scale evaporator system for double needle sampler testing was the addition of a mechanical mixer to the feed tank

Figure 3-1: STAR Center Bench-Scale Evaporator System

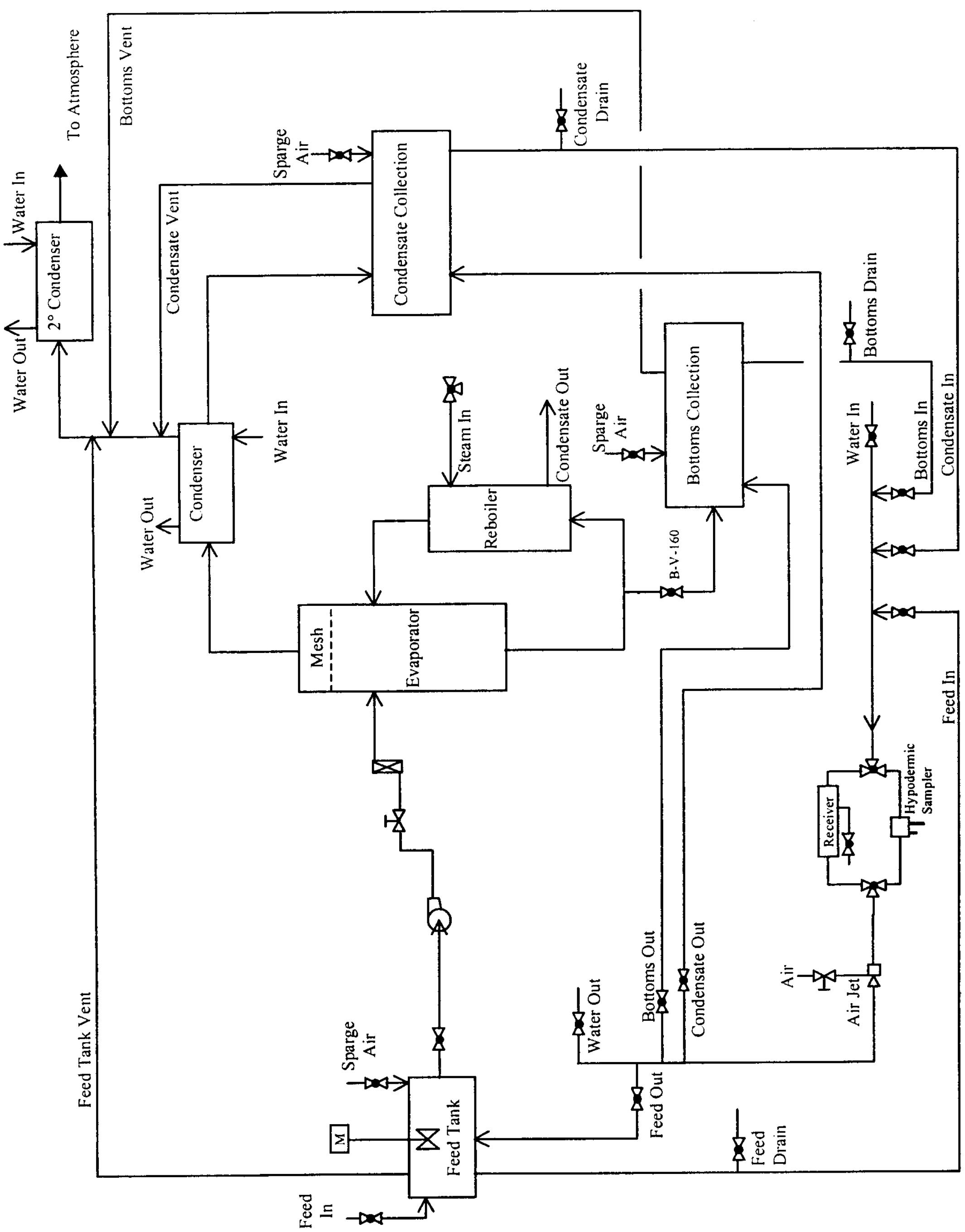


Figure 3-2: Bench-Scale Evaporator System Diagram

A sampling station and associated piping was assembled as part of the bench-scale system for the previous test series. The sample station was designed to model existing sample stations at INTEC. The double needle sample assembly was supplied by INTEC and is identical to the sample assemblies used at INTEC.

The sampling station can sample solutions from the feed tank, bottoms tank, and condensate tank. The sample station consists of a double hypodermic needle sampler and a larger volume sample receiver. An air jet is used to initiate sample flow through the sample station and recirculate the sample back to the respective tank. The hypodermic needle sampler consists of a double hypodermic needle sample assembly to which a sample bottle, fitted with a neoprene or Teflon diaphragm, can be attached. When the air jet is actuated, the sample flows into the sample bottle through one needle (the long needle) and exits through the other (the short needle), filling the sample bottle. This sampling method results in headspace in the top of the sample bottle. The double needle sampler was used exclusively throughout this testing. Figure 3-3 and 3-4 are images of the double needle sampling system.

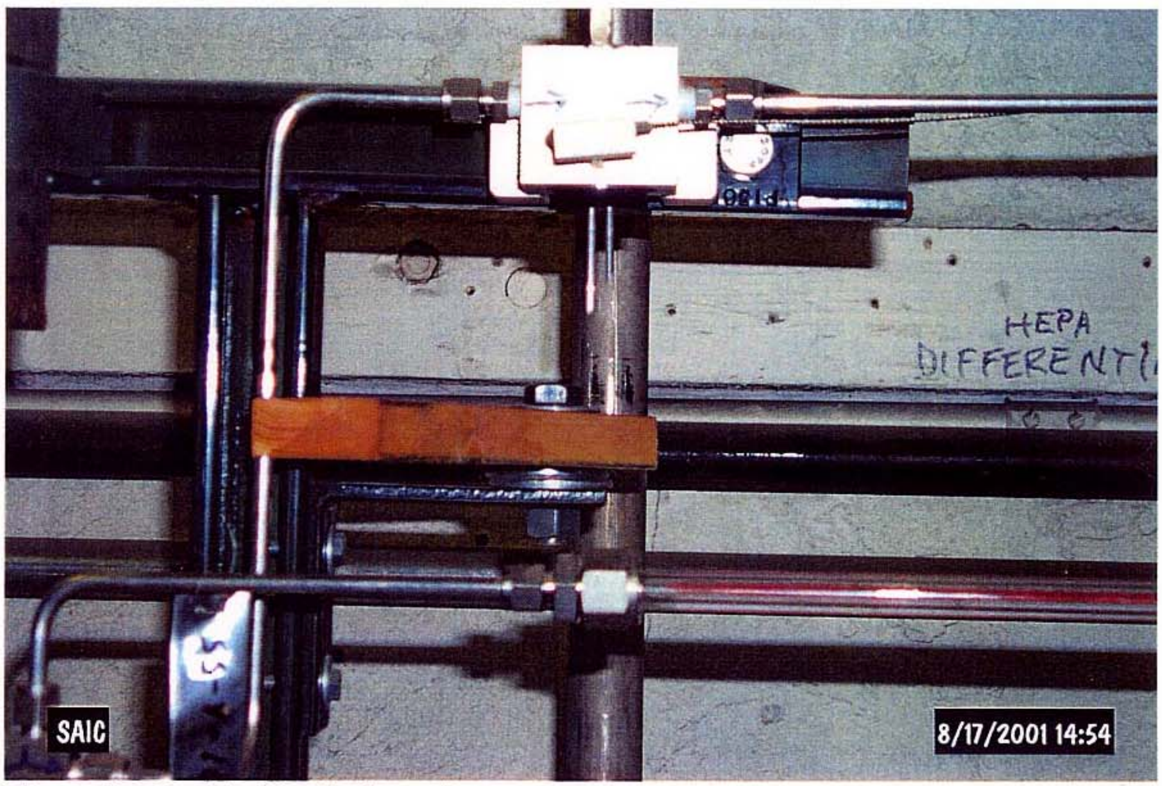


Figure 3-3 Double Needle Sampler

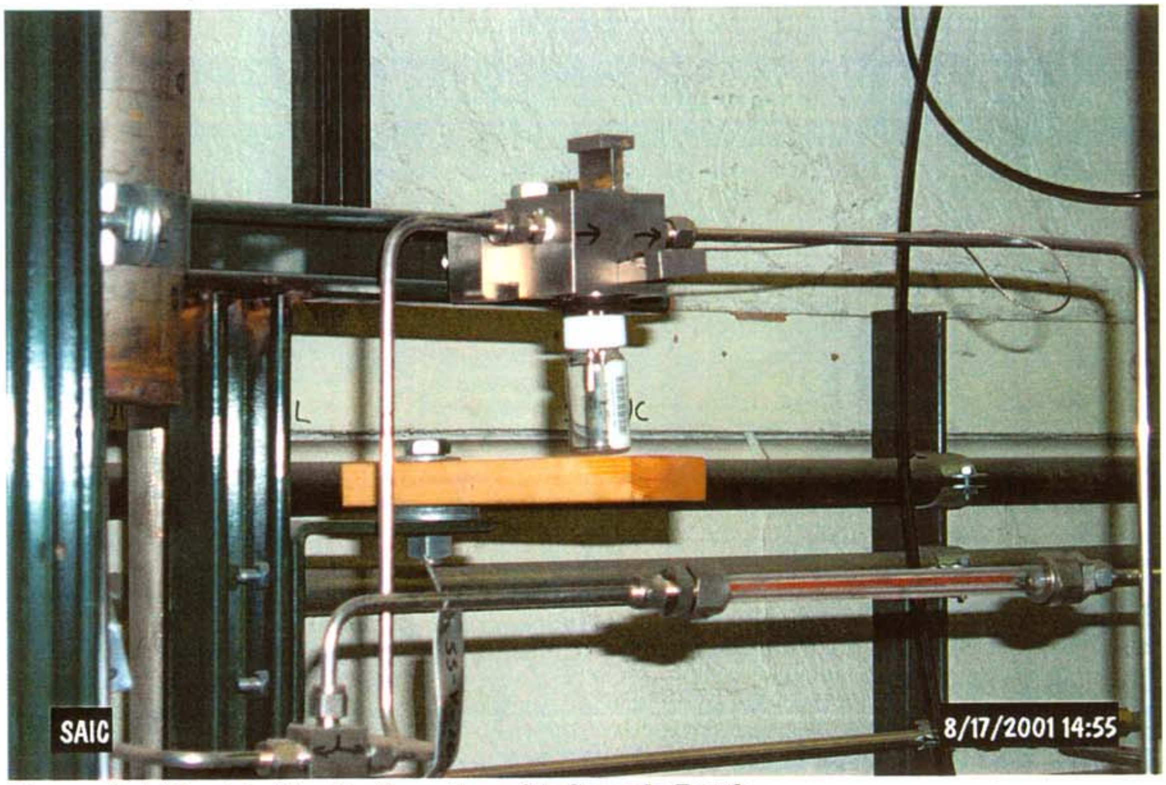


Figure 3-4 Double Needle Sampler with Sample Bottle

4.0 DOUBLE NEEDLE SAMPLER TEST SUMMARY

4.1. Feed Preparations

Previous organic partitioning testing at the SAIC STAR Center was used to determine organic species spiking concentrations. Bench-scale evaporator tests in September, 1998, (Test 1 and 2) spiked target organic constituents to a concentration of 1,000 mg/l in the feed, which is 3-4 orders of magnitude higher than concentrations typical of INTEC waste streams. Data analysis revealed that this concentration could be lowered while still maintaining acceptable detection limits for the target organic constituents.

Additional organic partitioning tests in both the bench-scale evaporator system and with the LDUA end effector (from October 1998 to March 2000) utilized target organic constituents that were spiked to a concentration of 100 mg/l in the feed. These concentrations were still an order of magnitude higher than typical INTEC waste streams, but were required to help ensure detection of the target organics by the analytical laboratory.

The concentration of organic and inorganic constituents in the feed solution for the double needle sampler testing was similar to previous organic partitioning tests. Operations and sampling procedures were provided in a test plan entitled *Organics Partitioning Resulting from Operation of an INTEC Double Needle Sampler*[3] which is provided as Attachment 1. Double needle sampler testing was conducted the week of July 9, 2001. All key operational and sampling procedures/parameters as well as significant testing observations were documented in a bound logbook. Copies of the logbook entries and datasheets are provided as Attachment 2.

Simulated feed materials were generated at the STAR Center to model known acid waste feed solutions processed in the PEWE system at INTEC. Organics were spiked into 44 liters of nitrated acid feed to concentrations of 100 mg/l. Organic constituents were added in greater concentrations than are typically found in INTEC waste streams. This helps ensure that the analytical methods applied to the sample solutions are capable of detecting the organic constituents present in the solutions. Table 4.1 shows the chemical species that are present in the simulated waste stream, the desired concentrations of the chemical, and the quantity of chemical required to obtain the desired concentration. The target volatile organics for this testing were carbon disulfide, toluene, and 1,1,1-trichloroethane.

Table 4-1: Double Needle Sampler Feed Solutions (for 44 Liters of feed)

Species	Chemical Formula	MW (g/mole)	Acid Feed		
			Desired Conc.	Units	Required Quantity (g)
Acid		63.01	1.2	N	3.34 L
Nitrate					
Aluminum	$Al(NO_3)_3$ Solution	2.2 Molar	5.4	g/l	4.00 L
Calcium	$Ca(NO_3)_2{*}4H_2O$	236.15	0.166	g/l	43.0
Iron	$Fe(NO_3)\ {*}9H_2O$	404.02	0.008	g/l	2.55
Sodium/Potassium	$NaNO_3$	85.01	3.954	g/l	643.0
Carbon Disulfide	CS_2	76.14	100	mg/l	3.48 ml
Toluene	$C_6H_5CH_3$	92.14	100	mg/l	5.08 ml
1,1,1-Trichloroethane	CH_3CCl_3	133.40	100	mg/l	3.29 ml

The organic species present in the waste stream were spiked directly to the feed tank after negative pressure to the system had been established. The feed solution was mechanically mixed to help ensure the feed homogeneity prior to performance of the double needle sampler testing.

4.2. Test Methodology and Sample Collection

After completion of feed preparation activities, the feed solution was mechanically mixed for 4 1/2 hours. The sampling rational for the double needle sampler testing was to collect a total of twenty feed solution samples for comparison of volatile organic constituent concentrations. Ten samples were collected using the double needle sample system and ten samples were collected from the feed tank drain.

For comparison purposes, one sample was collected using the double needle sampling system and a second sample was immediately collected from the feed tank drain (spigot sample). This procedure was repeated until the full twenty samples were collected. Table 4-2 lists the samples identification number, sample location, analysis type, and required sample volume for the double needle sampler testing. The samples collection methods for the double needle sampler system and the feed tank are discussed in the following sections.

Table 4-2: Double Needle Sampling System – Sampling Requirements

Sample ID No.	Description	Analytes	Volume
Feed Tank Sample			
05-FT-01	Direct Feed Tank Sample	Target	120 ml
05-FT-02	Direct Feed Tank Sample	Target	120 ml
05-FT-03	Direct Feed Tank Sample	Target	120 ml
05-FT-04	Direct Feed Tank Sample	Target	120 ml
05-FT-05	Direct Feed Tank Sample	Target	120 ml
05-FT-06	Direct Feed Tank Sample	Target	120 ml
05-FT-07	Direct Feed Tank Sample	Target	120 ml
05-FT-08	Direct Feed Tank Sample	Target	120 ml
05-FT-09	Direct Feed Tank Sample	Target	120 ml
05-FT-10	Direct Feed Tank Sample	Target	120 ml
Double Needle Samples			
05-DN-11	Double Needle Sample	Target	120 ml
05-DN-12	Double Needle Sample	Target	120 ml
05-DN-13	Double Needle Sample	Target	120 ml
05-DN-14	Double Needle Sample	Target	120 ml
05-DN-15	Double Needle Sample	Target	120 ml
05-DN-16	Double Needle Sample	Target	120 ml
05-DN-17	Double Needle Sample	Target	120 ml
05-DN-18	Double Needle Sample	Target	120 ml
05-DN-19	Double Needle Sample	Target	120 ml
05-DN-20	Double Needle Sample	Target	120 ml
Field Blank Sample			
05-QC-21	Distilled Water Field Blank	TOC	80 ml
05-QC-22	Distilled Water Trip Blank	TOC	80 mL
05-QC-23	Cross Contamination Sample	TOC	80 ml

4.2.1. Sample Collection Using the Double Needle Sampler

The double needle sample station was designed and fabricated to model existing PEWE sampling capabilities. The double needle sampler and air jet were supplied by INTEC. Operation of the sampling station was similar to the approved INTEC liquid sampling procedures.

To begin sampling, the sample bottle was connected to the sample station by piercing the diaphragm with a double-hypodermic needle sampling assembly. Once connected, the sample stream was circulated through the sample bottle with the use of an air jet and air lift. The sample stream flowed into the bottle through one needle and exited through the other, filling the bottle. The sample stream was recirculated for 10 minutes on the first sample bottle. The double needle sampler was then isolated by closing the inlet and outlet isolation valves, the sample bottle was removed from the double needle sampler, a new sample bottle was connected to the sample station, and the sample stream was recirculated through the second bottle for 5 minutes. This procedure was repeated until four samples bottles were filled using the double needle sampler.

As shown in Table 4-2, the analytical laboratory required 120-ml of sample volume for performance of the volatile organic analysis. Since sampling with the double needle sampler results in head space being present in the sample vials, four 40-ml sample vials were required for each sample series using the double needle sampling system. Sample collection and analysis of volatile organic species requires that no head space be present in the sample containers. Therefore, the fourth sample vial collected was used to fill the first three sample vials, the punctured septa were replaced, and the resultant sample volume was 120-ml.

Previous studies at INTEC have analyzed and recommended operating conditions for jet transfer systems. The preferred minimum sample circulation rate is 100 ml/min and a rate of 200 – 300 ml/min is considered a good circulation rate.[4] The flow rate of the sample stream through the double needle sampler was measured at the conclusion of the double needle sampler testing. The flow rate was measured by placing a 1 liter graduated cylinder on the sample return line and recording the volume of liquid that was transferred to the cylinder in 1 minute. The sample stream flow rate was determined to be 270 ml/min and would be considered a good recirculation rate.

The double needle sample system was operated with an initial sample recirculation time of 10 minutes and three subsequent recirculation times of 5 minutes each. The 10 minute recirculation would result in 2700 ml (2.7 l) of sample stream recirculating through the double needle sampler, which was approximately 6 percent of the total feed volume. Each subsequent 5 minute recirculation would result in 1350 ml (1.35 l) of sample stream recirculating through the sample system, which was approximately 3 percent of the total feed volume.

Overall, 6750 ml (2700 ml + 3*1350 ml) of sample stream was recirculated through the double needle sampler to obtain the 120-ml of sample volume required for analysis. This equates to approximately 15 percent of the total feed volume being recirculated for each sample series obtained using the double needle sampler.

4.2.2. Sample Collection from the Feed Tank Drain

The feed tank samples were collected directly into 40-ml amber glass vials with Teflon lined septum. Three amber glass vials were required for each sample to obtain the desired 120-ml of total sample volume. The procedure for collecting direct feed tank samples is listed below:

1. Place a container below the feed tank drain valve .
2. Open the feed tank drain valve and allow feed solution to flush the drain line, then close the feed tank drain valve

3. Place an empty sample container below the feed tank drain valve.
4. Open the feed tank drain valve and allow the solution to gravity flow into sample container.
5. When the sample container is full, close the drain valve.
6. Put the lid on the sample container, verify zero headspace, and place the sample container in the required shipping device for shipment to the analytical laboratory.

4.3. Analytical Results

All samples were analyzed by Hauser Laboratories located in Boulder, CO. Liquid organic samples were analyzed with a gas chromatograph/mass spectrometer (GC/MS) in accordance with SW 846-8260 guidelines. Liquid sample calibration curves for each analyte ranged from 50 ng to 400 ng. The chain of custody forms and the analytical package received from Hauser is included in Attachment 3. Hauser Laboratories conducted the analyses for the previous organic partitioning studies and is familiar with the intricacies of performing volatile organic analyses in an acidic matrix. Although every effort was made to minimize data uncertainty, the following factors potentially contributed to error.

1. Feed homogeneity: It was thought that with adequate mechanical feed mixing (5 hours), the spiked organics would be thoroughly dispersed/homogenized within the feed mixture. During collection of the initial feed tank sample, organic globules were visible in the sample bottle. The organic globules were also observed during previous bench-scale evaporator tests that utilized a recirculation pump for mixing. The initial feed tank sample was returned to the feed tank and mechanical mixing was reinitiated. In addition, a small amount of sparge air was introduced to the feed tank to promote mixing.

2. Chemical Reaction: Organic partitioning testing resulting from typical INTEC operations has been conducted since 1998. This testing has resulted in both qualitative and quantitative determinations for the partitioning of organics in INTEC systems. However, the rates of reaction and mechanisms between nitric acid and volatile organic constituents have not been fully quantified for the various INTEC operating scenarios.

5.0 DATA INTERPRETATION

5.1. Double Needle Sampler Test Data

The primary objective of the double needle sampler testing was to determine the effects of operation of INTEC double needle sampling systems on volatile organic species that were spiked in known concentrations to a typical PEWE feed solution. The target organic constituents (carbon disulfide, 1,1,1-trichloroethane, and toluene) were spiked to a concentration of 100 mg/l in the feed solution, which is an order of magnitude greater than concentrations typically anticipated for INTEC waste streams. This spiking concentration helps ensure detection of the target organic constituents by the analytical laboratory.

The feed was then mechanically mixed for approximately 4 1/2 hours to homogenize the acid matrix and the organics. After mixing, an initial feed tank sample was obtained using the procedure described in Section 4.2.2. The feed tank drain line was flushed into a new, clean container. Organic globules were present in the solution drained from the feed tank which indicated in a non-homogenous feed mixture. The samples were added back to the feed tank and the feed tank solution was allowed to mix for an additional 30 minutes. A small amount of air sparge was also applied to the feed tank to assist with mixing.

Sampling activities were then reinitiated with the double needle sampling system. Four 40-ml sample bottles were required for each data series collected using the double needle sampler. A feed tank sample series was collected immediately following the double needle sampler operation. Three 40-ml sample bottles were required for each direct feed tank sample.

Table 5-1 lists the analytical results from the double needle sampler testing. The results have been arranged in the order the samples were collected to assist with the comparison of the double needle sampler and the direct feed tank samples.

Table 5-1. Analysis of Double Needle Sampler versus Direct Feed Tank Samples for Volatile Organic Constituents.

Sample ID	Sample Location	Time of Day	CS_2 (ng/uL)	1,1,1-TCA (ng/uL)	Toluene (ng/uL)
05-FT-01A	Feed Tank	9:45	3.2	3.69	3.74
05-DN-11A	Double Needle	9:20 - 09:45	9.92	10.52	10.32
05-DN-11A (dup)	Double Needle	9:20 - 09:45	9.6	10.16	9.96
05-FT-02A	Feed Tank	10:11	0.74	0.82	0.68
05-DN-12A	Double Needle	09:51 - 10:16	1.31	1.87	1.93
05-FT-02B	Feed Tank	10:11	0.49	0.6	0.64
05-DN-12B	Double Needle	09:51 - 10:16	0.74	1.12	1.26
05-FT-02B (dup)	Feed Tank	10:11	0.5	0.63	0.65
05-FT-03A	Feed Tank	10:37	0.48	0.39	0.17
05-DN-13A	Double Needle	10:12 - 10:37	0.2	0.31	0.37
05-FT-04A	Feed Tank	11:03	0.23	0.18	0.05
05-DN-14A	Double Needle	10:38 - 11:03	0.05	0.07	0.1
05-FT-05A	Feed Tank	11:30	0.14	0.1	bloq
05-DN-15A	Double Needle	11:05 - 11:30	bloq	bloq	bloq
05-FT-06A	Feed Tank	11:56	0.12	0.11	nd
05-DN-16A	Double Needle	11:31 - 11:56	nd	nd	nd
05-FT-07A	Feed Tank	12:22	0.08	0.07	nd
05-DN-17A	Double Needle	11:57 - 12:22	nd	nd	nd
05-FT-08A	Feed Tank	12:48	nd	nd	nd
05-DN-18A	Double Needle	12:23 - 12:48	nd	nd	nd
05-FT-09A	Feed Tank	13:14	0.06	0.08	nd
05-DN-19A	Double Needle	12:49 - 13:14	nd	nd	nd
05-FT-10A	Feed Tank	13:40	0.09	0.09	nd
05-DN-20A	Double Needle	13:15 - 13:40	nd	nd	nd

dup = duplicate
nd = not detected (detection limit = 0.025 ng/ul
bloq = below limit of quantitation (0.050 ng/ul)
1,1,1-TCA = 1,1,1-trichloroethane

The most obvious trend in the volatile organic data was the consistent decrease in the concentration of the organic constituents with each sample series until most of the organic species were below the analytical detection limit. The detection limit for the organic constituents was 0.050 ng/μl or 50 parts per billion. This would suggest that the nitric acid solution was reacting/decomposing the spiked volatile organic constituents and/or the organic constituents were being stripped from solution by the air jet, air sparge, air lift. Both of these mechanisms most likely played a role in decreasing the volatile organic concentrations in the feed solution.

It should be noted that the spiked concentration of the volatile organics (100 mg/L) was significantly greater than the concentrations that would be typical of INTEC waste streams. The higher concentrations were required to ensure that detectable quantities of volatile organics would be present for analysis. It appears that some air stripping of volatile organic constituents may occur during operation of the double needle samplers, however, the air stripping occurs after sample collection and should not significantly effect the sample validity. The effectiveness of air stripping techniques is dependent on a number of variables (such as volatile organic concentration, operating temperatures, Henry's Law constants, and flow rates) and the higher spiking concentrations in the feed solution may have contributed to observed air stripping effects.[6]

Figures 5-1, 5-2, and 5-3 graphically show the reduction in concentration of the target volatile organics for both spigot and double needle samples. It can be seen that all three of the organic constituents follow the same general curve for reduction in concentration. Comparison of the analytical results relative to the time of day the samples were obtained results in a good correlation between the double needle and spigot samples. The mean time for the double needle sample period (25 minutes each) was utilized to compare the sample results. Attachment 4 contains photos of the bench-scale evaporator system at the SAIC STAR Center.

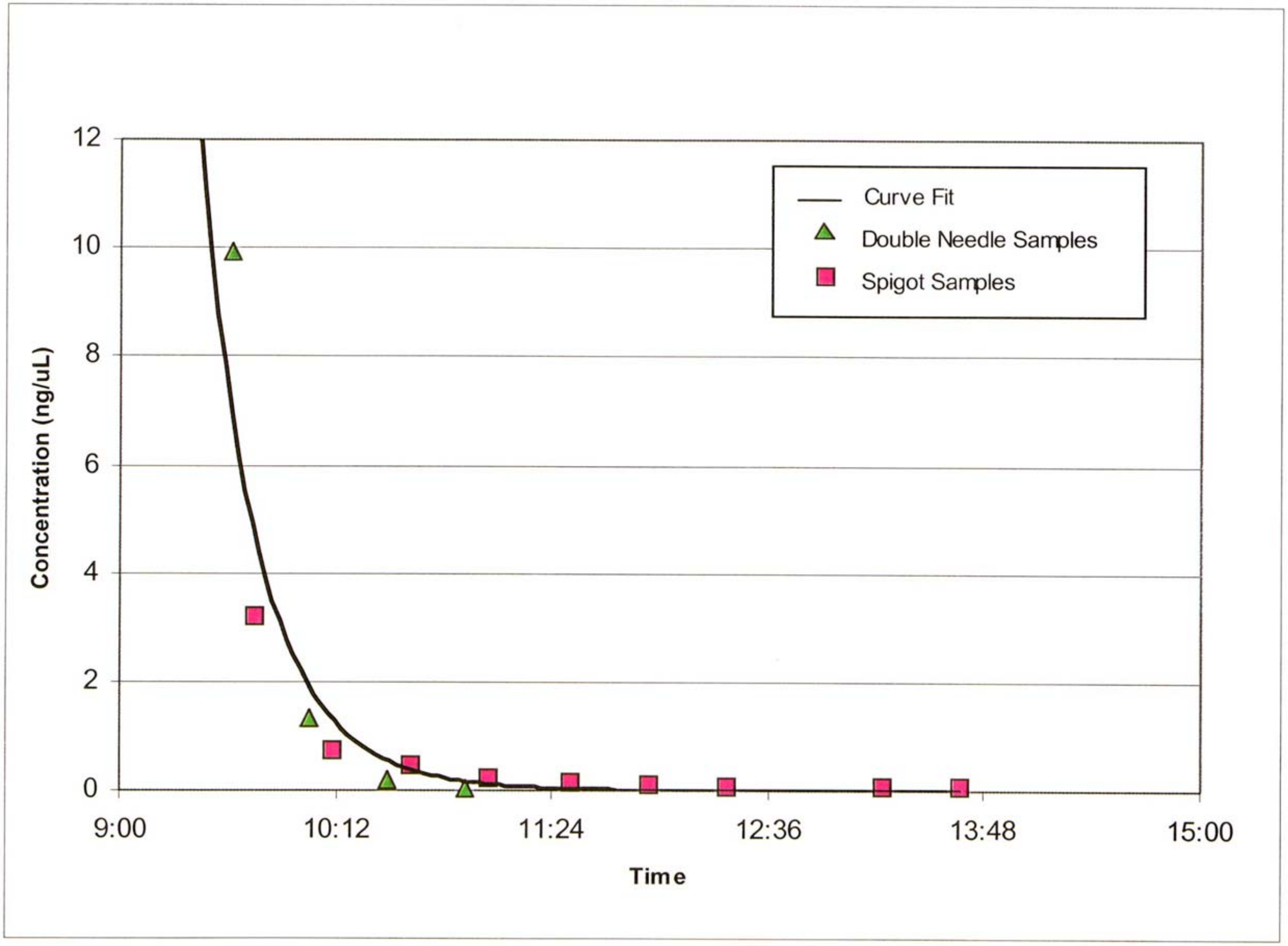


Figure 5-1: Comparison of Time Relative Sample Analysis for CS_2 Data.[7]

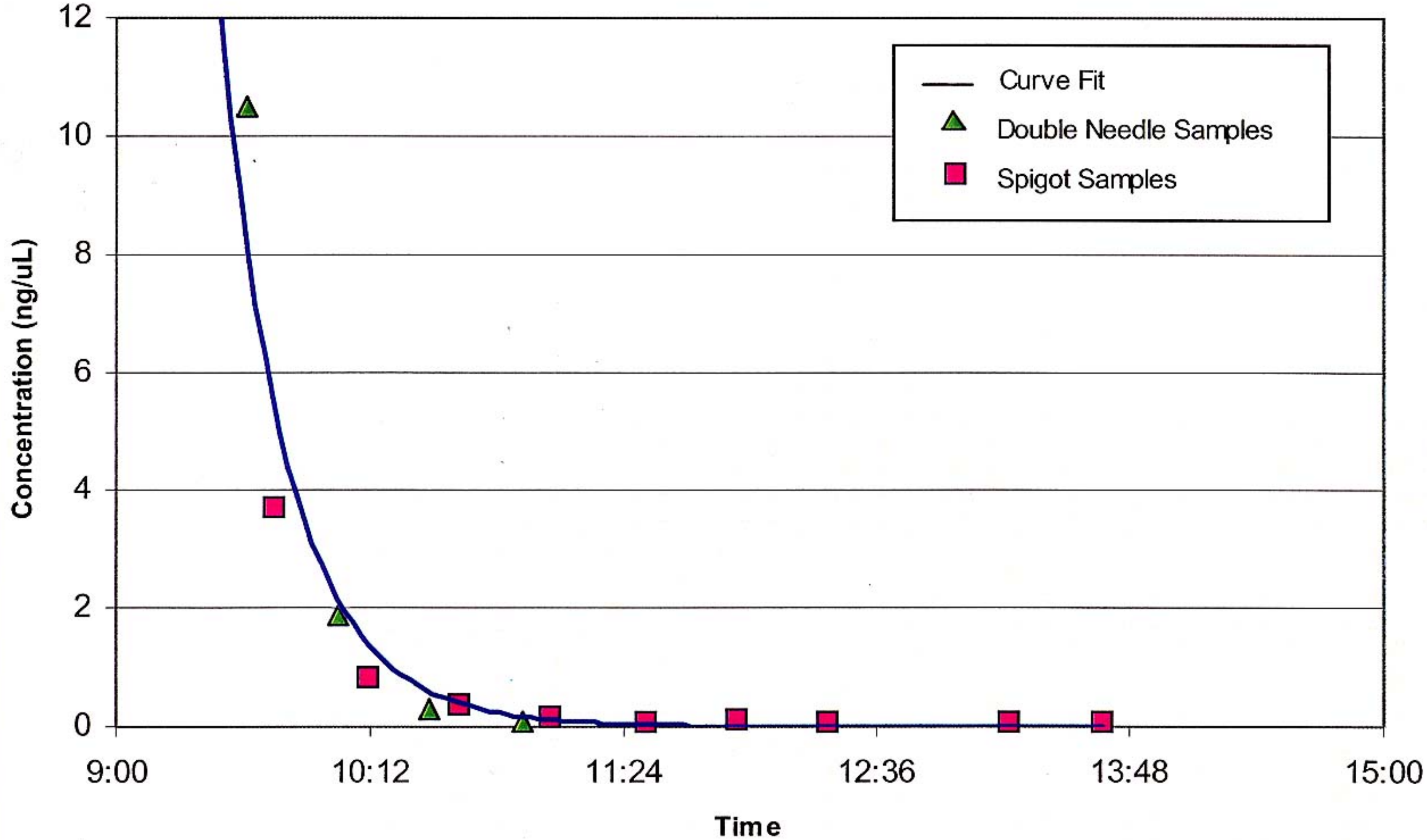


Figure 5-2: Comparison of Time Relative Sample Analysis for 1,1,1-Trichloroethane Data.[7]

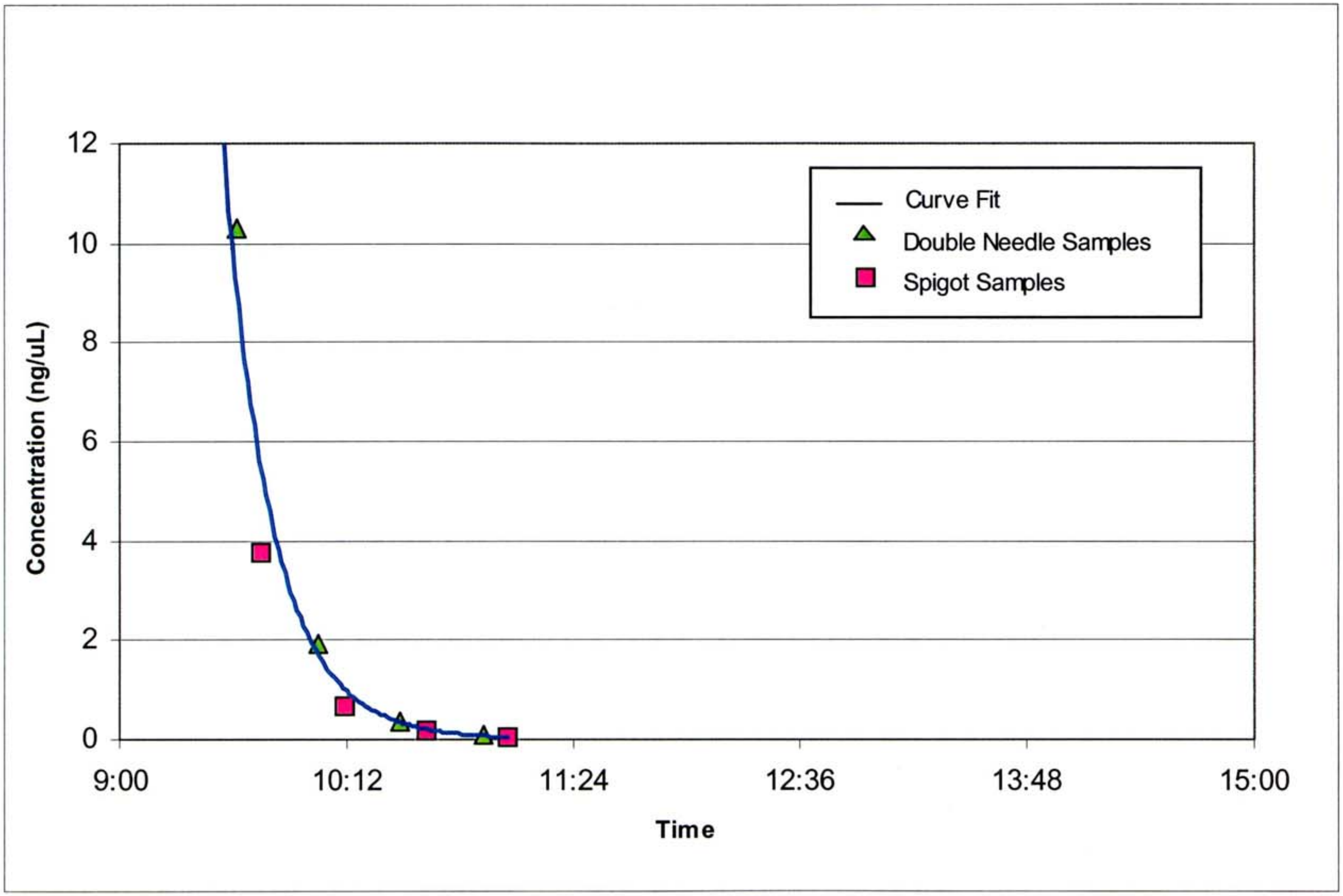


Figure 5-3: Comparison of Time Relative Sample Analysis for Toluene Data[7]

5.2. Comparison with Previous Organic Partitioning Tests

Previous bench-scale evaporator tests concluded that up to 75 percent of the volatile organic species spiked to the feedstocks were destroyed, decomposed, reacted, or volatilized prior to evaporator processing. The bench-scale evaporator feeds were steam jetted and air sparged prior to being sampled and fed to the evaporator.

For the LDUA test series, the concentration of the organic constituents in the feed solution was 100 mg/l. The analytical data from Test 2 with the LDUA end effector yielded volatile organic constituent concentrations of 0.2 to 1 mg/l, which is a 99 percent reduction in the volatile organic constituents concentrations. The LDUA Test 2 feed stock was mechanically mixed for 5 hours prior to sampling with the end effector.

The double needle sampler testing resulted in a reduction of approximately 90 percent of the volatile organic constituents after five hours of mechanical mixing (including 20 minutes of air sparge) and almost complete reduction by the end of the test. This is consistent with the conclusions documented from previous organic partitioning tests (bench-scale evaporator and LDUA EE operation) and indicates that the acidic nature of the solution plays a key role in the reduction of VOC concentrations in typical INTEC waste streams.

5.3. Comparison with INTEC Sampling

The double needle sampler test was designed to be a bench-scale operation (44 liter tank volume) for ease of sample collection and to minimize hazardous waste generation. The proportions utilized in the double needle sampler test are quite different from those present in the INTEC waste processing system.

The blend and hold tanks (VES-NCC-101, -102, and –103) typically hold 3,000 to 4,000 gallons. The sparge volume and the volume of air supplied to the airlift may be comparable and may similarly affect the solution transported to the sampler. The PEW tanks do receive the sample return from the double needle sampling system and could be affected by the air-jet, but this effect would be small due to the large volume of the tanks (the evaporator feed sediment tank , VES-WL-132 and the evaporator feed collection tank, VES-WL-133 have 4,700 gallon and 19,000 gallon capacities, respectively).[9]

Analysis of INTEC tank farm facility solutions for volatile organic constituents have been consistently less than the minimum quantification level of 10 ng/ml.[5] Based on the results of the organic partitioning test series conducted at the SAIC STAR Center, it is reasonable to infer that any volatile organic constituents introduced to the INTEC waste system have been destroyed, decomposed, reacted, or volatilized as a result of typical plant conditions and reactions with the nitric acid waste matrix.

6.0 CONCLUSIONS

Test series conclusions are based on quantitative data analysis as well as qualitative observations. The results provide representation of the fate of volatile organic constituents and the validity of samples the have been collected using INTEC double needle samplers.

Direct statistical comparison of the double needle and spigot samples is difficult due to decomposition, reaction, and/or volatilization of the target organic constituents. However, a good correlation between the double needle and spigot samples is observed by graphical representation of the analytical data relative to the time of day the samples were collected. This data indicates that samples collected utilizing a double needle sampler are comparable to spigot samples.

After 4 1/2 hours of mixing with a mechanical mixer, organic globules were still visible in a sample. Then after air sparging and mechanical mixing for 30 minutes, the first samples were taken and a sequence of sampling every few minutes was initiated. More than 90% of the organics were destroyed by the first sample and roughly 60-80% of the remaining quantities were destroyed in each 25-minute period through the remainder of the test.

Analytical data, compiled for previous organic partitioning studies (tests 1 through 4 in the bench scale evaporator and LDUA end effector testing), indicated that volatile organic constituents would be destroyed, decomposed, reacted, or volatilized as a result of typical INTEC plant conditions. The bench-scale evaporator utilized steam recirculation and air sparging to mix the tank contents, while the LDUA tests employed a mechanical mixer. A reduction of up to 99 percent of the volatile organic constituents concentration was observed in these tests. The rapid reduction of volatile organics concentrations, as evidenced in bench-scale evaporator, LDUA EE, and double needle sampler testing, suggests that nitric acid digestion plays a key role in the reduction of volatile organic concentrations in typical INTEC waste streams.

Based on the reduction of volatile organic constituents and previous sampling of INTEC tank farm facility solutions, it is reasonable to infer that volatile organic constituents introduced to the INTEC waste system are most likely destroyed, decomposed, reacted, or volatilized as a result of typical plant conditions and/or reactions with the nitric acid waste matrix and will be below quantification limits. The double needle and spigot samples both yielded comparative results. The double needle sampler may contribute to some air stripping of organics, but is negligible compared to the rapid degradation of the volatile organic compounds in nitric acid waste solutions. It is unlikely that trace volatile organic concentrations could be detected, in INTEC waste streams, utilizing any sampling method.

7.0 REFERENCES

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4. Houck, E. D., *Design and Operation of Process Liquid Samplers,* Westinghouse Idaho Nuclear Company, WINCO-1022, January 1986.

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7. Millet, C.B., letter to M.B. Heiser, "Organic Analysis with Double Needle Samplers", August 16, 2002.

ATTACHMENT 1

Double Needle Sampling System Test Plan

Double Needle Sampling System

Test Plan

Organics Partitioning Resulting from Operation of an INTEC Double Needle Sampler

Test 5, Double Needle Sampler Statistical Testing

SAIC STAR Center

June 25, 2001

Prepared for:
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Contract No. K00-564414, TO 10

Double Needle Sampling System

Test Plan

Organics Partitioning Resulting from Operation of an INTEC Double Needle Sampler

Test 5, Double Needle Sampler Statistical Testing

SAIC STAR Center

Approval Signature Date

7-16/01/2001

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Test 5, Double Needle Sampler Statistical Testing

Table of Contents

1.0 BACKGROUND

The Process Equipment Waste Evaporator (PEWE), located in CPP-604, reduces the volume of mixed waste sent to the Tank Farm Facility at the Idaho Nuclear Technology and Engineering Center (INTEC). The PEWE system consists of feed tanks for accumulation of waste solutions, two evaporator trains for processing the waste solution, a bottoms collection vessel, and condensate collection vessels. The waste solutions are transferred from the feed tanks to the evaporator vessel, where the solution is heated and circulated through the evaporator. The overhead vapors generated in the evaporator are condensed and transferred to the PEW condensate collection tanks. The condensate is accumulated in the condensate collection tanks for further processing at the Liquid Effluent Treatment and Disposal (LET&D) Facility, CPP-1618. The remaining solution is circulated through the evaporator until procedurally designated limits are met, at which time the solution is transferred to the bottoms collection vessel. The bottoms are eventually transferred to the Tank Farm for storage.

Hazardous organic species have been discharged to the PEWE system as a result of past operating practices. Studies have been conducted to determine the fate of the organic compounds in the INTEC Tank Farm,[1] but these studies did not address the effects of the evaporation process on the fate of the organics. SAIC has conducted four bench-scale studies to evaluate the fate of spiked organics in a high and low molarity nitric acid simulated feeds. These results of these tests indicated that INTEC sample collection and handling procedures do not significantly effect the concentration of volatile organic or semi-volatile organic constituents in the waste stream.[2] This test (Test 5) is designed to validate the sample collection (double needle sampler systems) and handling procedures currently employed by INTEC operations.

2.0 TEST OBJECTIVES

The purpose of Test 5 is to determine the effects of operation of the double needle sampling systems on volatile organic species that have been introduced into the PEWE system. Data will be evaluated to quantify the fate of organic constituents due to sampling system operation. Results will be incorporated into a final report designed to support INTEC RCRA compliance activities. This will be accomplished as follows:

1) A mechanical mixer will be added to the PEWE feed tank. The mechanical mixer will ensure a homogenous feed solution for sampling operations.

2) Samples will be collected and analyzed for spiked organic-constituents. This will involve collecting feed samples directly from the feed tank and also using the double needle sampling system. Samples will then be analyzed for spiked organic constituents as well as total organic carbon.

3) Evaluate the effects of the double needle sampling system on spiked organic constituents. This is accomplished by collecting approximately ten direct samples and ten double needle samples, in a planned test series, for comparison.

4) Verify conclusions drawn from previous bench-scale tests. Fill in double needle sampling system data gaps necessary to support organic partitioning hypotheses.

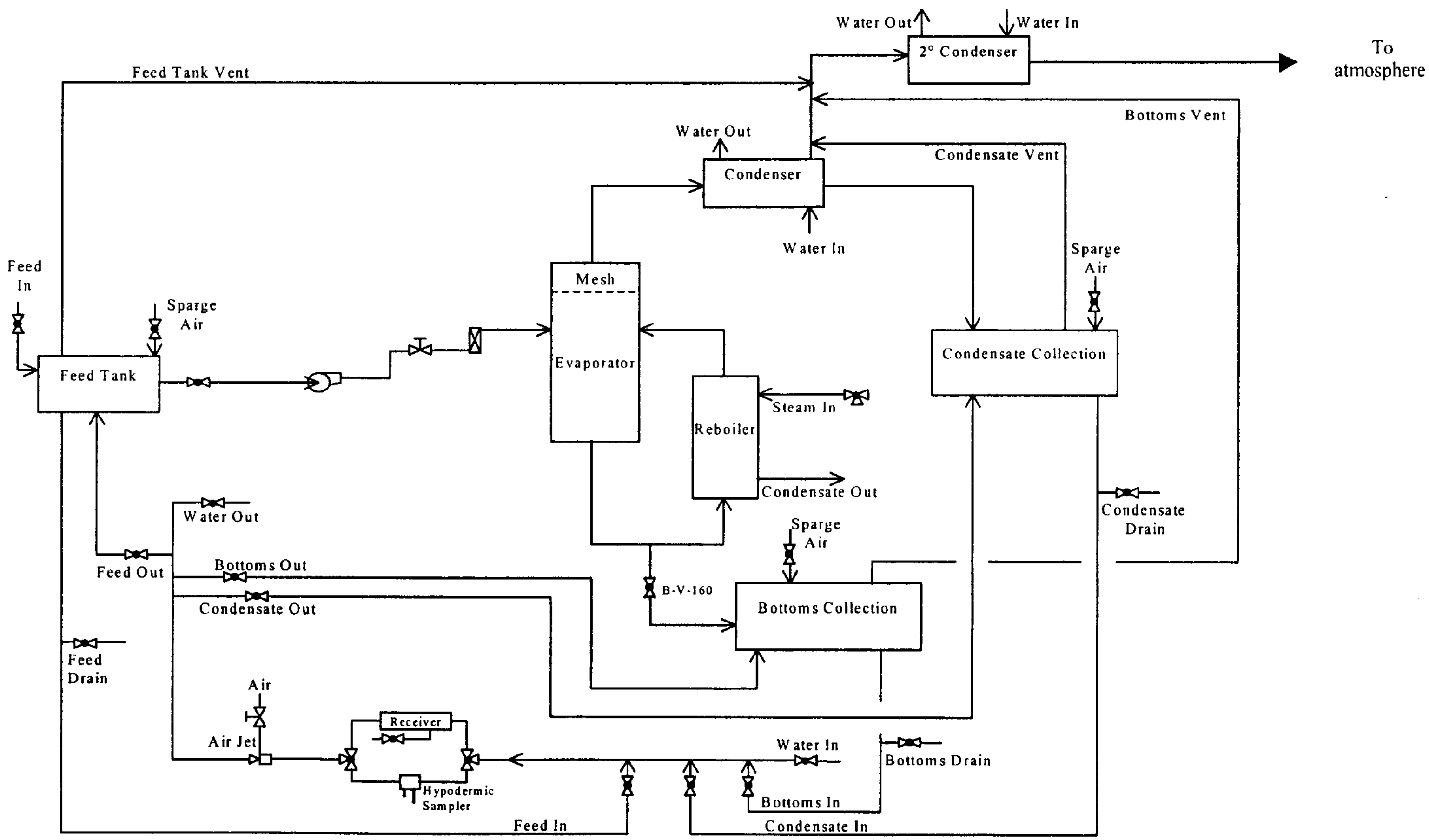
3.0 BENCH-SCALE SYSTEM DESIGN

A bench-scale PEWE system has been designed and constructed at the SAIC Science and Technology Applications Research (STAR) Center to model typical PEWE system operations. The bench-scale system consists of a feed tank, evaporator vessel with an attached thermosiphon reboiler, bottoms collection tank, condensate collection tank, and tank sampling station. A flow diagram of the bench-scale system is shown in Figure 3.1. The only modification to the bench-scale evaporator system for this test was the addition of a mechanical mixer to the feed tank.

A sampling station and associated piping has been assembled as part of the bench-scale system. The sampling station can sample solutions from the feed tank, bottoms tank, and condensate tank. The sample station consists of a double hypodermic needle sampler and a larger volume sample receiver. An air jet is used to initiate sample flow through the sample station and recirculate the sample back to the respective tank. The hypodermic needle sampler consists of a double hypodermic needle sample assembly to which a sample bottle, fitted with a neoprene or Teflon diaphragm, can be attached. When the air jet is actuated, the sample flows into the sample bottle through one needle and exits through the other, filling the sample bottle. This sampling method will result in headspace in the top of the sample bottle.

The sample receiver is a section of stainless steel pipe with an inlet and an outlet for the sample solution. When the air jet is actuated the sample flows into the bottom of the sample receiver and exits through the top, filling the receiver. The sample is then drained from the receiver into sample bottles by opening the drain valve located at the bottom of the receiver.

Figure 3.1 – Bench-Scale System Diagram



4.0 SYSTEM OPERATIONS

The following subsections provide the Test 5 operations details. These include feed preparation, sampler system operation, sample collection, and system cleaning procedures. Additional subsections address health and safety and waste management.

4.1 Feed Preparation

Simulated feed materials will be generated at the STAR Center to model known acid waste feed solutions processed in the PEWE system at INTEC. Organic constituents will be spiked in the feed material to determine the partitioning of these species as a result of double needle sampling system operation. Organic constituents are added in greater concentrations than are typically found in INTEC waste streams. This helps ensure that the analytical methods applied to the sample solutions are capable of detecting the organic constituents present in the solutions. Table 4.1-1 shows the chemical species that are present in the simulated waste stream, the desired concentrations of the chemical, and the quantity of chemical required to obtain the desired concentration.

Table 4.1-1: Test 5 Feed Solutions (for 44 Liters of feed)

Species	Chemical Formula	MW (g/mole)	Acid Feed		
			Desired Conc.	Units	Required Quantity (g)
Acid		63.01	1.2	N	3.34 L
Nitrate					
Aluminum	$Al(NO_3)_3$ Solution	2.2 Molar	5.4	g/l	4.00 L
Calcium	$Ca(NO_3)_2$*$4H_2O$	236.15	0.166	g/l	43.0
Iron	$Fe(NO_3)$ *$9H_2O$	404.02	0.008	g/l	2.55
Sodium/Potassium	$NaNO_3$	85.01	3.954	g/l	643.0
Carbon Disulfide	CS_2	76.14	100	mg/l	3.48 ml
Toluene	$C_6H_5CH_3$	92.14	100	mg/l	5.08 ml
1,1,1-Trichloroethane	CH_3CCl_3	133.40	100	mg/l	3.29 ml

The organic species present in the waste stream will be spiked directly to the feed tank after negative pressure to the evaporator vessels has been established. The feed solution will be mechanically mixed to help ensure the feed is homogenous prior performance of the double needle sampler test series.

4.2 Start-up Instructions

4.2.1 Pre-Start

4.2.1.1 Turn on the exhaust blower and adjust the bleed air supply valve (OG-V-127) to provide vacuum in the evaporator system. The evaporator should be operated at slightly negative conditions (~3 inches WC).

4.2.1.2 Verify the sample station equipment is properly configured for operation. Verify all vessel drain, sample supply, sample return, and air sparge valves are closed. The peristaltic pump and isolation ball valve (F-V-121) provide isolation of feed solution to the evaporator and must be turned off and closed, respectively..

4.2.1.3 Turn on the STAR Center cooling tower to initiate cooling water flow to the primary and secondary condensers.

4.2.1.4 Verify that feed preparations activities have been completed, and that the feed tank contains the required volume of feed for the test.

4.2.2 Feed Preparation

4.2.2.1 Add the pre-measured organic species to the feed vessel through the organic addition valve (F-V- 125) located on the top of the feed vessel.

4.2.2.2 Turn on the mechanical mixing device and allow the feed solution to mix for approximately 5 hours.

4.3 Sample Collection Instructions

Samples will be collected to determine organic partitioning associated with double needle sample system operations and perform material balances on the constituents present in the simulated feeds. Table 4.3-1 shows a matrix of the required samples, the sample location, and volume of sample that will be collected during testing. Special instructions for sampling activities will be included in the PEWE Bench-Scale Testing Logbook.

4.3.1 Sample Collection from Tank Drains

Samples will be collected from tank drains for comparison to double needle sampling system samples. This will enable direct comparison of the effects of the double needle sampler on the removal of organics.

4.3.1.1 Place a container below the feed tank drain valve (F-V-124).

4.3.1.2 Open the feed tank drain valve (F-V-124) and allow feed solution to flush the drain line, then close the feed tank drain vale (F-V-124).

4.3.1.3 Place an empty sample container below the feed tank drain valve.

4.3.1.4 Open the feed tank drain valve (F-V-124) and allow the solution to gravity flow into sample container.

4.3.1.5 When the sample container is full, close the drain valve.

4.3.1.6 Put the lid on the sample container, verify zero headspace, and place the sample container in the required shipping device for shipment to the analytical laboratory.

Table 4.3-1: Double Needle Sampler System Sampling Requirements

Sample ID No.	Description	Analytes	Volume
Feed Tank Sample			
05-FT-01	Direct Feed Tank Sample	Target	120 ml
05-FT-02	Direct Feed Tank Sample	Target	120 ml
05-FT-03	Direct Feed Tank Sample	Target	120 ml
05-FT-04	Direct Feed Tank Sample	Target	120 ml
05-FT-05	Direct Feed Tank Sample	Target	120 ml
05-FT-06	Direct Feed Tank Sample	Target	120 ml
05-FT-07	Direct Feed Tank Sample	Target	120 ml
05-FT-08	Direct Feed Tank Sample	Target	120 ml
05-FT-09	Direct Feed Tank Sample	Target	120 ml
05-FT-10	Direct Feed Tank Sample	Target	120 ml
Double Needle Samples			
05-DN-11	Double Needle Sample	Target	120 ml
05-DN-12	Double Needle Sample	Target	120 ml
05-DN-13	Double Needle Sample	Target	120 ml
05-DN-14	Double Needle Sample	Target	120 ml
05-DN-15	Double Needle Sample	Target	120 ml
05-DN-16	Double Needle Sample	Target	120 ml
05-DN-17	Double Needle Sample	Target	120 ml
05-DN-18	Double Needle Sample	Target	120 ml
05-DN-19	Double Needle Sample	Target	120 ml
05-DN-20	Double Needle Sample	Target	120 ml
Field Blank Sample			
05-QC-21	Distilled Water Field Blank	TOC	80 ml
05-QC-22	Distilled Water Trip Blank	TOC	80 mL
05-QC-23	Cross Contamination Sample	TOC	80 ml

4.3.2 Sample Station Sample Collection

A sample station has been designed and fabricated to model existing PEWE sampling capabilities. Operation of the sampling station will be similar to PEWE sampling procedures. The sample station is equipped with a double hypodermic needle sampler and a larger sample receiver. An air jet is used to draw the sample from the respective tank through the sample station. The feed, bottoms, and condensate tanks can be sampled using either the hypodermic needle sampler or the sample receiver.

Sampling will occur after the feed tank has been thoroughly mixed using a mechanical mixer. The feed tank and the hypodermic needle sampler will be used exclusively for this test series. Table 4.3-1 shows the required number of samples and the sample volume.

4.3.2.1 Verify the sample receiver drain (SS-V-108) and vent valves (SS-V-107) are closed.

4.3.2.2 Attach a sample bottle to the hypodermic sample assembly. Align the long hypodermic needle next to the sample bottle cap's edge with the short hypodermic needle as near the center of the septum as possible.

4.3.2.3 Push the sample bottle up (with hand positioned on the bottom half of the sample bottle) until it is firmly seated against the needle block gasket.

4.3.2.4 Position the sample station three-way valves (SS-V-109 and SS-V-110) to route sample solution through the hypodermic sampler.

4.3.2.5 Open the sample supply and sample return isolation valves from the tank to be sampled as shown in the table below.

Note: Feed tank valves (SS-V-112A and SS-V-112B) will be used exclusively for this test series.

Table 4.3-2: Sample Station Valve Line-up

Open Supply Valve	Tank To Be Sampled	Open Return Valve
SS-V-112A	Feed Tank	SS-V-112B
SS-V-113A	Condensate Tank	SS-V-113B
SS-V-111A	Bottoms Tank	SS-V-111B

4.3.2.6 Adjust the air flow to the sample station airlift to about 0.5 scfh.

4.3.2.7 Initiate airflow to the sample station air jet to start circulating solution through the sample station by throttling valve AIR-V-106. Record the air supply pressure and air flow rate to the air jet. The air flow through the jet should be between 5 and 20 scfh.

4.3.2.8 Allow the sample to recirculate through the sample station for 10 minutes. If multiple samples are required from the same tank, circulate solution for each subsequent sample through the sample station for 5 minutes.

4.3.2.9 After the sample has circulated for the specified period of time, shut off the air supply to the air jet by closing valve AIR-V-106.

4.3.2.10 Shut off the air supply to the sample station air lift.

4.3.2.11 Shut the respective sample station supply and return valves as shown in Table 4.3-2.

4.3.2.12 Disconnect the sample bottle from the sampling apparatus and install a new sample bottle (if required).

Note: *When removing the sample bottle from the hypodermic sampler, lower the sample bottle so that both needles are in the headspace above the liquid. Wait 30 – 60 seconds (until the needles stop dripping). Quickly pull the sample bottle straight down and away from the needles.*

4.3.2.13 If more sample volume is required, repeat steps 4.3.2.1 through 4.3.2.9 as necessary.

4.3.2.14 Upon completing sampling activities for each tank, drain the sample lines and sample station equipment into a collection vessel.

4.3.2.15 Open the water supply (SS-V-114A) and return (SS-V-114B) isolation valves to the sample station and thoroughly rinse the sample station lines. Collect the water in a collection vessel.

4.3.2.16 Close the water supply (SS-V-114A) and return (SS-V-114B) isolation valves to the sample station and drain the remaining water from the sample station.

4.3.2.17 Transfer the solution collected from the sampling operations into the VOA sample vials to be supplied to the analytical laboratory and verify that zero headspace is present in the sample vials.

4.4 System Cleaning

The feed tank and sampling system will require cleaning prior to Test 5 to prevent potential cross contamination of trace concentration of organic residues from previous testing. Water, dilute nitric acid , and/or steam will be employed to clean the evaporator system. The system will be cleaned after all sampling activities associated with the operation have been completed.

4.4.1 Verify that all tanks have been completely drained of test solutions.

4.4.2 Supply steam to the evaporator vessel, to steam clean the evaporator system, by opening the steam supply valve to the evaporator. Turn on the steam generator and allow steam to circulate through the evaporator and associated vessels for approximately 30 minutes.

4.4.3 Charge the feed tank and evaporator vessel with water or dilute nitric acid solution.

4.4.4 Heat and circulate the solution through the evaporator by following the evaporator startup instructions.

4.4.5 After cleaning the evaporator, drain the rinse solution remaining in the evaporator vessel to the bottoms collection vessel.

4.4.6 Circulate the rinsate through the sample lines and the sample station as described in the sample collection instructions.

4.4.7 Drain all solutions from the evaporator and associated vessels. A sample of the solution will be obtained to verify that no cross contamination of organics has occurred.

4.5 Health and Safety Requirements

Hazardous chemicals will be used during bench-scale system tests and will include nitric acid and organic species. Personnel protective equipment will be provided to mitigate potential exposure to these substances.

When handling acidic solutions, personnel shall wear neoprene gloves and a face shield. In addition, Draeger sample tubes will be used to monitor the presence of nitric acid vapors in the operating area.

When handling dry chemicals, all measurement of chemicals shall be conducted in a ventilated area. The dry chemicals will then be added to the liquid feed makeup vessel. Gloves shall be worn during all dry chemical handling operations.

When handling organic species, perform all liquid measurements in a ventilated area. The organic species will then be added to the liquid feed makeup vessel. Gloves shall be worn during all organic species handling operations. Once the feed solution has been added to the feed tank, maintain the evaporator system at slightly negative conditions to prevent organic vapors from entering the operating area. Additionally, Draeger sample tubes will be used to monitor the for the presence of organic vapors in the operating area.

The evaporator system will contain surfaces that are maintained at elevated temperatures. Heated surfaces shall be insulated to protect personnel during evaporator operation. Signs will be posted to notify personnel of potentially hot surfaces.

4.6 Waste Management

The double needle sampler test series will require generation of simulated INTEC waste streams. The total volume of simulated waste solutions and rinse waters will not exceed 50 gallons. Simulated solutions from double needle sampler testing will remain in the feed for use during a Paint Filter Leach Test (PFLT) of the PEWE system off-gas. The

PFLT will be performed after completion of the double needle sampler test series. Waste management and disposal is detailed in the test plan for the PFLT.

5.0 SAMPLE AND ANALYSIS RATIONALE

The primary objective of the double needle sampler test series is to quantify organic partitioning which results from INTEC sample collection and handling procedures. As such, the sampling system operation and sampling strategy has been designed to simulate INTEC operations. Prior to previous tests, it was postulated that organic partitioning results from the following operational/sampling activities:

- air sparging of evaporator feed, condensate and bottoms tanks,
- steam jet transfer of liquid waste to PEWE feed tanks,
- air jet transfer and hypodermic needle sample collection,
- sample transfer from sample collection bottles to no-headspace organic vials, and
- >4° C temporary storage following sample collection.

These tests (Tests 1 through 4) demonstrated that the effects of air sparging and simulated steam jetting on spiked organic concentrations was significantly greater than the effects of air jetted sample collection and sample handling. After air sparging and steam jetting of feed solutions, approximately 75 percent of the spiked VOCs were reacted, decomposed, or volatilized and were no longer present in the feed solution.

This test has been designed to verify the effects of operation of the double needle sampling system only. As such, air sparge and steam jet operations will not be conducted.

5.1 Data Quality Objectives

The US Environmental Protection Agency (EPA) developed the Data Quality Objectives (DQOs) process as a system-based tool to support decision making which often follows characterization activities. Although the double needle sampler testing does not affect remedial or corrective actions, elements of the DQO process are helpful in clearly defining and bounding characterization, ultimately resulting in defensible data. The following subsections address relevant DQO issues.

5.1.1 Problem Statement

Quantification of volatile organic losses due to operation of double needle sampling systems is unachievable at INTEC due to high radioactivity and sampling/analysis logistics. PEWE bottoms are transferred to the tank farm, and PEWE condensate serves as feed to the LET&D. These systems are subject to regulatory scrutiny; bench-scale sampling and analysis will contribute to the INTEC characterization database to be used for permitting and to demonstrate permit compliance.

5.1.2 Data Users

Double needle sampling system data will be used to support permitting activities conducted by BBWI and DOE-ID for the State of Idaho. Data may also be used by INTEC personnel to better understand the fate of organics due to double needle sampler operations.

5.1.3 Study Boundaries and Decisions

All reasonable efforts have been made to simulate INTEC operations and sampling protocols during sampler system testing. Target analytes (Table 5.2-1 below) were determined by evaluating PEWE feed data and selecting representative spike constituents. Spiking concentrations were bounded by analytical quantitation limits. Nitric acid and inorganic feedstock molarity was determined by evaluating and simulating PEWE feed.

Data generated by this test is anticipated to verify/validate that current INTEC sampling methods (i.e. double needle sampler operation) do not result in significant losses of volatile organic species. This data will be used to supplement INTEC process knowledge and ongoing RCRA sampling and analysis in generating a characterization database which will be used for operational permitting and to demonstrate permit compliance.

5.2 Target Analytes

Table 5.2-1 below lists test target analytes. Target analytes were chosen to best represent expected PEWE feed constituents with regard to vapor pressures. TOC analysis will be used for trip blanks and detection of potential cross contamination.

Table 5.2-1: Target Analytes

Volatile Organics	Other Analysis
1,1,1-trichloroethane	Total Organic Carbon (TOC)
toluene	
carbon disulfide	

5.3 Organic Spiking Concentrations

Whereas spiking concentrations of inorganics is predicated upon simulating INTEC liquid waste feed molarities and specific gravity, organic spiking concentrations are dependent upon test objectives and analytical detection limits. Based on previous tests, detection limits are expected to vary between 1 and 10 mg/l. To help ensure detection in all samples, organic spiking concentrations will be 10 times expected detection, or 100 mg/l. The volume of organics to be added to a 44 liter feedstock is provided in table 5.3-1 below.

Table 5.3-1: Organic Volumes per 46 Liter Feedstock

Spiked Organic	Volume
1,1,1-Trichloroethane	3.48 ml
Carbon disulfide	5.08 ml
Toluene	3.29 ml

5.4 Quality Control

Two quality control (QC) samples will be collected. The first quality control sample is a trip blank to monitor for organic cross contamination that may occur during sample shipping. The second QC sample will be collected following pre-cleaning to monitor for cross contamination.

The analytical laboratory maintains and adheres to a quality control manual that can be provided upon request.

6.0 REPORTING

A detailed operations/sample logbook will be maintained. All operational observations and any deviations from procedure will be recorded. All pertinent sample collection information (date of sample, quantity of sample, observations, etc.) will be recorded. Following the receipt and evaluation of analytical data, a comprehensive final report will be generated which will include:

- operations and sampling description,
- data reduction spreadsheet,
- organic partitioning calculations,
- statistical analysis of sampling data,
- conclusions,
- additional study recommendations, if any,
- copy of logbook, and
- Attachment 1 data sheets.

7.0 REFERENCES

1. Radian Corporation, *Results of a Laboratory Study to Assess the Fate of Organic Compounds in Synthetic ICPP Tank Farm Waste*, July 17, 1995.

2. Science Applications International Corporation, *PEWE and LDUA Test Series, Orangics Partitioning Comprehensive Final Report*, Revision 0, June 2000.

Attachment A

Double Needle Sampler Data Sheets

Double Needle Sampler Data Sheets

Data to be Taker prior to and During Sampling

DATE:__________

Time	System Pressure (In. WC)	Feed Tank Level (L)	Feed Tank Temp(°F)	Primary Cond. Exit Temp. (°C)	Cooling Water Supply Temp. (°F)	Primary Cond. Supply Temp. (°F)	Cooling Water Exit Temp. (°F)	Cooling Water Flow	Sampling Operations Readings: Sample ID	Air Jet Flow	Air Pressure	Air Lift Flow
	E-PI-1	F-SG-101	E-TC-10	E-TC-9	E-TE-11	E-TE-12	E-TE-13	E-FI-13		AIR-FI-106		AIR-FI-116

ATTACHMENT 2

Double Needle Sampler – Logbook Entries and Data Sheets

Double Needle Sampler Data Sheets

Data to be Taker prior to and During Sampling

PAGE 1/

DATE: 9 JULY, 2001

Time	System Pressure (In. WC)	Feed Tank Level (L)	Feed Tank Temp(°F)	Primary Cond. Exit Temp. ~~(°C)~~ °F	Cooling Water Supply Temp. (°F)	Primary Cond. Supply Temp. (°F)	Cooling Water Exit Temp. (°F)	Cooling Water Flow	Sampling Operations Readings: Sample ID	Air Jet Flow	Air ~~Pressure~~ PSIG Pressure	Air Lift ~~Flow~~ SCFH Flow
	E-PI-1	F-SG-101	E-TC-10	E-TC-9	E-TE-11	E-TE-~~12~~8	E-TE-13	E-FI-13		AIR-FI-106	PSI	AIR-FI-116
0410	ADD	ORGANICS										
0436	0	44	77	76	OFF	75	OFF	OFF				
0519	0	44	76	77	NA	74	NA	NA				
0819	-3"	44	75	73	71	73	71	10 gpm				
0858	-3"	44	74	74	70	73	70	10 gpm		7/9/01		
~~0900~~									~~05 FT01~~	~~0~~	~~0~~	~~0~~
0920	-3"	43	74	71	74	74	76	10	05 DN 11A	5	80	<.2SCFH
0929										5.5	90	<.2SCFH
0930									05DN11B	5.5	90	<.02
0933	-2"	43								5.5	92	<0.2
0935	-2								05DN11C	5.5	90	<0.2
0938	-2"									5.5	94	<0.2
0940	-2"	43	71						05DN11X	5.5	90	<0.2
										5.5	93	<0.2
0945	-2								05 FT 01			
0951	-2"								05DN12A	5.5	93	<0.2
0954	-2"									5.5	93	<0.2
0956	-2"								05DN12B	5.5	90	<0.2
0958	-2"									5.5	90	<0.2
1001	-2"	42	69						05DN12C	5.5	90	<0.2
1006	-2"	42	69	68	74			10	05DN12X	5.5	90	<0.2
1009	-2"									5.5	90	<0.2
1011									05 FT 02			

PEWE Bench-Scale Test 5: Double Needle Sampler Statistical Testing, June 25, 2001

Double Needle Sampler Data Sheets

Data to be Taker prior to and During Sampling

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DATE: JULY 9, 2001

Time	System Pressure (In. WC)	Feed Tank Level (L)	Feed Tank Temp(°F)	Primary Cond. Exit Temp. (°C)	Cooling Water Supply Temp. (°F)	Primary Cond. Supply Temp. (°F)	Cooling Water Exit Temp. (°F)	Cooling Water Flow	Sampling Operations Readings: Sample ID	Air Jet Flow	Air PSIG Pressure	Air Lift SCFH Flow
	E-PI-1	F-SG-101	E-TC-10	E-TC-9	E-TE-11	E-TE-12	E-TE-13	E-FI-13		AIR-FI-106	PSI	AIR-FI-116
1012	2"	42	68						05DN13A	5.5	90	<0.2
1017	2"								"	5.5	94	<0.2
1022	3"	42	67						05DN13B	5.5	100	<0.2
1025	3"									5.5	105	<0.2
1027	3"	42	67						05DN13C	5.5	105	<0.2
1030	3"									5.5	95	<0.2
1032	3"	42	67						05DN13X	5.5	95	<0.2
1035	4"									5.5	80	<0.2
1037	4"	42	67						05FT03	5.5	75	<0.2
1038	3"	42	67						05DN14A	5.5	85	<0.2
1048	3"	41	66						05DN14B	5.5	95	<0.2
1050	3"									5.5	100	<0.2
1053	3"	41	66						05DN14C	5.5	100	<0.2
1058	3"	41	66						05DN14X	5.5	105	<0.2
1103									05FT04			
1105	4"	41	66						05DN15A	5.5	82	<0.2
1110	4"	41	65						"	5.5	85	<0.2
1115	3"	41	65						05DN15B	5.5	90	<0.2
1120	3"	40	65						05DN15C	5.5	100	
1125	3"	40	65						05DN15X	5.5	100	<0.2
1130	3"	40	65						05FT05	5.5	95	<0.2

PEWE Bench-Scale Test 5: Double Needle Sampler Statistical Testing, June 25, 2001

Double Needle Sampler Data Sheets

Data to be Taker prior to and During Sampling

PAGE 3/

DATE: 7/9/01

Time	System Pressure (In. WC)	Feed Tank Level (L)	Feed Tank Temp(°F)	Primary Cond. Exit Temp. (°C)	Cooling Water Supply Temp. (°F)	Primary Cond. Supply Temp. (°F)	Cooling Water Exit Temp. (°F)	Cooling Water Flow	Sampling Operations Readings: Sample ID	Air Jet Flow	Air PSIG Pressure	Air Lift SCFH Flow
	E-PI-1	F-SG-101	E-TC-10	E-TC-9	E-TE-11	E-TE-12	E-TE-13	E-FI-13		AIR-FI-106		AIR-FI-116
1131	3"	40	65						05 DN16A	5.0	80	<0.2
1138	7"	40	65						05 "	5.5	85	<0.2
1141	3"	40	64						05 DN16B	5.5	95	<0.2
1146	3"	40	64						05DN16C	5.5	100	<0.2
1151	3"	40	64						05DN16X	5.5	100	<0.2
1156	4"	40	64						05FT06	5.5	85	<0.2
1157	4"	40	64						05DN17A	5.0	80	<0.2
1202	4	40	64						"	5.0	85	<0.2
1207	3	40	64						05DN17B	5.5	95	<0.2
1212	3	40	64						05DN17C	5.5	100	<0.2
1217	2	40	64						05DN17X	5.5	100	<0.2
1222									05FT07			
1223	3	39	64						05DN18A	5.5	85	<0.2
1228	3	39	64						"	5.0	80	
1233	3	39	64						05DN18B	5.5	85	
1238	3	39	64						05DN18C	5.5	90	<0.2
1240	3	39	64							5.5	95	<0.2
1243	3	39	64						05DN18X	5.5	95	<0.2
1248	3	39	63						05FT08	5.5	100	<0.2
1249	3	39	63						05DN19A	5.5	80	<0.2
1254	3	39	63						"	5.5	80	<0.2
1259	3	39	63						05DN19B	5.5	85	<0.2
1304	3	39	63						05DN19C	5.5	90	<0.2

Double Needle Sampler Data Sheets

Data to be Taker prior to and During Sampling

PAGE 4/

DATE: 7/9/01

Time	System Pressure (In. WC)	Feed Tank Level (L)	Feed Tank Temp(°F)	Primary Cond. Exit Temp. (°C)	Cooling Water Supply Temp. (°F)	Primary Cond. Supply Temp. (°F)	Cooling Water Exit Temp. (°F)	Cooling Water Flow	Sampling Operations Readings: Sample ID	Air Jet Flow	Air Pressure	Air Lift SCFH Flow
	E-PI-1	F-SG-101	E-TC-10	E-TC-9	E-TE-11	E-TE-12	E-TE-13	E-FI-13		AIR-FI-106	PSIG	AIR-FI-116
1306	3	39	63						05DN19C	5.5	95	<0.2
1309	3	39	63						05DN19X	5.5	95	
1314									05FT09			
1315									05DN20A			
1320	4	38	63							5.0	75	
1325	3	38	63						05DN20B	5.5	90	
1330	3	38	63						05DN20C	5.5	95	<0.2
1335	3	38	63						05DN20X	5.5	95	
1340	3	38	63						05FT10	5.5	100	<0.2

65

JULY 6 2001

1230 Added 10 L of water to the feed tank and initiated air jet recirculation through the double needle sampler. This will be the cross contamination sample. - TDT

1245 Beginning feed makeup. Cleaned feed makeup vessel. Chemical measured and added to feed are listed below. - TDT

Water: ~~25~~ 21 L TDT

Calcium Nitrate: 43.06 grams [$Ca(NO_3)_2 \cdot 4H_2O$]

Iron Nitrate: 2.64 grams [$Fe(NO_3)_3 \cdot 9H_2O$]

Sodium Nitrate: 623 grams [$NaNO_3$]

NITRIC ACID: 3.35 Liters [HNO_3 - 69%]

Aluminum Nitrate: 4.0 Liters [2.2 M $Al(NO_3)_3$ solution]

1315 Stopped air jet recirculation of the water in the feed tank. - TDT

1340 Obtained cross-contamination sample 05-QC-23A and -23B for TOC analysis and placed in laboratory fridge - TDT

1400 Adding feed solution to the feed tank. Added water to feed tank to generate 44 liters of feed.

7/09/2001

0410 Spiking the feed with organics.

Carbon disulphide: 3.5 ml TD

Toluene: 5.1 ml TD

1,1,1-TCA: 3.3 ml TD

0420 Organics added to feed and mixer is on @ 25 percent - TDT

0800 Prepared field blank (05-QC-21A and -21B) and trip blank (05-QC-22A and -22B) DI water samples - TDT

End of page

Left margin (partially cut off): REMOVE; NET; 9.48; 8.93; 9.50; 3; ROX (20 mm DIA; VERAGE; SAMPLES

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JULY 9, 2001

0820 TURNED ON COOLING Water and Exhaust fan. System pressure is @ -3" WC. -TDT

0900 Mixer off. Mix time = 4 hr 40 minutes. Began pulling direct sample 05-FT-01 series (A, B, 3C). -TDT

0905 LOTS OF ORGANIC GLOBULES WERE Apperent in the first direct samples. The samples were added back to the tank. Test Plan deviation - we turned on the air sparge. Rotameter setting is at 20. Pressure is 90 psig. Will sample again @ 9:30 - TDT Drill mixer on

0920 STARTED AIR JET Recirculation for Sample 05-~~FT~~ DN-11 (A, B, 3C) we will pull the direct sample after the jetted sample. - TDT

0930 Switched bottles on the Double Needle Sampler -TDT

0935 Switched bottles to 05-DN-11C on Needle Sampler -TDT

0940 Switched bottles to 05-DN-11X on Needle Sampler -TDT

0945 Completed sample set 05-DN-11 -TDT

0946 Started recirculating sample set 05-DN-12A and completed pulling samples 05-FT-01 A -01B and 01C -TDT

0956 Switched sample bottles to 05-~~12~~ DN-12B on needle system - TDT

1001 Switched sample bottles to 05-DN-12C on sampler -TDT

1006 Switched sample bottles to 05-DN-12X on sampler -TDT

1011 Completed sampling set 05-DN-12 -TDT

1012 Completed pulling feed tank samples 05-FT-02 and started needle samples 05-~~FT~~ DN-~~03~~ 13 TDT A -TDT

1022 Switched sample bottles to 05-DN-13B on the sampler system -TDT

JULY 9, 2001

1027 Switch...
the sa...
1032 Switche...
the sa...
1037 Comple...
1038 Complet...
Starte...
1048 Switch...
1053 Switche...
1058 Switche...
1103 Compl...
05-D...
1104 TURN...
1105 COMPL...
05-DN / FT...
05-DN...
1115 Switche...
1120 Switched...
1125 Switched...
1130 Complete...
series...
1131 Compl...
Series...
on the...
1141 Switche...
1146 Switches...
1151 Switche...
1156 Complete...
Series...
1157 Compl...
Series...
on the...

	JULY	9, 2001
and Exhaust	1027	Switched sample bottles to 05-DN-13C on
-3" WC. -TDT		the sampling system -TDT
minutes.	1032	Switched sample bottles to 05-DN-13X on
5-FT-01		the sampling system -TDT
	1037	Completed Double Needle Sample Set 05-DN-13 -TDT
WERE	1038	Completed Feed tank sample set 05-FT-03 and
samples.		Started Double Needle Sampleset 05-DN-14A -TDT
k to the	1048	Switched sample bottles to 05-DN-14B -TDT
- We	1053	Switched sample bottles to 05-DN-14C -TDT
Rotameter	1058	Switched sample bottle to 05-DN-14X -TDT
is 90 psig.	1103	Completed sampling Double Needle Sample series
TDT Drill mixer on TDT		05-DN-14 -TDT
	1104	TURNED THE DRILL MIXER OFF -TDT
, 3C)	1105	COMPLETED SAMPLING Feed tank Series
le after		05-~~DN~~ FT TDT -04 and initiated recirculation of
		05-DN-15A -TDT
Needle Sampler -TDT	1115	Switched sample bottles to 05-DN-15B -TDT
on Needle Sampler -TDT	1120	Switched sample bottles to 05-DN-15C -TDT
Needle Sampler -TDT	1125	Switched sample bottles to 05-DN-15X -TDT
-TDT	1130	Completed Sampling the Double Needle sampler
05-DN-12A		series 05-DN-15 -TDT
05-FT-01A	1131	Completed sampling the feed tank sample
		Series 05-FT-05 and initiated recirculation
12B on needle		on the Double Needle series 05-DN-16A -TDT
	1141	Switched sample bottles to 05-DN-16B -TDT
-12C on sampler TDT	1146	Switched sample bottles to 05-DN-16C -TDT
12X on sampler -TDT	1151	Switched Sample bottles to 05-DN-16X
2 -TDT	1156	Completed sampling the Double needle sampler
les		Series 05-DN-16 -TDT
samples	1157	Completed Sampling the feed tank sample
		Series 05-FT-06 and initiated recirculation
N-13B on		on the double needle sample 05-DN-17A -TDT
	(initials)	

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JULY 9, 2001

1207 Switched Sample bottles to 05-DN-17B -TDT
1212 Switched Sample bottles to 05-DN-17C -TDT
1217 Switched Sample bottles to 05-DN-17X -TDT
1222 Completed Sampling Double Needle sampler Series 05-DN-17 - TDT
1223 Completed Sampling ~~series~~ TDT Feed tank series 05-FT-07 and began recirculating series 05-DN-18A -TDT
1233 Switched Sample bottles to 05-DN-18B -TDT
1238 Switched Sample bottles to 05-DN-18C -TDT
1243 Switched sample bottles to 05-DN-18X - TDT
1248 Completed Sampling Double Needle Sampler Series 05-DN-18 - TDT
1249 Completed Sampling Feed tank sample Series 05-FT-08 and began recirculating Double Needle Sample 05-DN-19A -TDT
1259 Switched Sample bottles to 05-DN-19B -TDT
1304 Switched Sample bottles to 05-DN-19C -TDT
1309 Switched Sample bottles to 05-DN-19X -TDT
1314 Completed Sampling Double Needle Sampler Series 05-DN-19 -TDT
1315 Completed Sampling Feed Tank Sample Series 05-FT-09 and began recirculating Double needle Sample 05-DN-20A -TDT
1325 Switched sample bottles to 05-DN-20B -TDT
1330 Switched sample bottles to 05-DN-20C -TDT
1335 Switched sample bottles to 05-DN-20X -TDT
1340 Completed Sampling Double Needle Sampler Series 05-DN-20 -TDT
1341 Completed Sampling Feed tank Sample Series 05-FT-10 - TDT

JULY 9, 20
1353 Meas
Need
cylin
flow
the s
1400 Total
1435 Prepa
Samp
with
aroun

DN-17B -TDT
DN-17C -TDT
DN-17X -TDT
Sampler

tank series
ting series

-18B -TDT
-18C -TDT
-18X -TDT
le Sampler

sample
recirculating
19A -TDT
DN-19B -TDT
DN-19C -TDT
D-19X -TDT
Sampler

Sample
recirculating
-20A -TDT
20B -TDT
-20C -TDT
-20X -TDT
Sampler

Sample

JULY 9, 2001

1355 Measured the flow through the Double Needle sampler by placing a graduated cylinder beneath the sample system drain. Flow was measured at 270 ml/min through the system - TDT

1400 Total Samples # = 66 40 ml bottles
= 2.64 L -TDT

1435 Prepared shipping package for Hauser Lab. Samples are contained in plastic bags with six blocks of blue ice and vermiculite around all the samples -TDT

END OF PAGE

ATTACHMENT 3

Double Needle Sampler – Analytical Report

HAUSER®

Client: Science Applications International Corporation
545 Shoup Avenue
Idaho Falls, ID 83402
Attn: Troy Thomson

Objective: The client requested the services of Hauser, Inc., to quantify specified volatile organic compounds (VOC's) contained in twenty acidic, aqueous samples. The client also requested total organic carbon analysis (TOC) on three samples. The samples submitted were aqueous solutions containing 1.2 molar nitric acid. Samples were received in sixty-six separate containers. The VOC samples were received in triplicate and the TOC samples were received in duplicate. All samples were contained in 40mL, amber, VOA vials.

Method: Total Organic Carbon
Samples were analyzed using a Seivers® 800 Total Organic Carbon analyzer. The samples were analyzed in duplicate and results are listed in the Results section of this report.

Gas Chromatography / Mass Spectrometry – Purge and Trap
Samples were analyzed for three VOC compounds: carbon disulfide, 1,1,1-trichloroethane, and toluene. A four point calibration curve for each analyte was analyzed in the range of 50 to 400 ng. An internal standard mix was added to each sample to monitor the responses of three internal standard compounds. The following instrumentation was utilized:

Purge and trap unit (P&T) connected to a gas chromatograph (GC) / mass spectrometer (MS) system (Hewlett Packard® 5890 GC / 5972 MSD)
GC/MS Instrument ID #: 202
Purge and Trap Unit: Tekmar® 3000
Analytical Method: VOASAIC.M
Column type: DB-624, 60 m, 0.25 mm i.d., 1.4 µm film thickness
A detailed printout of the GC/MS method parameters listed in VOASAIC.M is included in the data package.

Samples: A complete listing of all samples submitted for analysis is included in the Chain of Custody form contained in this data package.

P&T/GC/MS Calibration:

A calibration curve was prepared by adding various amounts standard mix (2425-108-1) containing target analytes to a Luerlock® syringe containing 5mL of Nanopure DI. Internal standard (IS) mix (2425-107-1) was also added to each standard. Standards were analyzed in ascending order of concentration. The response ratios of target analytes to the internal standard compounds were plotted in a linear regression for each analyte. The correlation coefficients for the responses of each analyte in the calibration curve were all >0.990. This was deemed acceptable for purposes of quantitation within the 50 to 400 ng concentration range. For daily instrument calibration, a 250 ng check standard was analyzed. The recovery of the check standard compounds was required to be within 10% of the nominal 250 ng concentration for each VOC analyte. All check standards met these criteria on a daily basis. Following check standards a daily instrument blank was analyzed to monitor for any target analyte contamination of the P&T/GC/MS system.

Hauser Laboratories • 4750 Nautilus Ct. So. • Boulder, CO 80301-3240 • www.hauser.com
• Ph: (800) 241-2322 • Ph: (303) 581-0079 • FAX: (303) 581-0195

TOC Analysis Results:

The following table lists the results of duplicate analyses on the TOC samples. Sample results are in parts per billion (ppb as ng/mL). Sample 05-QC-23 was diluted 1:50 due to high sample concentration. The total inorganic carbon level was high in sample 05-QC-23 which may limit the accuracy of its' result.

Sample Identification	"A" Result (ppb)	"B" Result (ppb)	Average (ppb)
05-QC-21	262	153	208
05-QC-22	168	154	161
05-QC-23	3,290	2,750	3,020

P&T/GC/MS Sample Analysis Results:

The qualitative and quantitative data gathered from P&T/GC/MS sample analysis are summarized on a spreadsheet included in this data package. All sample, sample duplicate, and check standard data is included on the attached spreadsheet. Quality control was ensured by performing a duplicate sample analysis once every ten samples. Additionally, a sample was analyzed as both a non-spiked sample and as a sample spiked with 100 ng of each analyte once every ten samples. The table below lists the amounts of each target analyte detected in the non-spiked and spiked samples and the percentage recovery of the spiked analytes. The limit of quantitation is 50 ng and the detection limit is 25 ng.

Sample ID	Sample Amount (µL)	Carbon disulfide (ng)	1,1,1-Trichloroethane (ng)	Toluene (ng)
05-FT-02A	100	73.6	82.1	67.9
05-FT-02A spike	100	170	187	163
% Recovery		96.4	105	95.1
05-FT-07A	1,000	75.2	68.7	Nd
05-FT-07A spike	1,000	142	150	102
% Recovery		66.8	81.3	102

nd = not detected

REPORT PREPARED BY:

Keith M. Campbell
Chemist

REPORT REVIEWED BY:

Michael S. Pirkey
Section Manager

SAI0142832_rp1.xls

Date: 7/11/01 - 7/17/01

VOC Target Analyte Results from Purge and Trap GC/MS Analysis

Sample ID	Sample Amount (uL)	Carbon disulfide (ng)	1,1,1-Trichloroethane (ng)	Toluene (ng)	Carbon disulfide (ng/uL)	1,1,1-Trichloroethane (ng/uL)	Toluene (ng/uL)
05-FT-01A	100	320	369	374	3.20	3.69	3.74
05-DN-11A	25	248	263	258	9.92	10.52	10.32
05-DN-11A dup	25	240	254	249	9.60	10.16	9.96
250ng check std.	na*	252	241	263	na	na	na
05-FT-02A	100	73.6	82.1	67.9	0.74	0.82	0.68
05-FT-02A spike	100	170	187	163	1.70	1.87	1.63
05-DN-12A	50	65.3	93.4	96.7	1.31	1.87	1.93
05-FT-03A	500	241	197	83.2	0.48	0.39	0.17
05-DN-13A	500	101	156	184	0.20	0.31	0.37
05-FT-04A	1000	226	176	52.3	0.23	0.18	0.05
05-DN-14A	1000	52.2	74.0	97.5	0.05	0.07	0.10
05-FT-05A	1000	137	104	<50	0.14	0.10	bloq**
05-DN-15A	1000	<50	<50	<50	bloq	bloq	bloq
05-FT-06A	1000	119	106	nd***	0.12	0.11	nd
250ng check std.	na	242	240	256	na	na	na
05-DN-16A	1000	nd	nd	nd	nd	nd	nd
05-DN-16A dup	1000	nd	nd	nd	nd	nd	nd
05-FT-07A	1000	75.2	68.7	nd	0.08	0.07	nd
05-FT-07A spike	1000	142	150	102	0.14	0.15	0.10
05-DN-17A	1000	nd	nd	nd	nd	nd	nd
05-FT-08A	1000	82.8	84.7	nd	nd	nd	nd
05-DN-18A	1000	nd	nd	nd	nd	nd	nd
05-FT-09A	1000	61.8	75.7	nd	0.06	0.08	nd
05-DN-19A	1000	nd	nd	nd	nd	nd	nd
05-FT-10A	1000	85.9	93.7	nd	0.09	0.09	nd
05-DN-20A	1000	nd	nd	nd	nd	nd	nd
05-FT-02B	200	97.3	120	127	0.49	0.60	0.64
05-FT-02B dup	200	100	126	130	0.50	0.63	0.65
05-DN-12B	200	148	223	251	0.74	1.12	1.26
250ng check std.	na	258	275	256	na	na	na

na* = not applicable
bloq** = below limit of quantitation (0.050 ng/uL)
nd*** = not detected
detection limit = 0.025 ng/uL

Page 1 of 1

```
                         TOPLEVEL PARAMETERS
                         ------------------

Method Information For: C:\HPCHEM\1\METHODS\VOASAIC.M

Method Sections To Run:

  ( ) Save Copy of Method With Data
  ( ) Pre-Run Cmd/Macro  =
  (X) Data Acquisition
  (X) Data Analysis
  ( ) Post-Run Cmd/Macro =

Method Comments:
  Purge and Trap GC/MS method for identification of unknowns:  J&W 60m
  DB-624, 0.25mm i.d., 1.4um film.

                         END OF TOPLEVEL PARAMETERS
                         --------------------------



                         INSTRUMENT CONTROL PARAMETERS
                         -----------------------------

Sample Inlet:       GC
Injection Source:   Manual
Injection Location: Rear
Mass Spectrometer:  Enabled


                    HP5890 Temperature Parameters

Zone Temperatures:  State     Setpoint
     Inlet A:        Off        50 C
     Inlet B:         On       250 C
     Detector A:     Off        50 C
     Detector B:      On       250 C
     Auxiliary:      Off        50 C

Oven Parameters:
     Oven Equib Time:         0.25 minutes
     Oven Max:                 260 C
     Oven State:               On
     Cryo State:              Off
     Cryo Blast:              Off
     Ambient:                   25 C

Oven Program:
     Initial Temperature:       40 C
     Initial Time:            1.00 minutes

                Rate            Final            Final

Method: VOASAIC.M            Wed Jul 11 13:27:11 2001            Page: 1
```

```
                              TOPLEVEL PARAMETERS
                              -------------------

Method Information For: C:\HPCHEM\1\METHODS\VOASAIC.M

Method Sections To Run:

  ( ) Save Copy of Method With Data
  ( ) Pre-Run Cmd/Macro  =
  (X) Data Acquisition
  (X) Data Analysis
  ( ) Post-Run Cmd/Macro =

Method Comments:
  Purge and Trap GC/MS method for identification of unknowns:  J&W 60m
  DB-624, 0.25mm i.d., 1.4um film.

                              END OF TOPLEVEL PARAMETERS
                              --------------------------



                              INSTRUMENT CONTROL PARAMETERS
                              -----------------------------


Sample Inlet:        GC
Injection Source:    Manual
Injection Location:  Rear
Mass Spectrometer:   Enabled


                         HP5890 Temperature Parameters

Zone Temperatures:   State      Setpoint
     Inlet A:         Off         50 C
     Inlet B:          On        250 C
     Detector A:      Off         50 C
     Detector B:       On        250 C
     Auxiliary:       Off         50 C

Oven Parameters:
     Oven Equib Time:           0.25 minutes
     Oven Max:                   260 C
     Oven State:                  On
     Cryo State:                 Off
     Cryo Blast:                 Off
     Ambient:                     25 C

Oven Program:
     Initial Temperature:         40 C
     Initial Time:              1.00 minutes

                 Rate             Final             Final

Method: VOASAIC.M            Wed Jul 11 13:27:11 2001              Page: 1
```

Level	(C/minute)	Temperature (C)	Time (minutes)
1	10.0	250	8.00
2(A)	0.0	0	0.00
3(B)	0.0	0	0.00

Next Run Time: 30.00 minutes

HP5890 Inlet Pressure Programs

GC Pressure Units: psi

Inlet A:

Constant Flow: Off
Constant Flow Pressure: 0.0 psi
Constant Flow Temperature: 50 C
Initial Pressure: 0.0 psi
Initial Time: 650.00 minutes

Level	Rate (psi/minute)	Final Pressure (psi)	Final Time (minutes)
1	0.00	0.0	0.00
2(A)	0.00	0.0	0.00
3(B)	0.00	0.0	0.00

Total Program Time: 650.00 minutes

Column Length: 30.00 m
Column Diameter: 0.530 mm
Gas: He
Vacuum Compensation: Off

Inlet B:

Constant Flow: Off
Constant Flow Pressure: 20.0 psi
Constant Flow Temperature: 50 C
Initial Pressure: 17.0 psi
Initial Time: 480.00 minutes

Level	Rate (psi/minute)	Final Pressure (psi)	Final Time (minutes)
1	0.00	0.0	0.00
2(A)	0.00	0.0	0.00
3(B)	0.00	0.0	0.00

Total Program Time: 480.00 minutes

Column Length: 60.00 m
Column Diameter: 0.250 mm
Gas: He
Vacuum Compensation: On

HP5890 Packed Column Flow Control

Inlet A not used to control packed column flow.

Inlet B not used to control packed column flow.

Method: VOASAIC.M Wed Jul 11 13:27:11 2001 Page: 2

HP5890 Purge Valve Settings

Inlet Purge	Init Value	On Time	Off Time	Splitless Injection
A	Off	0.20	0.00	No
B	On	0.00	20.00	No

HP5890 Valve and Relay Information

Initial Setpoints:
5890 Valves:
Valve 1: Off   Valve 2: Off   Valve 3: Off   Valve 4: On
19405 Valves:
Valve 5: Off   Valve 6: Off   Valve 7: Off   Valve 8: Off
19405 Relays:
Relay 1: Off   Relay 2: Off   Relay 3: Off   Relay 4: Off

HP5890 Detector Information

Detector	Type	State
A	FID	Off
B	---	Off

HP5890 Signal Information

Not saving signal data.

Signal	Source	Peak Width	Data Rate	Start Data	Stop Data
1	Testplot	0.053	5.000	0.00	1.00
2	Testplot	0.053	5.000	0.00	650.00

MS ACQUISITION PARAMETERS

General Information
------- -----------

Tune File : atune.u
Acquistion Mode : Scan

MS Information
-- -----------

Solvent Delay : 4.00 min

EM Absolute : False
EM Offset : 106
Resulting EM Voltage : 2247.1

[Scan Parameters]

Low Mass : 35
High Mass : 500

Method: VOASAIC.M   Wed Jul 11 13:27:11 2001   Page: 3

```
Threshold                    : 150
Sample #                     : 1        A/D Samples    2

                        END OF MS ACQUISITION PARAMETERS

                      END OF INSTRUMENT CONTROL PARAMETERS
                      ------------------------------------



                      DATA ANALYSIS PARAMETERS
                      ------------------------

Method Name: C:\HPCHEM\1\METHODS\VOASAIC.M


Percent Report Settings
-----------------------

Sort By: Signal

Output Destination
    Screen:  No
    Printer: Yes
    File:    No

Integration Events: AutoIntegrate

Generate Report During Run Method:  No

Signal Correlation Window: 0.020


Qualitative Report Settings
---------------------------

Peak Location of Unknown: Apex

Library to Search       Minimum Quality
nist98.L                 0

Integration Events: voapurge.e

Report Type: Summary

Output Destination
    Screen:  No
    Printer: Yes
    File:    No

Generate Report During Run Method:  No
```

```
Quantitative Report Settings
---------------------------

Report Type: Detailed

Output Destination
    Screen:  No
    Printer: Yes
    File:    No

Generate Report During Run Method:  Yes


Purge and Trap Analysis
Calibration Last Updated: Wed Jul 11 10:35:22 2001


Reference Window: 2.00 Minutes
Non-Reference Window: 1.00 Minutes
Correlation Window: 0.10 minutes
Default Multiplier: 1.00
Default Sample Concentration: 0.00

Compound Information
--------------------

---------------------------------------------------------------------------
 1)  Bromochloromethane                             (ISTD TR)

Ret. Time   9.93 min., Extract & Integrate from   9.43 to  10.43 min.

Signal        Rel Resp.   Pct. Unc.(rel)    Integration
Tgt  129.75                                 voasaic.e
Q1   127.75     73.80       20.0            voasaic.e
Q2   131.80     23.00       20.0            voasaic.e

Lvl ID   Conc (ng)  Response
1          250.000      305065
2          250.000      272546
3          250.000      300138
4          250.000      249603

Qualifier Peak Analysis ON    ISTD conc:      250.000 ng
Curve Fit: Linear
---------------------------------------------------------------------------

 2)  Carbon disulfide                               ( TR)

Ret. Time   7.68 min., Extract & Integrate from   7.18 to   8.18 min.

Signal        Rel Resp.   Pct. Unc.(rel)    Integration
Tgt   75.90                                 voasaic.e
Q1    43.95     18.10       20.0            voasaic.e
Q2    77.90      8.20       20.0            voasaic.e

Lvl ID   Conc (ng)  Response

Method: VOASAIC.M           Wed Jul 11 13:27:11 2001             Page: 5
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```
1           50.000       355811
2          100.000       693592
3          200.000      1502872
4          400.000      2659589

Qualifier Peak Analysis ON
Curve Fit: Linear
---------------------------------------------------------------------------

 3)  1,1,1-Trichloroethane                          ( TR)

Ret. Time  10.32 min., Extract & Integrate from   9.82 to  10.82 min.

Signal        Rel Resp.   Pct. Unc.(rel)    Integration
Tgt   96.85                                 voasaic.e
Q1    98.85      66.20        20.0          voasaic.e
Q2    61.00      50.40        20.0          voasaic.e

Lvl ID    Conc (ng)  Response
1           50.000       167587
2          100.000       356325
3          200.000       763874
4          400.000      1396727

Qualifier Peak Analysis ON
Curve Fit: Linear
---------------------------------------------------------------------------

 4)  Carbon tetrachloride                           ( TR)

Ret. Time  10.57 min., Extract & Integrate from  10.07 to  11.07 min.

Signal        Rel Resp.   Pct. Unc.(rel)    Integration
Tgt  116.85                                 voasaic.e
Q1   118.75      93.90        20.0          voasaic.e
Q2   120.75      32.10        20.0          voasaic.e

Lvl ID    Conc (ng)  Response
1           50.000       144957
2          100.000       305283
3          200.000       649195
4          400.000      1214606

Qualifier Peak Analysis ON
Curve Fit: Linear
---------------------------------------------------------------------------

 5)  1,4-Difluorobenzene                            (ISTD TR)

Ret. Time  11.22 min., Extract & Integrate from  10.72 to  11.72 min.

Signal        Rel Resp.   Pct. Unc.(rel)    Integration
Tgt  113.95                                 voasaic.e
Q1    63.00      28.10        20.0          voasaic.e
Q2    87.90      20.10        20.0          voasaic.e

Lvl ID    Conc (ng)  Response
1          250.000      1365437
2          250.000      1233069
3          250.000      1266519

Method: VOASAIC.M           Wed Jul 11 13:27:11 2001           Page: 6
```

```
4           250.000       1138585

Qualifier Peak Analysis ON    ISTD conc:      250.000 ng
Curve Fit: Linear
-------------------------------------------------------------------------------

 6)  Toluene                                        ( TR)

Ret. Time  13.50 min., Extract & Integrate from  13.00 to  14.00 min.

Signal        Rel Resp.   Pct. Unc.(rel)    Integration
Tgt   91.00                                 voasaic.e
Q1    92.00     57.40        20.0           voasaic.e
Q2    65.00     15.10        20.0           voasaic.e

Lvl ID   Conc (ng)  Response
1           50.000      363135
2          100.000      708934
3          200.000     1499019
4          400.000     2664921

Qualifier Peak Analysis ON
Curve Fit: Linear
-------------------------------------------------------------------------------

 7)  Tetrachloroethene                              ( TR)

Ret. Time  14.37 min., Extract & Integrate from  13.87 to  14.87 min.

Signal        Rel Resp.   Pct. Unc.(rel)    Integration
Tgt  165.70                                 voasaic.e
Q1   163.70     83.90        20.0           voasaic.e
Q2   167.75     48.60        20.0           voasaic.e

Lvl ID   Conc (ng)  Response
1           50.000       59041
2          100.000      113686
3          200.000      237048
4          400.000      420546

Qualifier Peak Analysis ON
Curve Fit: Linear
-------------------------------------------------------------------------------

 8)  Chlorobenzene-d5                              (ISTD)

Ret. Time  15.66 min., Extract & Integrate from  15.16 to  16.16 min.

Signal        Rel Resp.   Pct. Unc.(rel)    Integration
Tgt  116.95                                 voasaic.e
Q1    82.00     65.00        20.0           voasaic.e
Q2   118.95     31.30        20.0           voasaic.e

Lvl ID   Conc (ng)  Response
1          250.000     1139095
2          250.000     1029566
3          250.000     1101464
4          250.000      966717

Qualifier Peak Analysis ON    ISTD conc:      250.000 ng

Method: VOASAIC.M          Wed Jul 11 13:27:11 2001          Page: 7
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Curve Fit: Linear

END OF DATA ANALYSIS PARAMETERS

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Test 5 -- Double Needle Sampler

Chain of Custody Form

July 9, 2001
Project Contact: Troy Thomson
(208)528-2145
(208)524-4750

7/11

7/12

Sample Matrix	Sample Identifier	no. of containers	Target VOC Analytes	TOC	Additional Comments
Aqueous pH~7	05-QC-21 (A&B)	2		X	
Aqueous pH~7	05-QC-22 (A&B)	2		X	
Aqueous pH~7	05-QC-23 (A&B)	2		X	
Aqueous pH~<1	05-FT-01 (A,B,C)	3	X		ACID CONCENTRATION = ~1.2 M HNO_3 100 µL,
Aqueous pH~<1	05-DN-11 (A,B,C)	3	X		
Aqueous pH~<1	05-FT-02 (A,B,C)	3	X		
Aqueous pH~<1	05-DN-12 (A,B,C)	3	X		
Aqueous pH~<1	05-FT-03 (A,B,C)	3	X		
Aqueous pH~<1	05-~~FT~~ DN for -13 (A,B,C)	3	X		
Aqueous pH~<1	05-FT-04 (A,B,C)	3	X		
Aqueous pH~<1	05-DN-14 (A,B,C)	3	X		
Aqueous pH~<1	05-FT-05 (A,B,C)	3	X		
Aqueous pH~<1	05-DN-15 (A,B,C)	3	X		

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Page 1 of 2

TARGET VOC Analytes: Carbon disulfide
1,1,1-Trichloroethane
Toluene

COPY

Test 5 -- Double Needle Sampler

Chain of Custody Form

July 9, 2001
Project Contact: Troy Thomson
(208)528-2145
(208)524-4750

	Sample Matrix	Sample Identifier	no. of containers	Target VOC Analytes	TOC	Additional Comments
7/12	Aqueous pH~ <1	05- FT-06 (A,B,C)	3	X		ACID CONCENTRATION = ~1.2 M HNO_3
7/13	Aqueous pH~ <1	05-DN-16 (A,B,C)	3	X		
	Aqueous pH~ <1	05-FT-07 (A,B,C)	3	X		
	Aqueous pH~ <1	05- DN-17 (A,B,C)	3	X		
	Aqueous pH~ <1	05- ~~DN~~ FT -08 (A,B,C)	3	X		
	Aqueous pH~ <1	05 - DN-18 (A,B,C)	3	X		
	Aqueous pH~ <1	05 - FT-09 (A,B,C)	3	X		
	Aqueous pH~ <1	05- DN-19 (A,B,C)	3	X		
	Aqueous pH~ <1	05- FT-10 (A,B,C)	3	X		
	Aqueous pH~ <1	05 - DN-20 (A,B,C	3	X		
	Aqueous pH~					
	Aqueous pH~					
	Aqueous pH~					

TOTAL CONTAINERS = 66

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Page 2 of 2

Target VOC Analytes = Carbon disulfide
1,1,1-Trichloroethane
Toluene

ATTACHMENT 4

Double Needle Sampler – Photos of Process Equipment

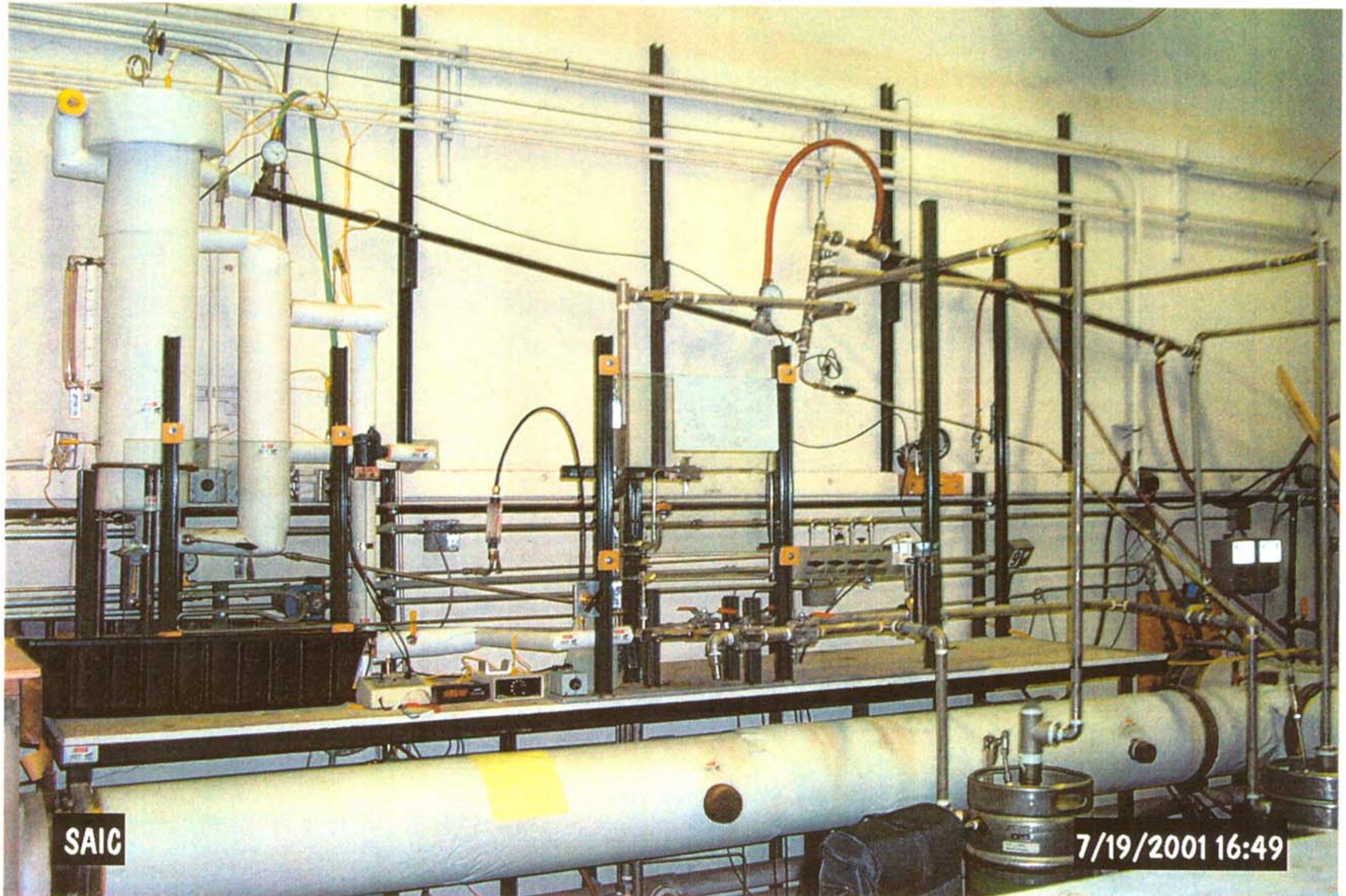

Figure D-1: Bench-scale evaporator system.

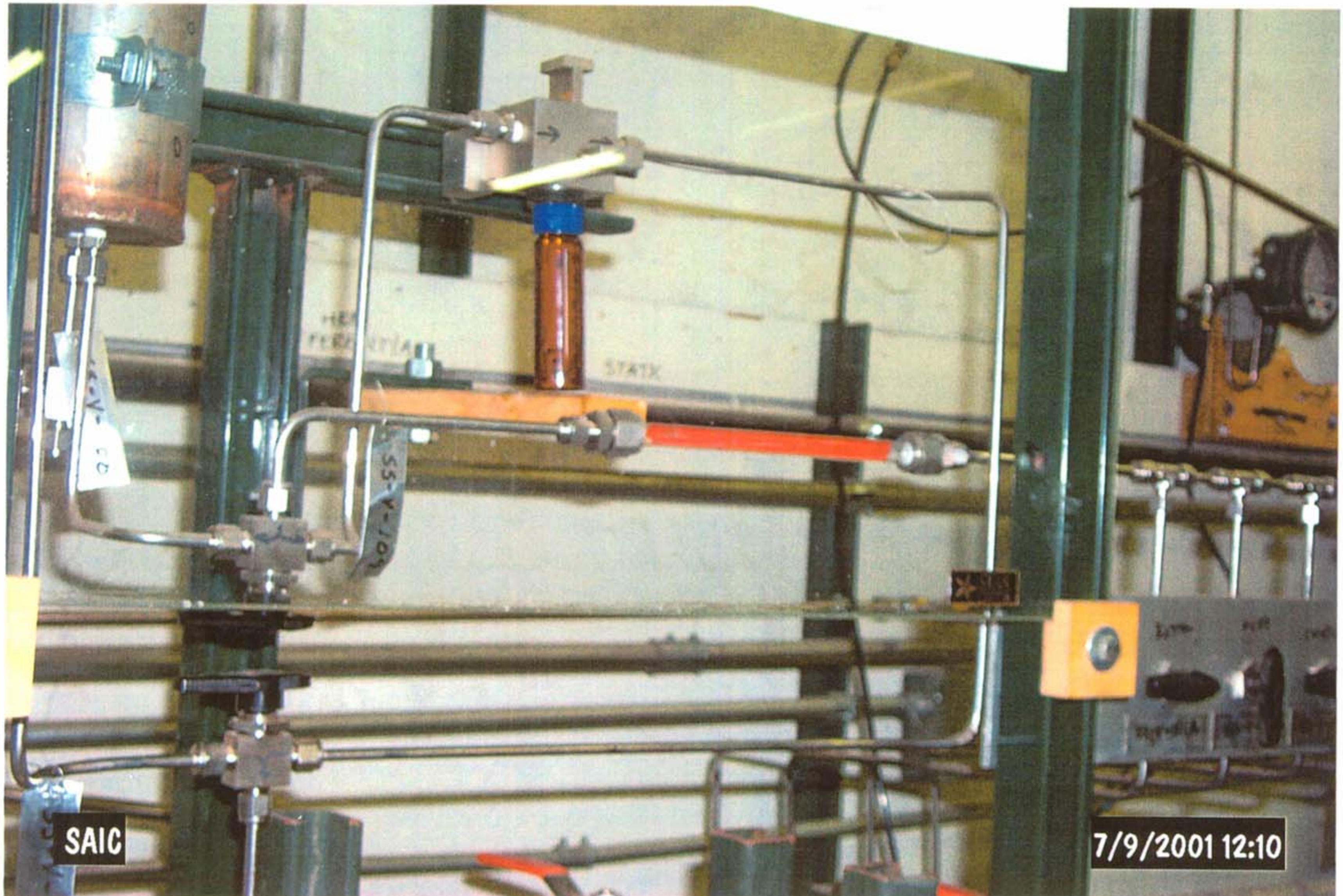

Figure D-2: Double Needle Sampler with 40-ml sample bottle.

Figure D-3: Double Needle Sampler Operations

Figure D-4: Double Needle Sample – Flow rate measurement.