DOE/ID-10891
June 2001
Revision 0

HWMA/RCRA Contingent Landfill Closure and Post-Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)

Voluntary Consent Order Action Plan VCO-5.8.d

DOE/ID-10891
Revision 0

HWMA/RCRA Contingent Landfill Closure and Post-Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)

Voluntary Consent Order Action Plan
VCO-5.8.d

Published June 2001

Idaho National Engineering and Environmental Laboratory
Voluntary Consent Order Program
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

ABSTRACT

Submittal of a Hazardous Waste Management Act/Resource Conservation and Recovery Act closure plan for the TRA-630 Catch Tank System at the Test Reactor Area, Idaho National Engineering and Environmental Laboratory, is a milestone under the Voluntary Consent Order Action Plan VCO-5.8.d. Per Idaho Administrative Procedures Act 58.01.05.009 [Title 40 of the Code of Federal Regulations 265.197(c)(1)], for a tank system that does not have secondary containment in accordance with 40 CFR 265.193(b) through (f), the United States Department of Energy must provide to the Idaho Department of Environmental Quality a plan for closing the unit as a tank system and a contingent plan for closing the unit as a landfill. In the event the unit must be closed as a landfill, post-closure care will be required as stipulated at 40 CFR 265.310 and 265.117 through 265.120. Per 40 CFR 265.197(c)(2), a contingent post-closure plan meeting the requirements of 40 CFR 265.118 must also be provided to the regional administrator. This document serves to fulfill the requirements for both contingent landfill closure and contingent landfill post-closure. The United States Department of Energy intends to close the TRA-630 Catch Tank System as a tank system. Consequently, this plan will be implemented only if achieving the tank system closure performance standard, as specified in the tank system closure plan, proves to be technically impracticable.

CONTENTS

ABSTRACT iii

ACRONYMS ix

1. INTRODUCTION 1-1

1.1 Regulatory Basis 1-1

1.2 Criteria For Implementation 1-1

2. TANK SYSTEM DESCRIPTION 2-1

2.1 Physical Configuration 2-1

2.2 Pump Vault (TRA-630) 2-1

2.3 Tank Vault 2-1

2.4 Tanks (TRA-730-1 through -4) 2-2

2.5 Piping 2-2

2.6 Tank System Operational History 2-2

3. FACILITY DESCRIPTION 3-1

4. TRA-630 CATCH TANK SYSTEM CURRENT AND MAXIMUM WASTE INVENTORIES 4-1

4.1 Waste Characteristics 4-1

4.2 Waste Sources 4-2

4.3 Heel Characterization 4-3

4.4 Landfill Characterization 4-3

5. LANDFILL CLOSURE OF THE TRA-630 CATCH TANK SYSTEM 5-1

5.1 System Boundaries 5-1

5.1.1 Tank System Boundaries 5-1

5.1.2 Landfill Boundaries 5-2

5.2 Landfill Closure Activities 5-2

5.2.1 Previous Tank System Closure Activities 5-2
5.2.2 Characterization Of Waste And/Or Waste Residues Left In Place 5-2
5.2.3 System Decontamination 5-3
5.2.4 System Isolation 5-3
5.2.5 Waste Residue Stabilization 5-5
5.2.6 Design And Installation Of Landfill Final Cover 5-6
5.2.7 Design And Installation Of Run-On And Runoff Controls 5-7

5.3 Post-Closure Permit 5-7

5.4 Landfill Closure Performance Standard 5-7

5.4.1 Landfill Closure Criteria 5-7
5.4.2 Regulatory Performance Standard 5-8

5.5 Waste Management 5-9

5.6 Closure Documentation 5-10

5.7 Time Allowed/Extension 5-10

5.7.1 Landfill Closure Schedule 5-10
5.7.2 Extension 5-11

5.8 Landfill Closure Plan Amendments 5-11

5.9 Certification of Landfill Closure 5-12

6. POST-CLOSURE CARE 6-1

6.1 Post-Closure Notices and Deed Restrictions 6-1

6.1.1 Survey Plat 6-1
6.1.2 Zoning Notification 6-1
6.1.3 Deed Restrictions 6-1

6.2 Post-Closure Monitoring 6-2

6.2.1 TRA Groundwater Description 6-2
6.2.2 TRA Groundwater Regulatory Background 6-2
6.2.3 Snake River Plain Aquifer 6-2
6.2.4 Perched Water 6-2
6.2.5 TRA-630 Post-Closure Care Monitoring 6-4

6.3 Post-Closure Maintenance 6-9

6.3.1 Final Cover Maintenance 6-10
6.3.2 Groundwater Monitoring Network Maintenance 6-10
6.3.3 Run-on and Runoff Control System Maintenance 6-10
6.3.4 Surveyed Benchmark Maintenance 6-10

6.4 DOCUMENT MANAGEMENT 6-11

6.4.1 Post-Closure Plan 6-11
6.4.2 Monitoring Records 6-11
6.4.3 Maintenance Records 6-11
6.4.4 Landfill Characterization Information 6-12

6.5 Contact Information 6-12

6.6 Post-Closure Plan Amendments 6-12

6.7 Certification Of Completion Of Post-Closure Care 6-12

7. COST AND LIABILITY REQUIREMENTS 7-1

8. REFERENCES 8-1

APPENDIX A—SCHEMATICS A-1

FIGURES

3-1. Map of the INEEL showing the Test Reactor Area 3-2

6-1. Outline for the groundwater quality assurance plan. 6-9

TABLES

4-1. Waste inventory and EPA characteristic hazardous waste numbers resulting from the 1999 characterization of the TRA-730 catch tanks. 4-1

5-1. Isolation points for TRA-630 CTS piping under the contingent landfill closure scenario. 5-4

5-2. Landfill closure schedule. 5-11

6-1. Groundwater monitoring parameters to be analyzed during the TRA-630 landfill post-closure care period. 6-6

ACRONYMS

ATR	Advanced Test Reactor
CTS	Catch Tank System
DOE	United States Department of Energy
DPWS	deep perched water system
EPA	United States Environmental Protection Agency
ETR	Engineering Test Reactor
FFA/CO	Federal Facility Agreement and Consent Order
HWMA	Hazardous Waste Management Act
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
INEEL	Idaho National Engineering and Environmental Laboratory
MTR	Materials Test Reactor
OU	operable unit
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SPWS	shallow perched water system
SRPA	Snake River Plan Aquifer
TRA	Test Reactor Area
VCO	Voluntary Consent Order

HWMA/RCRA Contingent Landfill Closure and Post-Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)

1. INTRODUCTION

1.1 Regulatory Basis

This Hazardous Waste Management Act (HWMA)/Resource Conservation and Recovery Act (RCRA) contingent landfill closure and post-closure plan has been prepared for the TRA-630 Catch Tank System (CTS), located at the Test Reactor Area (TRA), Idaho National Engineering and Environmental Laboratory (INEEL). This plan will be implemented in the event that tank system closure performance standard (DOE-ID 2001) for the TRA-630 CTS cannot be achieved. Submittal of a HWMA/RCRA closure plan for the TRA-630 CTS is an enforceable milestone of the Voluntary Consent Order (VCO) (IDEQ 2000a) between the State of Idaho and the United States Department of Energy (DOE) to correct potential HWMA/RCRA compliance issues at the INEEL. The TRA-630 CTS is not an interim status hazardous waste management unit included in the *HWMA/RCRA Part A Permit Application for the Idaho National Engineering and Environmental Laboratory* (DOE-ID 2000a); compliance with interim status requirements for the TRA-630 CTS is addressed in VCO Action Plan VCO-5.8.d, which requires that the INEEL shall:

> "Submit a draft closure plan and schedule for DEQ review and DOE revision for the TRA-730 tank system."[a]

The milestone deliverable, which has been written to fulfill the requirements of the Idaho Administrative Procedures Act (IDAPA) 58.01.05.009, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities" (40 CFR 265 Subparts F, G, J, and N), consists of the *HWMA/RCRA Tank System Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)* (DOE-ID 2001) and this HWMA/RCRA Contingent Landfill Closure and Post-Closure Plan for the Test Reactor Area Catch Tank System (TRA-630). Contingent landfill closure and post-closure plans are required per 40 CFR 265.197(c)(1) and (2) because portions of the tank system do not meet the secondary containment standards specified in 40 CFR 265 Subpart J. Every effort practicable will be made to close the TRA-630 CTS as a tank system under the tank system closure plan (DOE-ID 2001).

1.2 Criteria for Implementation

The DOE intends to close the unit as a tank system under 40 CFR 265 Subparts G and J. The *HWMA/RCRA Tank System Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)* (DOE-ID 2001) includes a discussion of all closure activities to be conducted to close the system. The tank system performance standards for tank systems at 40 CFR 265.111 and 265.197 are included in the tank system closure plan. This contingent landfill closure and post-closure plan has been prepared per 40 CFR 265.197(c)(1) and (2) to close the site as a landfill per the requirements of 40 CFR 265 Subparts F, G, and N and will be implemented only if it is technically impracticable to attain the tank system

---

[a] The naming convention at TRA is for tank systems to be designated by numbers beginning with a '6.' Thus, the TRA-730 tanks are included in the TRA-630 Catch Tank System. For purposes of this closure plan, and all referenced documents, the TRA naming convention will be observed.

closure performance standard. This plan describes the activities that will be performed if wastes and/or waste residues are to be left in place and the TRA-630 CTS site must be closed as a landfill. The TRA-630 CTS site will be considered closed as a landfill under HWMA/RCRA when the landfill closure performance standard (40 CFR 265.111 and 265.310) has been achieved according to the criteria set out in this plan. Landfill closure will be certified by an independent registered professional engineer and approved by the Idaho Department of Environmental Quality (IDEQ).

2. TANK SYSTEM DESCRIPTION

The CTS includes the TRA-630 pump vault, the TRA-730 tank vault, the TRA-730 tanks, and all ancillary pumps, valves, and piping associated with the system. The tanks (TRA-730-1 through -4) are contained in TRA-730, a concrete vault located beneath and immediately south of TRA-630, the catch tank pump vault (see Schematic P-VCO-5.8.d-TRA-630A; Appendix A). Radioactive wastewater at TRA was classified as either warm or hot depending upon radioactivity. Wastewater was considered hot if it exceeded 20,000 counts per minute per milliliter (NRTS 1971). The CTS was used to collect both warm and hot radioactive liquid waste and store it temporarily prior to transfer to final disposal in other TRA radioactive waste management systems. The downstream TRA radioactive waste management systems and associated piping are included in the VCO under a separate action plan (VCO Action Plan SITE-TANK-005).

The catch tank pump vault (TRA-630) consists of a concrete vault over which a weather enclosure has been erected. This vault houses the pumps and valves used to transfer waste into and out of the four catch tanks. The original CTS was constructed as part of the Materials Test Reactor (MTR) construction activities in 1951 and 1952. Between 1984 and 1986, the original direct-buried tanks were replaced with the TRA-730 tank vault and the TRA-730 tanks.

2.1 Physical Configuration

A discussion of the physical configuration of the CTS components is included below. A more detailed description of the CTS boundaries and components is contained in the *System Identification for the Test Reactor Area Catch Tank System (TRA-630)* (INEEL 2001a). The CTS consists of the pump vault, the tank vault, the tanks, and associated piping. Piping schematics for the CTS are provided in Appendix A.

2.2 Pump Vault (TRA-630)

The pump vault is located beneath a concrete slab west of the Reactor Services Building (TRA-635) and south of the Reactor Wing (TRA-604). The slab is 1 ft above ground level and on the north center side it has a 3- by 5-ft access hatch (and ladder) with a steel cover. There is a drain sump located in the south center side of the floor (Rolfe and Wills 1984) that drains by gravity to the tank overflow header located in the TRA-730 tank vault. The pump vault is unlined and does not meet the secondary containment criteria for tank systems (40 CFR 265 Subpart J).[b] The pump vault was constructed in 1951-1952 as part of the original CTS.

2.3 Tank Vault

Construction of the tank vault was completed in 1986. This vault is located immediately south of and beneath the TRA-630 pump vault. The original tanks were placed on a concrete pad and were direct buried; the new vault was constructed on this concrete pad. The remaining portions of the original tank system that were located south of TRA-630 were removed in 1984 (Briscoe 1984). Access to the vault is through a 4-ft diameter manhole that extends from the roof of the vault to the surface. There is a ladder associated with this manhole that leads from the surface to the vault floor (INEL 1992). A sump is included in the south central portion of the floor. This sump is equipped with a pump that discharges to the tank overflow header. A bully barn was placed over the vault entry manhole. This structure was

[b] Gregory, D.M., Letter to Koshuta, C.R., July 21, 1997, "Use of TRA-730 Catch Tank Imbedded Lines," CRK-48-97.

placed to limit access to the vault and to prevent rainwater and snowmelt from entering the vault through the manhole.

2.4 Tanks (TRA-730-1 through -4)

The four catch tanks (TRA-730-1, 98TRA00468; TRA-730-2, 98TRA00470; TRA-730-3, 98TRA00472; TRA-730-4, 98TRA00474) are located in the TRA-730 tank vault, south of the pump vault (TRA-630). The tanks are horizontal, cylindrical, and constructed of stainless steel with elliptical end bells. Tank TRA-730-1 is the northeast tank, TRA-730-2 is the southeast tank, TRA-730-3 is the southwest tank, and TRA-730-4 is the northwest tank. Tanks 1 and 2 are identical and are arranged to be mirror images of tanks 3 and 4, with the exception of the diameter of the inlet piping; tanks TRA-730-1 and -2 have 3-in. inlets, whereas tanks TRA-730-3 and -4 have 4-in. inlets. Access flanges are located on the top of the tanks near the outside ends. These access flanges house penetrations that allow the transfer of liquids, venting, and sparging. The overflow flanges are located on the inside elliptical end bell of the tanks (Briscoe 1984). Although nominal tank capacity is 1,500 gal, the position of the overflow flange limits the tank capacity to 1,246 gal (INEL 1992). In 1999, a 3-in. hole was cut into the end of each tank directly below the overflow flange. These holes were cut to facilitate the sampling of the tank contents. Following sampling activities, the holes were plugged.

2.5 Piping

The CTS is connected to a variety of TRA wastewater handling systems. There are a total of 12 separate inlet and outlet lines that may have transferred hazardous wastes into or out of the TRA-630 CTS. The CTS piping plan is shown in Schematic P-VCO-5.8.d-TRA-630A (see Appendix A). Significant portions of these 12 lines, with the exception of the 4-in. cross-tie, are direct buried and do not have secondary containment. The 4-in. cross-tie is entirely contained within the TRA-635 pipe pits. In addition to the inlet and outlet piping, there are nine lines penetrating the south wall of the pump vault that connect to the tank vault (TRA-730). These pipes include an inlet and an outlet for each tank and a sump drain line from the pump vault sump. The sump drain line discharges to the overflow header attached to the tanks.

Each tank is equipped with an inlet and an outlet line that connect the tanks to the pump vault (TRA-630). Each tank is equipped with an instrument air and a plant air line that are connected to a level indicator and an air agitator, respectively. Each tank is equipped with a vent line and an overflow. The tank overflows are connected to a common overflow header that is also attached to the drain line from the pump vault sump and the discharge line from the tank vault sump pump.

The buried piping connecting the tank vault and the pump vault is direct buried and does not have secondary containment. The portions of the piping that are embedded in the concrete of both the tank and pump vaults do not have secondary containment.

2.6 Tank System Operational History

The CTS received discharges of liquid waste from a variety of sources since 1952, when the system was put into service. The original tanks 1 and 2 collected waste from the reactor drain tank, located in the MTR Reactor Building (TRA-603). The original tanks 3 and 4 collected waste from the Hot Cell (TRA-632), the Reactor Services Building (TRA-635), the Radiochemistry Laboratories (TRA-604 and -661), and the vent scrubber, located in TRA-604. The laboratories in the Alpha Wing (TRA-661) contributed warm waste to the system beginning in 1962. In 1981, the original tanks 1 and 2 were reconfigured to receive waste generated at the hot cells via line 4” HDC-632. All other sources were connected to the original tanks 3 and 4. The reactor drain tank discharge line (2” HDA-603-A) was

redirected from the tank inlets to a CTS discharge line (4" WDA-630-B), bypassing the tanks in 1981. The vent scrubber drain line (4" HDB-604-A) was disconnected in the 1970s. The radiochemistry laboratory drain line (4" HDC-604-B) was disconnected from the CTS in 1991. The in-cell hot cell drains connected to the hot cell drain line (4" HDC-632) were grouted in 1999. Between 1984 and 1986, the original direct-buried tanks were replaced by the TRA-730 tank vault and the TRA-730 tanks.

Discharge from the catch tanks was through one of three lines. If the tank contents were classified as hot waste, the valves were lined up to discharge the tank contents through the hot waste effluent line (3" HDA-630) to the TRA-613 Hot Waste Storage Tank System (VCO System TRA-004; SITE-TANK-005 Action Plan). This hot waste storage tank system stored the waste until disposal. If the waste was classified as warm waste, the valves were lined up to discharge to either the retention basin inlet header or to the retention basin outlet sump (lines 4" WDA-630-A and 4" WDA-630-B, respectively) (VCO System TRA-011; SITE-TANK-005 Action Plan). In 1984 through 1986, TRA waste system upgrades allowed the CTS to discharge to the newly created MTR sump tank. This warm waste was treated in the warm waste treatment facility that was installed in the Process Water Building (TRA-605). Treated waste was discharged to the leaching pond (TRA-758) until 1993. Subsequent to 1993, treated waste was discharged to the evaporation pond (TRA-715) via the retention basin inlet header (TRA-712). The remainder of the retention basin and the lines connecting the CTS to the retention basin inlet header were removed from service in 1993.

The CTS last received waste in 1997 and has been administratively taken out of service; however, piping still remains attached to the CTS. Administrative inactivation of a system means that the system is still physically connected, but is not used.

3. FACILITY DESCRIPTION

The INEEL encompasses approximately 890 square miles (569,135 acres) on the northern edge of the Eastern Snake River Plain in southeastern Idaho. Formerly named the National Reactor Testing Station, the INEEL was established as a site where the DOE could safely build, test, and operate various types of nuclear reactor facilities. Strict security is maintained for all INEEL facilities in accordance with the INEEL's nuclear and defense missions. The INEEL topography and hydrology are described extensively in the *Comprehensive Remedial Investigation/Feasibility Study for the Test Reactor Area Operable Unit 2-13 at the Idaho National Engineering and Environmental Laboratory* (DOE-ID 1997a).

The TRA was established in the 1950s for studying the effects of radiation on materials, nuclear fuels, and equipment. Three major reactors have been built at TRA, including the MTR, the Engineering Test Reactor (ETR), and the Advanced Test Reactor (ATR). The TRA is located in the south central portion of the INEEL (see Figure 3-1).

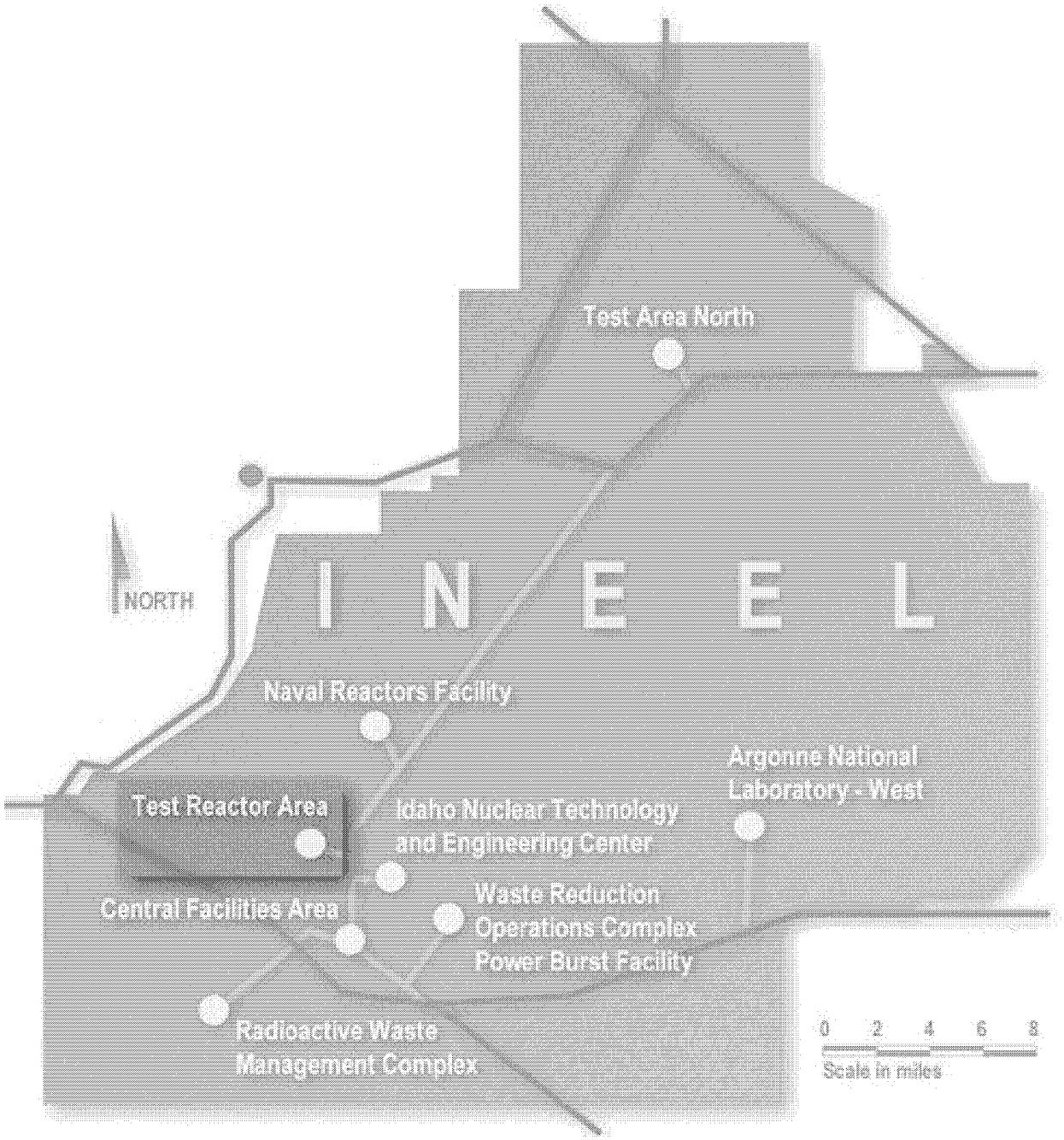


Figure 3-1. Map of the INEEL showing the Test Reactor Area.

4. TRA-630 CATCH TANK SYSTEM CURRENT AND MAXIMUM WASTE INVENTORIES

The maximum waste inventory of the TRA-730 catch tanks is approximately 5,000 gal. Each tank has a nominal capacity of 1,500 gal. However, due to the location of the tank overflow piping, the operational capacity is approximately 1,250 gal. The tanks currently contain approximately 3,100 gal of waste. The current volume of waste contained in each of the four tanks is as follows:

- Tank TRA-730-1 766 gal
- Tank TRA-730-2 919 gal
- Tank TRA-730-3 422 gal
- Tank TRA-730-4 990 gal.

4.1 Waste Characteristics

The TRA-730 catch tanks were sampled in 1996 and 1999 to complete a hazardous waste determination. The results of the hazardous waste determination for EPA characteristic waste numbers are presented in Table 4-1.

Table 4-1. Waste inventory and EPA characteristic hazardous waste numbers resulting from the 1999 characterization of the TRA-730 catch tanks.

	Tank Number			
	TRA-730-1	TRA-730-2	TRA-730-3	TRA-730-4
Current Waste Inventory (gal)	766	919	422	990
EPA Characteristic Hazardous Waste Numbers – By Phase				
Liquid	D008 (Lead)[a]	D008 (Lead)	D009 (Mercury)[a]	D006 (Cadmium) D009 (Mercury)[a]
Flocculent Solid	Not Sampled[b]	D007 (Chromium) D008 (Lead)	D007 (Chromium) D008 (Lead) D009 (Mercury)	Phase not present
Hard Solid	Not Sampled	Not Sampled	Not Sampled	Phase not present

a. EPA Hazardous waste numbers resulting from the 1996 sampling of the tanks.

b. Tanks TRA-730-1 and -2 were used together to manage waste from the Hot Cell Building (TRA-732). Although the flocculent solids in tank TRA-730-1 were not sampled, these solids are presumed to be similar to those in tank TRA-730-2.

4.2 Waste Sources

Based on a historical disposal of 33 L of liquid waste at the TRA radiochemistry laboratories resulting from analysis of samples from the Idaho Nuclear Technology and Engineering Center (INTEC) and additional activities at TRA, a variety of EPA listed hazardous waste numbers were assigned to the TRA radioactive liquid waste system, which includes the TRA-630 CTS. The EPA listed hazardous waste numbers, resulting from these activities that were historically associated with the TRA-630 CTS, are as follows (INEEL 2000b).

- F001 – Carbon Tetrachloride; 1,1,1-Trichloroethane; and Trichloroethene
- F002 – Carbon Tetrachloride; 1,1,1-Trichloroethane; Tetrachloroethane; and Trichloroethene
- F005 – Benzene; Carbon Disulfide; 2-Butanone; Pyradine; and Toluene
- U134 – Hydrogen Fluoride.

In a consent order to resolve a May 26, 1999, notice of violation, the issue of the alleged disposal of listed hazardous waste at TRA was resolved (IDEQ 2000b). The consent order states, in item 5.33, that:

> "DOE has resolved the alleged violation described in Section 4.3 of this Consent Order by submitting to the Department documentation concluding that any hazardous constituents in the Hot and Warm Waste Tank System at TRA as a result of the disposal of 33 liters of listed waste, if present at all, are present at less than $1x10^{-8}$ ppm (one hundredth part per trillion). The documentation represents that if analyses were to be conducted, the listed constituents contributed by the 33 liters would not be detectable and do not present a risk to human health and the environment. Therefore, additional sampling would not provide any useful data concerning the disposal of the 33 liters of listed waste into this tank system. Based upon these representations, no additional sampling of this tank system to address this disposal of listed waste constituents is required. Additionally, no sampling will be necessary to delist this listed waste disposed of in this tank system. The waste generated from this tank system will not carry the EPA hazardous waste numbers for listed waste that relate to the 33 liters that were discharged to this tank system prior to 1997. All interim measures to deal with affected waste streams that were initiated pending resolution of the listed waste issue shall cease. This resolution only addresses removal of these listed hazardous waste numbers from this tank system. DOE is completing the determination for characteristic levels of hazardous waste in this tank system outside the terms of this Consent Order."

The EPA listed hazardous waste numbers described above were removed from the TRA radioactive liquid waste system based upon the representation by DOE that, if these tank systems were sampled, the listed constituents would not be detectable. Comparing the list of analytes detected during the 1999 sampling and the constituents, for which the system was listed, reveals that this representation is accurate. With the exception of 2-butanone, none of the listed constituents were detected.

The detection of 2-butanone does not indicate the presence of a listed constituent. The EPA hazardous waste number for 2-butanone (F005) was applied to the TRA radioactive liquid waste system after it was determined that 2-butanone was used for solvent purposes and disposed of through multiple laboratory drains to theTRA-730 catch tanks prior to 1985. The total volume of spent 2-butanone discharged to the TRA-730 catch tanks was 1 L. Based on the TRA listed waste survey and administrative controls that have been implemented, including, but not limited to the TRA Waste Management Authority, no listed 2-butanone has been discharged to TRA drains since prior to 1985. The TRA-730 catch tanks were replaced in 1986; therefore, the 2-butanone detected in the TRA-730 tanks is not the same 2-butanone that was discharged to the tanks prior to 1985. Consequently, no EPA listed hazardous waste numbers are applicable to the contents of the TRA-630 CTS.

4.3 Heel Characterization

As noted in Table 4-1, the flocculent solids in tank TRA-730-1 and the hard solids in tanks TRA-730-1, -2, and -3 have not, to date, been characterized. These phases will be sampled and characterized during closure of the system. A fluidic pulse tank mixing and waste removal system will be used to empty and characterize the contents of the tanks. A detailed description of the system is provided in subsequent sections of this closure plan. This system will be used to remove the liquid phase from each tank. Subsequent to the removal of the liquids, a known quantity of water (expected to be less than 150 gal) will be added to each of the tanks in which a heel is present. This water will be used to mobilize and completely mix the tank heel. The mobilized heel will then be sampled and characterized as outlined in the *Abbreviated Sampling and Analysis Plan for TRA-730 Catch Tanks – Phase II Solids* (INEEL 2000a). Hazardous waste determinations will be completed for each the uncharacterized portion of the waste based upon the results of this sampling. At a minimum, the EPA hazardous waste numbers associated with the liquid phase in each tank will apply to the solid phase. Additional EPA hazardous waste numbers will be assigned as appropriate.

4.4 Landfill Characterization

The DOE is required under 40 CFR 265.309 to document, on a map, the exact location and dimensions of the landfill with respect to permanently surveyed benchmarks and the approximate location of each hazardous waste type within the landfill.

The location and dimensions of the landfill can be estimated for purposes of this contingent landfill closure plan. Two scenarios would necessitate closure of the site as a landfill:

1. The integrity of the system has been verified; however, decontamination activities are unsuccessful. Final rinsate analysis would be compared to action levels set out in the tank system closure plan to evaluate compliance with the tank system performance standard. Should it prove impracticable to decontaminate to meet action levels, landfill closure would be required.

2. The integrity of a system component cannot be verified and it would be impracticable to remove the component and/or any soil contamination to the extent necessary to protect human health and the environment. Leaving the component and/or soil contamination in place at concentrations posing a threat to human health and the environment would require closure as a landfill.

The aerial extent of the landfill is easily defined under the first scenario. If only tank system components comprise the landfill, the landfill includes all tank system components. Under the second scenario, it is possible that soil contamination has extended beyond the aerial extent of the system components. For purposes of this contingent landfill closure plan, any soil contamination will be assumed to be limited to the area in which the tank system components are located. Should soil contamination from

a TRA-630 CTS release pose a threat to human health and the environment from HWMA/RCRA-regulated constituents be detected outside the proposed landfill boundaries, the boundaries will be extended to encompass this soil contamination. A site plan drawing showing the expected aerial extent of the landfill is provided in Schematic P-VCO-5.8.d-TRA-630N in Appendix A. Piping integral to the building structures of the buildings surrounding the TRA-630 CTS will be included in the landfill. The buildings in which these lines are contained will serve as interim covers for the piping until such time that the buildings and the associated lines are removed.

The location of hazardous waste within the landfill and the EPA hazardous waste numbers associated with the waste are currently unknown. The waste currently contained within the TRA-630 CTS carries the EPA hazardous waste numbers for cadmium (D006), chromium (D007), lead (D008), and mercury (D009). It is expected that these hazardous waste numbers, at a minimum, will apply to any waste left in place in the landfill. As noted in Section 4.2, the flocculent solid phase of tank TRA-730-1 and the hard solid phase of tanks TRA-730-1, -2, and -3 have not been characterized. This waste will be characterized during tank system closure activities. The EPA hazardous waste numbers will be applied as appropriate based upon the results of this characterization effort. The location of hazardous waste to be left in place within the landfill will be determined during tank system closure activities. The nature and extent of contamination within the landfill will be determined during closure activities of the tank system as a landfill.

5. LANDFILL CLOSURE OF THE TRA-630 CATCH TANK SYSTEM

As previously mentioned, this contingent landfill closure and post-closure plan will be implemented if the TRA-630 CTS cannot be closed as a tank system.

5.1 System Boundaries

5.1.1 Tank System Boundaries

For purposes of this contingent landfill closure plan, any soil contamination will be assumed to be limited to the area in which the tank system components are located. The boundaries of the landfill will bound the components included in the TRA-630 CTS as defined in the tank system closure plan (DOE-ID 2001). Should soil contamination be detected outside the proposed landfill boundaries, the boundaries will be extended to encompass all soil contamination from the TRA-630 CTS that poses a threat to human health and the environment. The TRA-630 CTS (VCO Action Plan VCO-5.8.d) (see Schematics P-VCO-5.8.d-TRA-630A through -630G; Appendix A) includes the tanks (TRA-730-1 through -4; 98TRA00468, 98TRA00470, 98TRA00472, and 98TRA00474) and the tank vault sump (98TRA00467). The pump vault (TRA-630), the tank vault (TRA-730), the pump vault sump, the pumps (630-1 and -2), and all associated valves are included in the TRA-630 CTS as ancillary equipment. Steam, water, and air lines penetrating the vaults are not part of the system as these lines have never managed hazardous waste. All intervault piping is included as part of the system. Inlet and outlet boundaries to define breakpoints between the CTS and other VCO systems included on VCO Action Plan SITE-TANK-005 have been established. These boundaries were established where access to pipes was available to allow decontamination of both the CTS and the remaining VCO systems. These boundaries are shown in Schematics P-VCO-5.8.d-TRA-630A through -630G of Appendix A and are described in more detail in the *System Identification for the Test Reactor Area Catch Tank System* (*TRA-630)* (INEEL 2001a).

Although the catch tanks have been removed from service, a portion of the piping associated with this system has remained active and must be isolated during landfill closure activities. The following CTS lines are currently used to transfer radioactive waste from the radiochemistry laboratories to the MTR warm sump tank (VCO Action Plan SITE-TANK-005 System TRA-007) and will remain in service:

- The radiochemistry lab drain lines and headers that discharge to the reactor drain tank (TRA-603-M-314; VCO Action Plan SITE-TANK-005 System TRA-007)
- Line 2” HDA-603-A
- The section of line 4” WDA-630-B between the TRA-630 pump vault and the west pipe pit in TRA-635
- The 4-in. cross-tie between line 4” WDA-630-B and line 10” WDC-603 that is located in the TRA-635 east pipe pit
- Line 10” WDC-603 from the 4-in. cross-tie to line 4” WDC-603
- Line 4” WDC-603 from the connection with 10” WDC-603 to the MTR warm sump tank.

The active portion of the system is shown with an alternative line-type on Schematics P-VCO-5.8.d-630A, -630B, -630D, -630E, and -630G, which are provided in Appendix A of this closure plan.

5.1.2 Landfill Boundaries

The boundaries of the tank system are provided above. As previously noted, for purposes of this contingent landfill closure plan, soil contamination, if present, will be assumed to be limited to the area where the tank system components are located. Should soil contamination that was the result of a TRA-630 CTS release pose a threat to human health and the environment from HWMA/RCRA-regulated constituents outside the landfill boundaries, the boundaries of the landfill will be extended to encompass this contamination. The boundaries of the landfill have been developed to bound all components of the tank system defined above.

The entire courtyard formed by the Reactor Services Building (TRA-635), the MTR Building (TRA-603), the MTR Building Wing (TRA-604), and the Radiochemistry Laboratories (TRA-604 and -661) will be included in the landfill. The landfill will extend to the south to the Hot Cell Building (TRA-632). The eastern boundary of the landfill along TRA-632 will be located at E289,980 and the western boundary along TRA-632 will be located at E289,030. The longitude and latitude of each landfill boundary is provided on Schematic P-VCO-5.8.d-TRA-630N. Piping is included in the system that is located either within or beneath buildings TRA-635, TRA-603, TRA-604, TRA-661, and TRA-632. This piping is included in the landfill. The buildings will serve as interim covers for the piping until such time that the building and piping will be removed.

5.2 Landfill Closure Activities

If, during closure, a release is discovered that poses an imminent threat to human health and the environment, the DOE will immediately take actions, including the removal or decontamination of contaminated equipment or soils to the extent technically and economically practicable, to eliminate this threat. Under normal circumstances, if it is determined that the TRA-630 CTS will be closed as a landfill, the DOE will notify IDEQ at least 45 days prior to the implementing this contingent landfill closure and post-closure plan and initiating landfill closure activities. The activities required to close the site as a landfill, as required at 40 CFR 265.112(b), are described below.

5.2.1 Previous Tank System Closure Activities

Closure will be performed activities as outlined in the *HWMA/RCRA Tank System Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)* (DOE-ID 2001). If it is determined that the TRA-630 CTS must be closed as a landfill, DOE will notify IDEQ 45 days prior to initiation of landfill closure activities as stipulated at 40 CFR 265.112(d). All previous closure activities completed under the tank system closure will be documented as part of the landfill closure. The status of the system at the initiation of landfill closure activities is currently unknown, as this status will depend upon the tank system closure activities conducted until the time landfill closure is deemed appropriate.

5.2.2 Characterization of Waste and/or Waste Residues Left in Place

Waste and/or waste residues to be left in place in the landfill will be characterized as required at 40 CFR 265.309. Waste to be left in place may be present either in tank system components or in contaminated soil. Soil sampling will be conducted as necessary to characterize the nature and extent of soil contamination. Soil samples will be obtained and analyzed in accordance with the *Field Sampling Plan for the HWMA/RCRA Closure Certification of the Test Reactor Area Catch Tank System (TRA-630)* (INEEL 2001b) and the *Quality Assurance Project Plan for the Test Reactor Area Catch Tank System (TRA-630)* (INEEL 2001c).

During tank system closure activities, waste inside tank system components will be characterized. Rinsate sampling data generated during tank system closure activities will provide characterization data for the waste residuals contained within the system. During decontamination of the tank system under the *HWMA/RCRA Tank System Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)* (DOE-ID 2001), rinsate samples will be collected to demonstrate compliance with the contaminant of concern-specific action levels. If it is determined that the TRA-630 CTS will be closed as a landfill, the rinsate sampling results will be used, where applicable, to document the nature and extent of waste and/or waste residues left in place. In the event that the integrity of some system components was not verified during closure and, hence, not rinsed, soils will be sampled to determine the nature and extent of contamination.

5.2.3 System Decontamination

Should closure as a landfill become necessary, no additional decontamination efforts will be conducted beyond those already performed according to the *HWMA/RCRA Tank System Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)* (DOE-ID 2001). Residuals will be left in place and measures taken to ensure compliance with the performance standard at 40 CFR 265.111 and 265.310.

5.2.4 System Isolation

To minimize the need for further maintenance and control the post-closure escape of hazardous waste and/or waste residues, as stipulated at 40 CFR 265.111(a) and (b), respectively, the TRA-630 CTS system will be completely isolated from the other TRA wastewater handling systems before closure as a landfill. Isolation of the system will be performed as noted in Table 5-1 and shown on Schematic P-VCO-5.8.d-TRA-630N. In addition to the inactive waste lines that will be isolated, the following TRA-630 CTS lines are currently used to transfer radioactive wastewater from the radiochemistry laboratories located in TRA-604 and -661 to the MTR sump tank (VCO System TRA-007; SITE-TANK-005 VCO Action Plan):

- The radiochemistry lab drain lines and headers that discharge to the reactor drain tank (TRA-603-M-314; VCO Action Plan SITE-TANK-005 System TRA-007)
- Line 2" HDA-603-A
- The section of line 4" WDA-630-B between the TRA-630 pump vault and the west pipe pit in TRA-635
- The 4-in. cross-tie between line 4" WDA-630-B and line 10" WDC-603 that is located in the TRA-635 east pipe pit
- Line 10" WDC-603 from the 4-in. cross-tie to line 4" WDC-603
- Line 4" WDC-603 from the connection with 10" WDC-603 to the MTR warm sump tank.

The active portion of the system is shown with an alternative line-type on Schematics P-VCO-5.8.d-630A, -630B, -630D, -630E, and -630G, which are provided in Appendix A of this contingent plan. If this contingent plan is implemented, this active waste stream will be diverted as follows to isolate the TRA-630 CTS from the remaining TRA wastewater handling systems:

- The radiochemistry lab drain lines and headers will be flushed and decontaminated, but will continue to discharge to the reactor drain tank (TRA-603-M-314; VCO System TRA-007, SITETANK-005 VCO Action Plan). These lines will not be considered part of the landfill. These

lines will be successfully decontaminated or, if decontamination proves ineffective, these lines will be replaced. These lines are fully accessible in the basements of TRA-604 and -661.

- A new line will be installed from the reactor drain tank to the reactor drain tank vault drain allowing liquids discharged of liquids from the radiochemistry laboratories to bypass the TRA-630 CTS and discharge to the MTR warm sump tank (98TRA00378; VCO System TRA-007, SITE-TANK-005 VCO Action Plan) via the TRA-603 reactor building sump (98TRA00379; VCO System TRA-007, SITE-TANK-005 VCO Action Plan).

- The 2-in. line (2" HDA-603-A) from the reactor drain tank to the TRA-630 pump vault will be disconnected at the reactor drain tank pump discharge, as identified in Table 5-1 and Schematic P-VCO-5.8.d-TRA-630N.

- The 10-in. reactor building sump discharge line (10" WDC-603) will be disconnected where connected to line 4" WDC-603 as identified in Table 5-1 and Schematic P-VCO-5.8.d-TRA-630N.

Table 5-1. Isolation points for TRA-630 CTS piping under the contingent landfill closure scenario.

Boundary Corresponding to Schematic P-VCO-5.8.d-TRA-630A	Identification	Isolation Point
1)	2" HDA-603	Disconnect and cap at the reactor drain tank pump discharge in the reactor drain tank vault in TRA-603
2)[a]	10" WDC-603	North end: Disconnect and cap at junction with 4" WDC-603 in north pipe pit in TRA-635 South end: Disconnect and cap at longitude E289,980 south of TRA-635
3)	4" HDC-635	Individual drain caps for all drains shown on Schematic P-VCO-5.8.d-630E
4)	4-in. cross-tie	Disconnect and cap in the east pipe pit in TRA-635
5)	4" WDA-630-B	Disconnect and cap at longitude E289,980, south of TRA-635
6)[a]	4" WDA-630-A	Disconnect and cap at longitude E289,980, south of TRA-635
7)[a]	3" HDA-630	Disconnect and cap at longitude E289,980, south of TRA-635
8)	4" HDC-632	Individual drain caps for all drains shown on Schematic P-VCO-5.8.d-630F
9)[a]	4" WDC-641	Disconnect and cap at longitude E288,996, west of TRA-661
10)	4" HDB-604-A	Line is cut and capped in the basement of TRA-604, no further isolation activities planned
11)	4" HDC-604-B	Line is cut and capped in the basement of TRA-604, no further isolation activities planned
NA[a]	2" HDA-661	East end: Disconnect and cap at longitude E289,980, south of TRA-635 West end: Individual drain caps for all drains in TRA-661

a. Lines 10" WDC-603, 4" WDA-630-A, 3" HDA-630, 4" WDC-641, and 2" HDA-661 are not currently defined as part of the TRA-630 CTS. These lines are currently included in VCO Action Plan SITE-TANK-005 Systems TRA-007, -011, -004, -009, and -004, respectively. Because these lines transect the site of the proposed landfill, they will be isolated as noted and included as part of the landfill.

In addition to the inactive and active waste lines associated with the TRA-630 CTS other piping and conduit buried in the area of the landfill, will be isolated and rerouted as necessary before closing the tank system as a landfill. These lines, which will be identified and evaluated as part of the landfill cap design, may include air lines, steam lines, electrical lines, alarm and communication lines, raw water lines, sanitary sewer lines, and firewater lines.

5.2.5 Waste Residue Stabilization

Waste and/or waste residues remaining in the tank system at the time the DOE makes the decision to close the tank system as a landfill will be left in place and measures taken per 40 CFR 265.111 and 265.310 to ensure protection of human health and the environment. The tanks and ancillary equipment will be filled with grout to stabilize hazardous waste and/or waste residues remaining in the TRA-630 CTS equipment and to minimize the potential for post-closure escape of hazardous waste and hazardous constituents. This action will constitute immediate "disposal" of the waste in hazardous waste landfill.

Components to be grouted are as follows:

- Tanks
  - TRA-730-1
  - TRA-730-2
  - TRA-730-3
  - TRA-730-4
- Piping
  - 2" HDA-603 from the isolation point in the reactor drain tank vault in TRA-603 to the TRA-630 CTS pump vault
  - 10" WDC-603 from the isolation point in the TRA-635 north pipe pit to the isolation point south of TRA-635
  - 4" HDC-635 from the individual drain assemblies to the TRA-630 CTS pump vault
  - The 4-in. cross-tie from the isolation point in the east pipe pit in TRA-635 to both lines 10" WDC-603 and 4" WDA-630-B
  - 4" WDA-630-B from the isolation point south of TRA-635 to the existing cut and cap in the TRA-635 west pipe pit
  - 4" WDA-630-B from the TRA-630 CTS pump vault to the existing cut and cap in the TRA-635 west pipe pit
  - 4" WDA-630-A from the isolation point south of TRA-635 to the existing cut and cap in the TRA-635 west pipe pit
  - 4" WDA-630-A from the TRA-630 CTS pump vault to the existing cut and cap in the TRA-635 west pipe pit
  - 3" HDA-630 from the isolation point south of TRA-635 to the TRA-630 CTS pump vault
  - 4" HDC-632 from the individual drain assemblies in TRA-632 to the TRA-630 CTS pump vault

- 4” WDC-641 from the isolation point west of TRA-661 to the connection with line 4” WDA-630-A

- 4” HDB-604-A from the existing cap in the basement of TRA-604 to the connection with line 4” HDC-632

- 4” HDC-604-B from the existing cap in the basement of TRA-604 to the TRA-630 CTS pump vault

- 3” HDA-661 from the individual drain assemblies in TRA-661 to the isolation point south of TRA-635

- Vaults

  - Pump vault (TRA-630)

  - Tank vault (TRA-730).

5.2.6 Design and Installation of Landfill Final Cover

As part of the landfill closure activities, a cap will be installed to prevent water from infiltrating the landfill area. The DOE will begin the design of the final cover for the TRA-630 CTS when the decision is made to close the TRA-630 CTS as a landfill. Complicating factors in the design of a landfill cover for the TRA-630 CTS that will be addressed as part of the design include:

- Limited area of the courtyard in which the TRA-630 CTS is located

- Nonsystematic lines (e.g., utility lines, fire water lines, etc.) located in the courtyard

- Future decontamination and decommissioning of structures located next to the cap and the impact such activities may have on the cap.

The cap will serve as a final cover for waste and waste residues contained within the tank system. In accordance with 40 CFR.265.310(a), the final cover will be designed and constructed to:

- Provide long-term minimization of migration of liquids through the closed landfill

- Function with minimum maintenance

- Promote drainage and minimize erosion or abrasion of the cover

- Accommodate settling and subsidence so that the cover's integrity is maintained

- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

Schematic P-VCO-5.8.d-TRA-630N, included in Appendix A, is a plot plan of the courtyard and the preliminary footprint of the cap, should the TRA-630 CTS be closed as a landfill. The aerial extent of the landfill was developed based upon the assumption that any soil contamination associated with the system is limited to the area in which the tank system components are located. In the event soil contamination resulting from a release from the TRA-630 CTS outside the currently defined landfill

boundaries that poses a threat to human health and the environment from HWMA/RCRA-regulated constituents, the landfill boundary will be extended to encompass the contamination.

5.2.7 Design and Installation of Run-On and Runoff Controls

In accordance with 40 CFR 265.301(f), run-on and runoff controls will be designed and constructed as part of the final cover of the landfill. The run-on control system will prevent flow onto the active portion of the landfill during peak discharge from at least a 25-year storm. Run-on and runoff controls will be designed as part of the design of the final landfill cover and will be installed as part of the cover.

The TRA cold wastewater management system currently consists of a piping drainage network that collects industrial, service wastewater from a variety of sources and buildings throughout TRA. Cold wastewater drains from the collection headers to the cold waste disposal pond (TRA-702) via a cold waste sampling station (TRA-764). It is proposed that this cold wastewater management system will be used to direct runoff away from the landfill area.

The run-on controls will consist of berms at the perimeter of the landfill that will prevent water from running onto the landfill cover surface. Gutters and drainage systems will be constructed on the roofs of the surrounding buildings, TRA-603, -604, -635, and -661. This gutter system will direct rainwater and snowmelt from the roofs of the buildings away from the landfill area and into the TRA cold (nonradioactive) wastewater management system. For runoff control, the final cover of the landfill will be equipped with a drain system that will be designed to accommodate water flow from a 25-year storm event. The final cover drain system will discharge to cold waste piping located in the vicinity of the landfill.

5.3 Post-Closure Permit

Post-closure care of the landfill will be performed under a post-closure permit. In accordance with the requirements of 40 CFR 265.197(c)(2), a post-closure plan has been prepared and included as part of this document (Section 6). A post-closure permit application will be prepared and submitted to IDEQ within 180 days of the date DOE determines that the TRA-630 CTS must be closed as a landfill. The post-closure permit application will include all of the provisions outlined in the post-closure plan included in Section 6 of this document, along with the applicable elements of 40 CFR 270. Approval of the post-closure permit will be a criterion for certification of closure of the TRA-630 CTS as a landfill.

5.4 Landfill Closure Performance Standard

5.4.1 Landfill Closure Criteria

The following performance standard criteria are the standards for determining the success of the landfill closure. The performance standard criteria are quantifiable goals that must be met to demonstrate that the landfill closure standard at 40 CFR 265.111 and 265.310 has been satisfied. The TRA-630 CTS will be considered closed as a landfill when the following performance standards criteria have been met:

- Soil and TRA-630 CTS rinsate sampling has been performed to assess the nature and extent of contamination left in place.
- All components of the system have been isolated as specified in Table 5.1.
- All system components have been filled with grout as specified in Section 5.2.5.

- A cap has been constructed, including run-on and runoff controls, that will function with a minimum of maintenance, promote drainage and minimize erosion or abrasion, accommodate settling and subsidence, and have a permeability less than the surrounding soil.

- A post-closure permit has been obtained for the landfill.

5.4.2 Regulatory Performance Standard

Attainment of the preceding closure performance standard criteria will serve to meet the regulatory requirements for closure performance. The regulatory requirements are listed below, together with a discussion of how the preceding criteria serve to meet the standard.

Standard 1. The owner or operator must close the facility in a manner that minimizes the need for further maintenance [40 CFR 265.111(a)].

- System isolation and grouting of the TRA-630 CTS will prevent future accumulation of hazardous wastes.

- Sampling of the TRA-630 CTS and/or soils before final closure as a landfill will document the nature and extent of wastes and/or waste residues left in place.

- The tanks and ancillary equipment will be filled with grout to stabilize hazardous waste and waste residues remaining in the TRA-630 CTS equipment.

- A final cover will be constructed to prevent the migration of hazardous wastes and/or waste residues from the landfill.

- Post-closure care will be implemented to ensure continued integrity of the cap.

Standard 2. The owner or operator must close the facility in a manner that controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere [40 CFR 265.111(b)].

- System isolation and grouting of the TRA-630 CTS will be performed to prevent future accumulation of hazardous wastes.

- Sampling of the TRA-630 CTS and/or soils before final closure as a landfill will document the nature and extent of wastes and/or waste residues left in place.

- The tanks and ancillary equipment will be filled with grout to stabilize hazardous waste and waste residues remaining in the TRA-630 CTS equipment.

- A final cover will be constructed to prevent migration of hazardous wastes and/or waste residues from the landfill.

- Post-closure care will be implemented to maintain cap integrity and monitoring will be conducted over the 30-year period following landfill closure of the TRA-630 CTS.

Standard 3. At final closure of the landfill or upon closure of any cell, the owner or operator must cover the landfill or cell with a final cover designed and constructed to: provide long-term minimization of migration of liquids through the closed landfill; function with minimum maintenance; promote drainage and minimize erosion or abrasion of the cover; accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present [40 CFR 265.310(a)].

- A final cover meeting the requirements of 40 CFR 265.310(a) will be constructed to prevent the migration of hazardous wastes and/or waste residues from the landfill.

- Post-closure care will be implemented to maintain cap integrity following landfill closure of the TRA-630 CTS.

Standard 4. After final closure, the owner or operator must comply with all post-closure requirements contained in 40 CFR 265.117 through 265.120, including maintenance and monitoring throughout the post-closure care period. The owner or operator must: maintain the integrity and effectiveness of the final cover, including making repairs to the cover as necessary to correct the effects of settling, subsidence, erosion, or other events; maintain and monitor the leak detection system in accordance with 40 CFR 264.301(c)(3)(iv) and (4) of this chapter and 265.304(b), and comply with all other applicable leak detection system requirements of this part; prevent run-on and runoff from eroding or otherwise damaging the final cover; and protect and maintain surveyed benchmarks used in complying with 40 CFR 265.309 [40 CFR 265.310(b)].

- Post-closure care will be implemented to maintain cap integrity and monitoring will be conducted over the 30-year period following landfill closure of the TRA-630 CTS. A post-closure plan written to meet the requirements of 40 CFR 265.117 through 265.120, 40 CFR 265.310, and 40 CFR 265 Subpart F has been included in Section 6 of this document. A post-closure permit application will be submitted within 180 days of the date DOE determines that the tank system must be closed as a landfill. Certification of closure of the TRA-630 CTS as a landfill depends upon approval of the post-closure permit application.

5.5 Waste Management

All incidental, closure-derived waste (waste generated other than that currently managed in the TRA-730 catch tanks) generated during the landfill closure of the CTS will undergo a hazardous waste determination and will be managed accordingly. All closure-derived waste will be characterized under abbreviated sampling and analysis plans prepared in compliance with INEEL management control procedures. Hazardous waste will be managed in compliance with applicable HWMA/RCRA regulations, which may include generator treatment, debris treatment, or packaging for off-Site treatment and disposal. Closure-derived hazardous waste managed within the demarcated boundaries of the facility will not be subject to the HWMA/RCRA 90-day storage limit.

Should the tank system be closed as a landfill, contaminated structures, equipment, and soils may be left in place per the provisions of 40 CFR 265.111 and 265.310. Waste generated as a result of landfill closure activities will consist of disposable equipment and equipment decontamination solutions. This waste will be handled in accordance with 40 CFR 262.

5.6 Closure Documentation

Closure methods and attainment of the closure performance standards for the TRA-630 CTS will be documented by performing the following:

- Closure activities will be monitored and reviewed by an independent, registered professional engineer. Following successful completion of the landfill closure activities and receipt of approval of a post-closure permit, the professional engineer will certify that closure was performed in accordance with the approved closure plan.

- The following information will be recorded or documented during closure activities and provided to the professional engineer, as requested, to support closure certification. Successful demonstration of achieving closure performance standards will require documentation of the following:

  - Closure activities performed under the tank system closure plan

  - System isolation procedures and results

  - Validated soil sampling analytical data

  - Validated rinsate sampling analytical data

  - System grouting procedures and results

  - Component removal procedures and results, if applicable

  - Final cover and run-on/runoff control engineering drawings, including design drawings and "as-built" drawings

  - Closure-derived waste management procedures.

5.7 Time Allowed/Extension

Time limits for submitting closure plans, beginning closure, and completing closure are specified at IDAPA 58.01.05.009 [40 CFR 265.113(a) and (b)]. The DOE is requesting an extension of these time limits because completion of the closure will, of necessity, take longer than 180 days. The DOE is presenting the schedule outlined in Section 5.8.1 of this plan for completion of closure activities and requesting an extension as discussed in Section 5.8.2 of this plan.

5.7.1 Landfill Closure Schedule

Table 5.2 identifies the closure schedule that will be initiated following determination that the TRA-630 CTS will be closed as a landfill. This schedule reflects the time required for conducting landfill closure activities and submitting information to the professional engineer for the closure certification. The DOE will notify IDEQ in writing 45 days in advance of beginning landfill closure activities as outlined in the following schedule. Should closure activities and implementation of the post-closure plan be completed ahead of schedule, implementation of post-closure care, and submittal of the professional engineer's closure certification will be adjusted accordingly. Because this closure will take an extended period of time, quarterly status reports (to be submitted on April 30, July 31, October 31, and January 31 of each year) will be submitted to IDEQ that document the progress of closure activities. Quarterly status

reports will include the status of activities as it relates to the schedule provided in Table 5-2 and progress reports for all ongoing activities.

Table 5-2. Landfill closure schedule.

Planned Work Tasks	Day of Completion[a]
Determination that the TRA-630 CTS will be closed as a landfill	Day 0
IDEQ notification that the TRA-630 CTS will be closed as a landfill	Day 45
Final quantification of wastes and/or waste residues to be left in place	Day 150
Construction of cap begins	Day 390
Construction of cap complete	Day 570
The professional engineer and owner/operator certification submitted to IDEQ	Day 630
Final approval of the TRA-630 CTS landfill closure activities received from IDEQ	Day 690

a. The determination that the TRA-630 must be closed as a landfill and initiation of this schedule may occur at any time during the tank system closure as identified in the *HWMA/RCRA Tank System Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)* (DOE-ID 2001).

5.7.2 Extension

The DOE is requesting an extension to the 180-day closure period of 510 days from the time it is determined that the TRA-630 CTS will be closed as a landfill, should such a determination be made. This period of time is the time required to complete landfill closure activities and institute post-closure care for the TRA-630 CTS. An extension is required because landfill closure activities and implementation of post-closure care will, of necessity, require longer than 180 days. Complicating factors include:

- Spatial limitations of the courtyard in which the TRA-630 CTS is located
- Active operations near the TRA-630 CTS, including active piping and utilities
- Complete characterization of wastes and/or waste residues to be left in place
- Compliance with DOE O 435.1, which regulates disposal of radioactive waste
- Compliance with DOE and NRC requirements for disposal of radioactive waste.

5.8 Landfill Closure Plan Amendments

The conditions described in IDAPA 58.01.05.009 (40 CFR 265.112), "Closure Plan; Amendment of Plan," will be followed to implement changes to the approved closure plan. Should unexpected events during the closure period require modification of the approved closure activities, the closure plan will be amended within 30 days of the unexpected event. A written request detailing the proposed changes and the rationale for those changes and a copy of the amended closure plan will be submitted to IDEQ for approval. Minor changes to the approved closure plan, which are equivalent to or do not compromise the closure requirements and performance standards identified in the approved closure plan, may be made

without prior notification to IDEQ. Minor changes will be identified in the documentation supporting the independent professional engineer's certification.

5.9 Certification of Landfill Closure

Within 60 days of completing the closure activities, a certification of closure of the TRA-630 CTS will be provided, in accordance with IDAPA 58.01.05.009 (40 CFR 265.115), by an independent, Idaho-registered professional engineer. The certification of closure will be submitted as a milestone deliverable under Section 9.8 of the VCO (IDEQ 2000a). The professional engineer and owner/operator signatures on the closure certification, which is submitted to the IDEQ, will document the completion of closure activities in accordance with the approved landfill closure plan and State of Idaho HWMA/RCRA requirements. The closure certification may also identify any minor changes to the closure plan made without prior approval of the IDEQ. Closure of these units will be considered complete upon receipt of written acceptance issued by the IDEQ.

Copies of documentation supporting the closure of the TRA-630 CTS will remain in both the TRA and VCO program project files in the event that additional information is requested by IDEQ.

6. POST-CLOSURE CARE

As stipulated in 40 CFR 265.197(c)(2), a contingent post-closure plan must be prepared and provided to IDEQ. This section of the contingent landfill closure and post-closure plan has been prepared to fulfill the post-closure requirements specified at 40 CFR 265.301, 265.309, and 265.310, 40 CFR 265.116 through 265.120, and 40 CFR 265 Subpart F.

6.1 Post-Closure Notices and Deed Restrictions

In accordance with 40 CFR 265.117(c), post-closure use of property on or in which hazardous wastes remain after partial or final closure must never be allowed to disturb the integrity of the final cover, other components of the containment system, or the function of the facility's monitoring systems. Post-closure use of the property will be protected as required at 40 CFR.265 Subpart G through zoning restrictions, deed restrictions, and a survey plat.

6.1.1 Survey Plat

As required under 40 CFR 265.116, DOE will submit to the authority with jurisdiction over local land use, and to IDEQ, a survey plat indicating the location and dimensions of the TRA-630 landfill with respect to permanently surveyed benchmarks. This plat will be prepared and certified by a professional land surveyor. The plat filed will contain a note, prominently displayed, which states DOE's obligation to restrict disturbance of the TRA-630 landfill in accordance with 40 CFR 265.117(c).

The survey plat will be submitted to the authority with jurisdiction over local land use and IDEQ no later than the certification of closure of the TRA-630 CTS as a landfill, which will be within 60 days of the completion of landfill closure activities

6.1.2 Zoning Notification

In accordance with 40 CFR 265.119(a), no later than 60 days after certification of closure of the TRA-630 site, DOE will submit to the authority with jurisdiction over local land use, and to IDEQ, a record of the type, location, and quantity of hazardous wastes disposed of within the TRA-630 landfill.

6.1.3 Deed Restrictions

In accordance with 40 CFR 265.119(b), within 60 days of certification of closure of the TRA landfill, DOE will:

- Record, in accordance with State law, a notation on the deed to the facility property – or on some other instrument which is normally examined during title search – that will in perpetuity notify any potential purchaser of the property that the land has been used to manage hazardous wastes, its use is restricted under 40 CFR 265 Subpart G regulations, and the survey plat and record of the type, location, and quantity of hazardous wastes disposed of within the unit required by 40 CFR 265.116 and 265.119(a) have been filed with the authority with jurisdiction over local land use and with IDEQ.

- Submit a certification signed by the DOE that the notation specified above has been recorded and a copy of the document in which the notation has been recorded to IDEQ.

6.2 Post-Closure Monitoring

In accordance with 40 CFR 265.118(c)(1), 265.310(b)(3), and 265 Subpart F, a monitoring network must be installed and a monitoring plan developed that is capable of detecting a release of hazardous waste or hazardous waste residuals from the closed landfill to the uppermost aquifer. This monitoring plan will be used by DOE to ensure compliance with 40 CFR 265 Subpart F and continued protection of human health and the environment for the TRA-630 landfill.

6.2.1 TRA Groundwater Description

Three water-bearing zones have been recognized in the vicinity of TRA: the shallow perched water system (SPWS), the deep perched water system (DPWS), and the Snake River Plain Aquifer (SRPA). The presence of perched water at TRA is primarily from infiltration of wastewater from ponds, including the former Warm Waste Pond (TRA-758), the Cold Waste Pond (TRA-702), and the Sewage Leach Pond (TRA-732). Other sources of infiltration include lawn irrigation, infiltration of rainfall and snowmelt, and the Big Lost River (DOE-ID 1997a).

6.2.2 TRA Groundwater Regulatory Background

In December 1992, the record of decision (ROD) was issued for operable unit (OU) 2-12, the TRA perched water system. It was determined that no remedial action was necessary for the DPWS to ensure protection of human health and the environment. This decision was dependent upon the results of a three-year statutory review. The results of the three-year review were incorporated into the *Comprehensive Remedial Investigation/Feasibility Study for the Test Reactor Area Operable Unit 2-13 at the Idaho National Engineering and Environmental Laboratory* (DOE-ID 1997a). In December 1997, the OU 2-13 ROD was issued (DOE-ID 1997b). According to this ROD, a groundwater-monitoring program was required to ensure continued protection of human health and the environment (DOE-ID 2000b). This groundwater monitoring effort is ongoing.

The ongoing monitoring efforts at TRA are being performed under the provisions of the Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991). These efforts, while compliant with the provisions of the OU 2-13 ROD and protective of human health and the environment for the operable unit under consideration, are inadequate to meet the specific requirements of 40 CFR 265 Subpart F, as they relate to post-closure of the TRA-630 CTS. Consequently, the monitoring network and monitoring plan required to comply with 40 CFR 265 Subpart F for post-closure care of the TRA-630 landfill will be independent of ongoing FFA/CO-driven monitoring activities at TRA.

6.2.3 Snake River Plain Aquifer

The SRPA occurs approximately 137 m (450 ft) below TRA and consists of a series of saturated basalt flows and interlayered pyroclastic and sedimentary materials. The aquifer is relatively permeable because of the presence of fractures, fissures, and voids such as lava tubes in the basalt. Groundwater flow in the SRPA is to the south-southwest at rates between 1.5 and 6 m/day (5 and 20 ft/day) (DOE-ID 2000b).

6.2.4 Perched Water

Two perched water systems have generally been recognized below TRA. In the vicinity of the ponds and the retention basin (TRA-712; VCO Action Plan SITE-TANK-005 System TRA-011), the shallow perched water system is formed approximately 15 m (50 ft) below ground surface. Finer-grained sediments and/or fracture infilling at the alluvium and basalt interface areas impede the downward

movement of water, resulting in perched conditions. The shallow perched water eventually percolates through the underlying basalt to the deep perched water zone. The deep perched water is caused by low-permeability sediments within the interbedded basalt-sediment sequence at depths of approximately 43 to 61 m (140 to 200 ft) below ground surface. These interbed sediments (referred to as the perching layer) include silt, clay, sand, cinders, and gravel, and appear to be laterally continuous in the vicinity of TRA. The deep perched water zone occurs above this low-permeability interbed and is much larger than the shallow perched water zone. The low-permeability layer causes the water to perch approximately 91 m (300 ft) above the regional water table, which is approximately 139 to 146 m (450 to 480 ft) below ground surface. The shallow and deep perched waters form two separate perched water zones.

The uppermost aquifer is defined in HWMA/RCRA at 40 CFR 260 Subpart B as follows:

> "The geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary."

An aquifer is defined in HWMA/RCRA at 40 CFR 260 Subpart B as follows:

> "A geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs"

The uppermost aquifer beneath the TRA-630 landfill is the SPWS, which occurs at approximately 15 m (50 ft) below ground surface. This perched water is capable of yielding a significant amount of groundwater to wells. This aquifer is the aquifer beneath the TRA-630 CTS that is located nearest to ground surface. Although this aquifer is undoubtedly hydraulically connected to deeper perched water zones, it appears to be isolated from these deeper zones in the vicinity of the TRA-630 site. See Schematic P-VCO-5.8.d-TRA-630O in Appendix A for groundwater elevation contours of this uppermost aquifer in the vicinity of the TRA-630 site. This aquifer was formed as a result of discharges to the various wastewater disposal ponds located southeast of TRA. As a result, the direction of flow of this shallow aquifer beneath the TRA-630 landfill is approximately north-northwest. A groundwater contour map for the SPWS beneath TRA is provided in Schematic P-VCO-5.8.d-TRA-630O in Appendix A. The direction of flow of this groundwater body is also noted on the schematic. As it is the uppermost aquifer, the SPWS will be monitored under the provisions of 40 CFR 265 Subpart F to ensure that there has been no post-closure escape of hazardous waste or hazardous waste constituents from the TRA-630 landfill.

6.2.5 TRA-630 Post-Closure Care Monitoring

Post-closure monitoring of the SPWS will be conducted in accordance with 40 CFR 265 Subpart F throughout the post-closure period. A groundwater monitoring plan and specific engineering design documents for construction of the monitoring network will be developed and submitted as part of the post-closure permit application in the event that the TRA-630 CTS must be closed as a landfill. The groundwater monitoring plan, sampling and analysis plan, and engineering design documents will incorporate the requirements of this post-closure plan.

6.2.5.1 Well Location

As required at 40 CFR 265.91(a), a groundwater monitoring system will be installed that is capable of yielding groundwater samples for analysis and will consist of:

- One monitoring well installed south-southeast of the TRA-630 landfill (hydraulically upgradient). The well will be designed and constructed such that it will be sufficient to yield groundwater samples that are representative of background groundwater quality in the SPWS near the TRA-630 landfill but not affected by the TRA-630 site. The proposed location of the upgradient well is shown on Schematic P-VCO-5.8.d-630O (see Appendix A). This well location is preliminary and will be finalized when the boundaries of the landfill are finalized.

- Three monitoring wells installed north-northwest of the TRA-630 landfill (hydraulically downgradient). These wells will be designed and constructed such that they will immediately detect any statistically significant amounts of hazardous waste or hazardous waste constituents that migrate from the TRA-630 landfill to the SPWS. The proposed location of these downgradient wells is shown on Schematic P-VCO-5.8.d-630O (see Appendix A). This well location is preliminary and will be finalized when the boundaries of the landfill are finalized.

The "limit of the waste management area" as provided for in 40 CFR 265.91(b) is defined as the inner courtyard in which the TRA-630 CTS is located. The waste management area is highlighted on Schematic P-VCO-5.8.d-630N. Per the provisions of 40 CFR 265.91(a)(3), DOE intends to demonstrate that alternate hydraulically downgradient monitoring well locations will be required. This demonstration will be in writing and kept at the facility, and will be provided as part of the post-closure permit application. The demonstration will be certified by a qualified groundwater scientist and will establish that:

- Existing physical obstacles (Buildings TRA-603, -604, and -661) prevent monitoring well installation at the hydraulically downgradient limit of the waste management area

- The selected alternate downgradient location is as close to the limit of the waste management area as practical

- The location ensures detection that, given the alternate location, is as early as possible of any statistically significant amounts of hazardous waste or hazardous waste constituents that migrate from the TRA-630 landfill to the SPWS.

6.2.5.2 Well Construction

Construction parameters of monitoring wells are provided at 40 CFR 265.91(c). All monitoring wells will be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing will be screened or perforated, and packed with gravel or sand where necessary, to enable sample collection at depths where appropriate aquifer flow zones exist. The annular space above the sampling depth will be sealed with a suitable material to prevent contamination of samples and the groundwater. Engineering design information for each of the wells to be used for groundwater monitoring in compliance with 40 CFR 265 Subpart F will be prepared and provided as part of the post-closure permit application.

6.2.5.3 Sampling and Analysis

The DOE will obtain and analyze samples from the installed groundwater monitoring system at intervals specified in 40 CFR 265 Subpart F. The requirements for groundwater monitoring sampling and analysis are stipulated at 40 CFR 265.92. The DOE will develop and implement a groundwater sampling and analysis plan that will be included in the post-closure permit application and kept at the facility. The plan will include procedures and techniques for:

- Sample collection
- Sample preservation and shipment
- Analytical procedures
- Chain of custody control.

The DOE will determine the concentration or value of the parameters listed in Table 6-1. For all monitoring wells, The DOE will establish initial background concentrations or values of all parameters listed in Table 6-1. The DOE will do this quarterly for one year. For each of the indicator parameters included in Set 3 of Table 6-1, at least four replicate measurements will be obtained for each sample and the initial background arithmetic mean and variance will be determined by pooling the replicate measurements for the respective parameter concentrations or values in samples obtained from upgradient wells during the first year.

After the first year, all monitoring wells will be sampled and the samples analyzed with the following frequencies:

- Samples collected to establish groundwater quality (Set 2 of Table 6-1) will be obtained and analyzed at least annually.
- Samples collected to indicate groundwater contamination (Set 3 of Table 6-1) will be obtained and analyzed at least semiannually.
- Elevation of the groundwater surface at each monitoring well will be determined each time a sample is obtained.

Table 6-1. Groundwater monitoring parameters to be analyzed during the TRA-630 landfill post-closure care period.

Set 1 – Drinking Water Parameters		Set 2 – Groundwater Quality Parameters	Set 3 – Contamination Parameters	Set 4 – Contaminants of Concern
• Arsenic	• Lindane	• Chloride	• pH	• Arsenic
• Barium	• Methoxychlor	• Iron	• Specific Conductance	• Barium
• Cadmium	• Toxaphene	• Manganese	• Total Organic Carbon	• Cadmium
• Chromium	• 2,4-D	• Phenols	• Total Organic Halogen	• Chromium
• Fluoride	• 2,4,6-TP Silver	• Sodium		• Lead
• Lead	• Radium	• Sulfate		• Mercury
• Mercury	• Gross Alpha			• Selenium
• Nitrate (as N)	• Gross Beta			• Silver
• Selenium	• Turbidity			• Vanadium
• Silver	• Coliform Bacteria			• Cyanide
• Endrin				• 2-Butanone
				• 4-Methylphenol
				• Pentachlorophenol

6.2.5.4 Groundwater Quality Assessment Program

The DOE is required under 40 CFR 265.93 to submit an outline of a groundwater quality assessment program for the SPWS in the vicinity of the TRA-630 landfill as part of this post-closure plan. This section of the post-closure plan, upon approval, will serve to meet the requirements for submittal of an outline of a groundwater quality assessment program in compliance with 40 CFR 265.93. The groundwater quality assessment program for the TRA-630 landfill, if required, will be a more comprehensive groundwater-monitoring program than that previously described. This program will be capable of determining:

- Whether hazardous waste or hazardous waste constituents have entered the groundwater
- The rate and extent of migration of hazardous waste or hazardous waste constituents in the groundwater
- The concentrations of hazardous waste or hazardous waste constituents in the groundwater.

The DOE is only required to submit an outline for the groundwater quality assessment plan with the post-closure plan for the TRA-630 CTS [40 CFR 265.93(a)]. The DOE will implement an indicator evaluation program, which will serve as the criteria for submittal of the outlined plan as follows:

- For each indicator parameter specified in Set 3 of Table 6-1, DOE will calculate the arithmetic mean and variance, based on at least four replicate measurements on each sample, for each well monitored in accordance with this post-closure plan, and compare these results with its initial background arithmetic mean. The comparison will consider individually each of the wells in the monitoring system, and will use the Student's t-test at the 0.01 level of significance to determine statistically significant increases (and decreases, in the case of pH) over initial background.
- If the comparisons for the upgradient wells described above show a significant increase (or pH decrease), DOE will submit this information to IDEQ in accordance with 40 CFR 265.94(a)(2)(ii). If the described comparisons for downgradient wells show a significant increase (or pH decrease), DOE will then immediately obtain additional groundwater samples from those downgradient wells where a significant difference was detected, split the samples in two, and obtain analyses of all additional samples to determine whether the significant difference was a result of laboratory error.
- If it is confirmed there has been a significant increase (or pH decrease), DOE will provide written notice to IDEQ within seven days of the date of the confirmation that the facility may be affecting groundwater quality.

Within 15 days after notifying IDEQ that the TRA-630 landfill may be affecting groundwater quality, DOE will develop and submit to IDEQ a specific plan, based on the following outline, for a groundwater quality assessment program for the TRA-630 landfill. A qualified geologist or geotechnical engineer will certify the groundwater quality assessment plan. An outline for the groundwater quality assessment plan is provided in Figure 6-1.

Groundwater Quality Assessment Plan for the TRA-630 HWMA/RCRA Landfill

1. Introduction
2. Regulatory Basis
3. Site Description
   - 3.1. Site History
   - 3.2. Current Status
   - 3.3. Summary of Available Monitoring Data
4. Monitoring Well Description
   - 4.1. Upgradient Well
     - 4.1.1. Location
     - 4.1.2. Depth
   - 4.2. Downgradient Wells
     - 4.2.1. Location
     - 4.2.2. Depth
5. Sampling and Analysis Methods for Contaminants of Concern
6. Data Quality Evaluation
7. Groundwater Quality Assessment Activities
   - 7.1. Activities Required to Determine Rate of Contaminant Migration
   - 7.2. Activities Required to Determine Contaminant Concentration
8. Implementation Schedule
9. References

Figure 6-1. Outline for the groundwater quality assurance plan.

The groundwater quality assessment plan that will be submitted will include:

- The number, location, and depth of wells
- Sampling and analytical methods for those hazardous wastes or hazardous waste constituents in the facility
- Evaluation procedures, including any use of previously gathered groundwater quality information
- A schedule of implementation.

Following submittal of the groundwater quality assurance plan, DOE will then implement the groundwater quality assessment plan according to the provided schedule and, at a minimum, determine:

- The rate and extent of migration of the hazardous waste or hazardous waste constituents in the groundwater
- The concentrations of the hazardous waste or hazardous waste constituents in the groundwater.

The DOE will make the first of these determinations as soon as technically feasible and, within 15 days after that determination, will submit to IDEQ a written report containing an assessment of the groundwater quality. If DOE determines, based on the results of the first of these determinations, that no hazardous waste or hazardous waste constituents from the TRA-630 landfill have entered the groundwater, then DOE will reinstate the indicator evaluation program described above. If DOE reinstates the indicator evaluation program, DOE will so notify IDEQ in the report discussed in the previous paragraph.

If DOE determines, based on the results of the first of these determinations, that hazardous waste or hazardous waste constituents from the TRA-630 landfill have entered the groundwater, then DOE will cease to make the determinations, as the groundwater quality assessment plan was implemented during the post-closure care period [40 CFR 265.93(d)(7)(ii)].

6.2.5.5 Annual Reviews

Unless the groundwater is monitored under the provisions of a groundwater quality assessment plan, at least annually DOE will evaluate the data on groundwater surface elevations to determine whether the requirements under 40 CFR 265.91(a) for locating the monitoring wells continues to be satisfied. If the evaluation shows that 40 CFR 265.91(a) is no longer satisfied, DOE will immediately modify the number, location, or depth of the monitoring wells to bring the groundwater monitoring system into compliance with this requirement.

6.3 Post-Closure Maintenance

In order to ensure that measures taken during both closure and post-closure of the TRA-630 CTS to protect human health and the environment are maintained throughout the post-closure period, this post-closure plan is required to include a discussion of the maintenance activities that will be performed to ensure that all engineered elements of the landfill function as designed. A maintenance plan including all of the elements of this section of the post-closure plan will be developed and submitted as part of the post-closure permit application. The maintenance plan will be written into procedures at TRA and TRA personnel will be responsible for performing maintenance inspections and all required maintenance.

6.3.1 Final Cover Maintenance

In accordance with 40 CFR 265.310(b)(1), after final closure, DOE will maintain the integrity and effectiveness of the final cover, including making repairs to the cover as necessary to correct the effects of settling, subsidence, erosion, or other events.

Cap maintenance will consist of detailed inspections at least semiannually. Visual inspections will be performed to determine if the effects of settling, subsidence, erosion, or other events have compromised the integrity of the cover. Any defects in the cover will be noted in an inspection logbook and DOE will take immediate measures to correct the defect. All maintenance activities including inspections and repairs will be noted in the maintenance plan logbook.

6.3.2 Groundwater Monitoring Network Maintenance

In accordance with 40 CFR 265.118(c)(2), after final closure, DOE will maintain the function of the monitoring equipment associated with the groundwater monitoring network.

Monitoring system maintenance will consist of detailed inspections at least semiannually. Inspections will include operation of all equipment used to perform groundwater sampling, visual inspection of the wellhead to assess the integrity of the annular space seal. Any defects in the monitoring equipment will be noted in the maintenance logbook and DOE will take immediate measures to correct the defect. All maintenance activities including inspections and repairs will be noted in the maintenance plan logbook. Any defects noted during normal sampling operations will be reported to the TRA project manager, entered in the maintenance plan logbook, and corrected immediately.

6.3.3 Run-On and Runoff Control System Maintenance

In accordance with 40 CFR 265.310(b)(4), after final closure, DOE will maintain the run-on and runoff controls to prevent run-on and runoff from eroding or otherwise damaging the final cover, including making repairs to the run-on and runoff controls as necessary to correct any noted defects.

Run-on and runoff control maintenance will consist of detailed inspections at least semiannually. Visual inspections will be performed to determine if any defects are evident. Any standing water on or adjacent to the final cover will be indicative of defects in the run-on and runoff controls. Any defects in the run-on and runoff controls will be noted in the maintenance logbook and DOE will take immediate measures to correct the defect. All maintenance activities including inspections and repairs will be noted in the maintenance plan logbook.

6.3.4 Surveyed Benchmark Maintenance

In accordance with 40 CFR 265.310(b)(5), after final closure, DOE will maintain all surveyed benchmarks. Surveyed benchmark maintenance will consist of detailed inspections at least semiannually. Visual inspections will be performed to determine if any defects are evident. Any defects in the surveyed benchmarks will be noted in the maintenance logbook and DOE will take immediate measures to correct the defect. All maintenance activities including inspections and repairs will be noted in the maintenance plan logbook.

6.4 Document Management

Records will be maintained during the post-closure care period documenting maintenance, monitoring, inspections, and all other unit-specific information required under the approved post-closure plan. All information discussed in this section will be maintained by the TRA-630 CTS project manager and provided to an independent professional engineer registered in the State of Idaho to show that post-closure care was performed in accordance with the specifications in the approved post-closure plan.

6.4.1 Post-Closure Plan

In accordance with 40 CFR 265.118(b), after final closure has been certified, the person or office specified at 40 CFR 265.118(c)(3) must keep the approved post-closure plan during the post-closure period. The approved post-closure plan will be maintained by the TRA-630 CTS project manager throughout the post-closure period.

6.4.2 Monitoring Records

In accordance with 40 CFR 265.94(a)(b), DOE will keep records of the analyses required in Section 6.2.5.3 and the evaluations required in Section 6.2.5.4 of this post-closure plan throughout the post-closure care period. The DOE will report the following groundwater monitoring information to IDEQ:

- During the first year when initial background concentrations are being established for the TRA-630 landfill: Concentrations or values of the parameters listed in Set 1 of Table 6-1 for each groundwater monitoring well within 15 days after completing each quarterly analysis. The DOE will separately identify for each monitoring well any parameters whose concentration or value has been found to exceed the maximum contaminant levels listed in Appendix III of 40 CFR 265.

- Annually: Concentrations or values of the parameters listed in Set 3 of Table 6-1 for each groundwater monitoring well, along with the required evaluations for these parameters as described in Section 6.2.5.4 of this post-closure plan. The DOE will separately identify any significant differences from initial background found in the upgradient wells, in accordance with 40 CFR 265.93(c)(1).

- No later than March 1 following each calendar year: Results of the evaluations of groundwater surface elevations as described in Section 6.2.5.5 of this post-closure plan, and a description of the response to that evaluation, where applicable.

If the groundwater is monitored under the provisions of a groundwater quality assessment plan, DOE will keep records of the analyses and evaluations specified in the plan, which satisfies the requirements of Section 6.2.5.4 of this post-closure plan throughout the post-closure care period.

6.4.3 Maintenance Records

Copies of all maintenance records, including maintenance logbooks, maintenance project files, and maintenance and inspection procedures will be maintained by the TRA-630 project manager. A record will be kept of all inspection and maintenance activities.

6.4.4 Landfill Characterization Information

In accordance with 40 CFR 265.309, DOE will maintain, in the TRA-630 CTS project files, the following information:

- On a map, the exact location and dimensions, including depth, of each cell with respect to permanently surveyed benchmarks
- The contents of each cell and the approximate location of each hazardous waste type within each cell.

6.5 Contact Information

In accordance with 40 CFR 265.118(c)(3), DOE is required to provide the name, address, and phone number of the person or office to contact about the hazardous waste disposal unit or facility during the post-closure care period.

The office to contact about the TRA-630 CTS landfill is:

TRA-630 CTS Project Manager
Contact via:
ATR Shift Supervisor's Office
(208) 533-4353
P.O. Box 1625
Idaho Falls, ID 83415

6.6 Post-Closure Plan Amendments

The conditions described in IDAPA 58.01.05.009 [40 CFR 265.118(d)], "Post-Closure Plan; Amendment of Plan," will be followed to implement changes to the approved post-closure plan. DOE will submit a written request to IDEQ to authorize a change to the approved plan. The written request will include a copy of the amended post-closure plan for approval by IDEQ. The DOE must amend the post-closure plan whenever events occur that affect the post-closure plan. The DOE will amend the post-closure plan no later than 60 days after an unexpected event has occurred which has affected the post-closure plan.

6.7 Certification of Completion of Post-Closure Care

No later than 60 days after the completion of the established post-closure care period for the TRA-630 CTS, DOE will submit to IDEQ, by registered mail, a certification that the post-closure care period for the hazardous waste disposal unit was performed in accordance with the specifications in the approved post-closure plan. The certification must be signed by DOE and an independent, Idaho-registered professional engineer. Documentation supporting the independent registered professional engineer's certification will be furnished to IDEQ upon request.

7. COST AND LIABILITY REQUIREMENTS

The federal government, as owner of the INEEL, is exempt from the requirements to provide cost estimates for closure.

The federal government, as owner of the INEEL, is exempt from the requirements to provide a financial assurance mechanism for closure.

The federal government, as owner of the INEEL, is exempt from liability requirements.

The federal government, as owner of the INEEL, is exempt from requirements regarding state-required mechanism and state assumption of responsibility.

8. REFERENCES

40 CFR 260, Subpart B, "Adoption and Submittal of State Plans for Designated Facilities," *Code of Federal Regulations*, Office of the Federal Register, July 1, 2000.

40 CFR 262, "Standards Applicable to Generators of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register, July 1, 2000.

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register, July 1, 2000.

40 CFR 270, "EPA-Administered Permit Programs – The Hazardous Waste Program," *Code of Federal Regulations*, Office of the Federal Register, July 1, 2000.

Briscoe, A.V., 1984, *TRA Catch Tank Upgrade Conceptual Design Report,* PG-T-84-020, October.

DOE O 435.1, "Radioactive Waste Management," U.S Department of Energy, July 9, 1999.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering and Environmental Laboratory*, U.S. Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency Region 10, State of Idaho Department of Health and Welfare.

DOE-ID, 1997a, *Comprehensive Remedial Investigation/Feasibility Study for the Test Reactor Area Operable Unit 2-13 at the Idaho National Engineering and Environmental Laboratory,* DOE/ID-10531, February.

DOE-ID, 1997b, *Final Record of Decision (ROD) for Test Reactor Area (TRA) for Operable Unit (OU) 2-13 at Idaho National Engineering and Environmental Laboratory (INEEL)*, DOE/ID-10586, December.

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

DOE-ID, 2000b, *Groundwater Monitoring Plan for the Test Reactor Area Operable Unit 2-13*, DOE/ID-10626, Revision 1, July.

DOE-ID, 2001, *HWMA/RCRA Tank System Closure Plan for the Test Reactor Area Catch Tank System (TRA-630)*, DOE/ID-10823, Revision C, June.

IDAPA, 58.01.05.009, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities," Idaho Administrative Procedures Act, Idaho Department of Environmental Quality Rules, April 5, 2000.

IDEQ, 2000a, B. R. Monson, IDEQ, to D. N. Rasch, DOE-ID, Enclosure: "Consent Order," Idaho Code § 39-4413, June 13.

IDEQ, 2000b, B. R. Monson, IDEQ, to D. N. Rasch, DOE-ID, Enclosure: "Consent Order to Resolve the May 26, 1999, Notice of Violation," January 12.

INEEL, 2000a, *Abbreviated Sampling and Analysis Plan for TRA-730 Catch Tanks – Phase II Solids*, WGS-006-00, Revision 3, September.

INEEL, 2000b, *Analytical Parameters for Listed Waste Numbers Associated with TRA Radioactive Liquid Waste System (RLWS).*

INEEL, 2001a, *System Identification for the Test Reactor Area Catch Tank System (TRA-630),* Voluntary Consent Order Action Plan VCO-5.8.d, INEEL/EXT-2000-00801, Revision 1, June.

INEEL, 2001b, *Field Sampling Plan for the HWMA/RCRA Closure Certification of the Test Reactor Area Catch Tank System (TRA-630)*, Voluntary Consent Order Action Plan VCO-5.8.d, INEEL/EXT-2000-01156, Revision 1, June 2.

INEEL, 2001c, *Quality Assurance Project Plan for the HWMA/RCRA Closure Certification of the Test Reactor Area Catch Tank System (TRA-630),* Voluntary Consent Order Action Plan VCO-5.8.d, INEEL/EXT-2000-01155, Revision 1, June.

INEL, 1992, *TRA OMM 7.11–Outer Area Operating and Maintenance Manual, Section 7.11.12.1.2 – MTR Catch Tank System,* Revision 0, September 14.

NRTS, 1971, *Buried Line Register for NRTS, Part 1 TRA,* Allied Chemical Corporation, National Reactor Testing Station, ACI-107, December.

Rolfe, R. L. and E. L. Wills, 1984, *Characterization of the Materials Testing Reactor,* WM-FL-83-016, April.

DRAWINGS

007428, INEEL Reference Drawing, *MTR Catch Tanks Valve and Tank Locations,* MTR-D-4015, Revision 12.

008851, INEEL Reference Drawing, *MTR-ETR Plant Drain Lines Flow Diagram,* MTR-E-4505, Revision 26.

100496, INEEL Reference Drawing, *Effluent Control, Area 13, Catch Tanks and Pump Room Piping Plan and Elevation,* 3150-713-1, Revision 14.

156482, INEEL Reference Drawing, *TRA Hot Waste Storage Flow Diagram,* 1375-MTR-605/613-P-5, Revision 4.

161549, INEEL Reference Drawing, *TRA – Building 603/605 – Test Reactor Area Cleanup – TRA Warm Waste System – TRA Warm Waste Collection System Piping Flowsheet,* 1570-TRA-603/635-P-1, Revision C.

165930, INEEL Reference Drawing, *TRA Catch Tank Upgrade Site Map, Area Map, and Drawing Index,* Revision 2.

165932, INEEL Reference Drawing, *TRA Catch Tank Upgrade Tank Vault Details,* Revision 1.

165933, INEEL Reference Drawing, *TRA Catch Tank Upgrade Vault Section and Details,* Revision 1.

165934, INEEL Reference Drawing, *TRA Catch Tank Upgrade Vault Cover and Ladder Details,* Revision 1.

165935, INEEL Reference Drawing, *TRA Catch Tank Upgrade Flow Diagram Demolition,* Revision 1.

165936, INEEL Reference Drawing, *TRA Catch Tank Upgrade Flow Diagram Installation,* Revision 1.

165939, INEEL Reference Drawing, *TRA Catch Tank Upgrade Piping Plan Installation,* Revision 2.

165940, INEEL Reference Drawing, *TRA Catch Tank Upgrade Piping Section and Details,* Revision 1.

165941, INEEL Reference Drawing, *TRA Catch Tank Upgrade Existing Utilities Plot Plan,* Revision 1.

165942, INEEL Reference Drawing, *TRA Catch Tank Upgrade Electrical Plan and Section,* Revision 1.

452217, INEEL Reference Drawing, *TRA Hot and Warm Waste Flow Diagram,* Revision C.

Appendix A

SCHEMATICS

Appendix A

Schematics

Appendix A includes piping schematics showing the piping that is included as part of this closure. Schematic P-VCO-5.8.d-TRA-630A is a site piping plan showing piping associated with the TRA-630 Catch Tank System. The subsequent schematics show piping plan details for the vaults and any buildings that have contributed waste to the TRA-630 CTS. System boundaries are discussed in the notes section of Schematic P-VCO-5.8.d-TRA-630A and shown as appropriate on the subsequent schematics. The following schematics are included in this appendix:

- P-VCO-5.8.d-TRA-630A — Site Piping Plan and System Boundaries
- P-VCO-5.8.d-TRA-630B — Pump Vault and Intervault Piping Plan
- P-VCO-5.8.d-TRA-630C — Tank Vault and Intervault Piping Plan
- P-VCO-5.8.d-TRA-630D — MTR Reactor Building (TRA-603) Basement Waste Piping Plan
- P-VCO-5.8.d-TRA-630E — Reactor Services Building (TRA-635) Piping Plan
- P-VCO-5.8.d-TRA-630F — Hot Cell Building (TRA-632) Piping Plan
- P-VCO-5.8.d-TRA-630G — Radiochemistry Laboratories (TRA-604 and 661) Waste Piping Plan
- P-VCO-5.8.d-TRA-630N — Proposed Landfill Footprint, Boundaries, and Isolation Points
- P-VCO-5.8.d-TRA-630O — Proposed Monitoring Well Locations

Insert Schematic P-VCO-5.8.d-TRA-630A here.

Insert schematic P-VCO-5.8.d-TRA-630B here

Insert schematic P-VCO-5.8.d-TRA-630C here.

Insert schematic P-VCO-5.8.d-TRA-630D here.

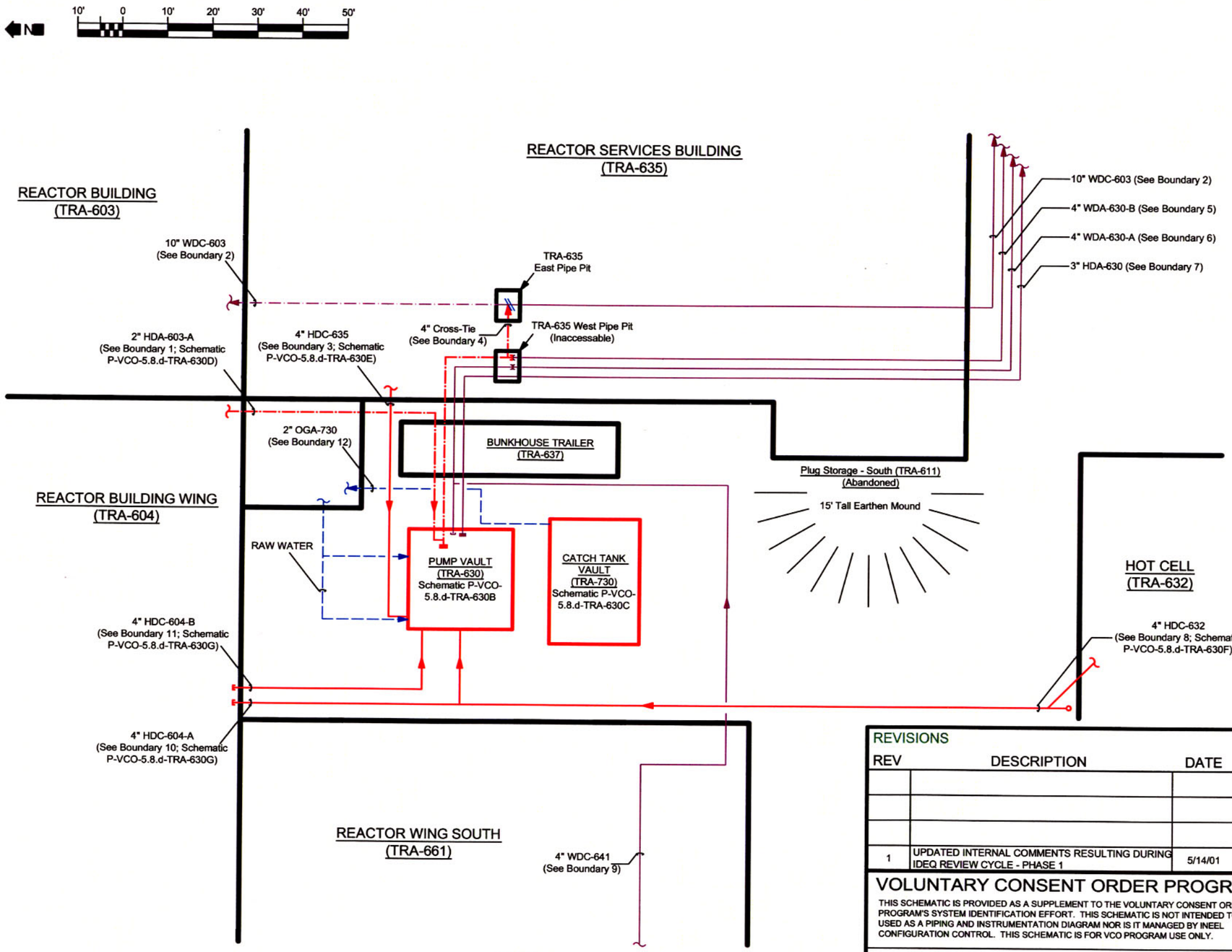
Insert schematic P-VCO-5.8.d-TRA-630E here.

Insert schematic P-VCO-5.8.d-TRA-630F here.

Insert schematic P-VCO-5.8.d-TRA-630G here.

Insert schematic P-VCO-5.8.d-TRA-630N here.

Insert schematic P-VCO-5.8.d-TRA-630O here.



LEGEND

- BUILDINGS
- UNITS INCLUDED IN THE TRA-630 CLOSURE
- LINES AND COMPONENTS INCLUDED IN THE TRA-630 CLOSURE
- VCO ACTION PLAN SITE-TANK-005 EVALUATION
- ACTIVE WASTE PIPING
- LINES EXCLUDED FROM THE TRA-630 CLOSURE
- EXISTING CAP
- PROPOSED ISOLATION POINT

VCO UNITS

TRA-630 CATCH TANK SYSTEM (VCO ACTION PLAN VCO-5.8.d)

BOUNDARIES

1. THE REACTOR DRAIN TANK DISCHARGE LINE (2" HDA 603-A) IS INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D) FROM THE REACTOR DRAIN TANK PUMP DISCHARGE TO THE TRA-630 CTS PUMP VAULT. THE REACTOR DRAIN TANK AND ASSOCIATED TRA-603 INLET PIPING ARE INCLUDED IN VCO ACTION PLAN SITE-TANK-005 SYSTEM TRA-007. SCHEMATIC P-VCO-5.8.D-TRA-630D SHOWS THE PORTION OF THIS LINE INSIDE TRA-603. SCHEMATIC P-VCO-5.8.D-TRA-630B SHOWS THE PORTION OF THIS LINE INSIDE THE TRA-630 CTS PUMP VAULT.

2. THE PROCESS SUMP DISCHARGE/INLET LINE (10" WDC-603) IS NOT INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D). THIS LINE IS INCLUDED FROM THE TRA-635 EAST PIPE PIT TO THE MTR REACTOR BUILDING (TRA-603) IN VCO ACTION PLAN SITE-TANK-005 SYSTEM TRA-007. THIS LINE IS INCLUDED FROM THE TRA-635 EAST PIPE PIT TO THE TRA-712 RETENTION BASIN INLET SUMP IN VCO ACTION PLAN SITE-TANK-005 SYSTEM TRA-011. SCHEMATIC P-VCO-5.8.D-TRA-630E SHOWS THE PORTION OF THIS LINE INSIDE TRA-635.

3. THE TRA-635 DRAIN LINE (4" HDC-635) IS INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D) IN ITS ENTIRETY FROM THE TRA-635 DRAIN ASSEMBLIES TO THE TRA-630 CTS PUMP VAULT. SCHEMATIC P-VCO-5.8.D-TRA-630E SHOWS THE PORTION OF THIS LINE INSIDE TRA-635. SCHEMATIC P-VCO-5.8.D-TRA-630B SHOWS THE PORTION OF THIS LINE INSIDE THE TRA-630 PUMP VAULT.

4. THE 4-IN. CROSS-TIE IS INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D) IN ITS ENTIRETY FROM LINE 4" WDA-630-B IN THE TRA-635 WEST PIPE PIT TO LINE 10" WDC-603 IN THE TRA-635 EAST PIPE PIT. SCHEMATIC P-VCO-5.8.D-TRA-630E SHOWS THIS LINE CONNECTING THE TWO PIPE PITS IN TRA-635.

5. THE CTS DISCHARGE LINE (4" WDA-630-B) TO THE RETENTION BASIN OUTLET SUMP (TRA-612) IS INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D) FROM THE TRA-630 CTS PUMP VAULT TO THE POINT AT WHICH IT IS CUT AND CAPPED IN THE TRA-635 WEST PIPE PIT. THE REMAINDER OF THIS LINE IS INCLUDED IN VCO ACTION PLAN SITE-TANK-005 SYSTEM TRA-011. SCHEMATIC P-VCO-5.8.D-TRA-630E SHOWS THE PORTION OF THIS LINE INSIDE OF TRA-635. SCHEMATIC P-VCO-5.8.D-TRA-630A SHOWS THE PORTION OF THIS LINE INSIDE THE TRA-630 CTS PUMP VAULT.

6. THE CTS DISCHARGE LINE (4" WDA-630-A) TO THE RETENTION BASIN INLET SUMP (TRA-712) IS NOT INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D). THIS LINE IS INCLUDED IN VCO ACTION PLAN SITE-TANK-005 SYSTEM TRA-009 FROM THE POINT AT WHICH IT IS CUT AND CAPPED INSIDE THE TRA-630 CTS PUMP VAULT TO THE POINT AT WHICH IT IS CUT AND CAPPED IN THE TRA-635 WEST PIPE PIT. THE REMAINDER OF THIS LINE IS INCLUDED IN VCO ACTION PLAN SITE-TANK-005 SYSTEM TRA-011. SCHEMATIC P-VCO-5.8.D-TRA-630E SHOWS THE PORTION OF THIS LINE INSIDE OF TRA-635. SCHEMATIC P-VCO-5.8.D-TRA-630B SHOWS THE PORTION OF THIS LINE INSIDE THE TRA-630 CTS PUMP VAULT.

7. THE CTS DISCHARGE LINE (3" HDA-630) TO THE TRA-613 HOT WASTE STORAGE TANK SYSTEM IS NOT INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D). THIS LINE IS INCLUDED FROM THE TRA-630 CTS PUMP VAULT TO THE TRA-613 HOT WASTE STORAGE TANK SYSTEM IN VCO ACTION PLAN SITE-TANK-005 SYSTEM TRA-004. SCHEMATIC P-VCO-5.8.D-TRA-630E SHOWS THE PORTIONS OF THIS LINE INSIDE TRA-635. SCHEMATIC P-VCO-5.8.D-TRA-630B SHOWS THE PORTION OF THIS LINE INSIDE THE TRA-630 CTS PUMP VAULT.

8. THE TRA-632 DRAIN LINE (4" HDC-632) IS INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D) FROM THE INDIVIDUAL DRAIN ASSEMBLIES IN TRA-632 TO THE TRA-630 CTS PUMP VAULT IN ITS ENTIRETY. SCHEMATIC P-VCO-5.8.D-TRA-630F SHOWS THE PORTION OF THIS LINE INSIDE TRA-632. SCHEMATIC P-VCO-5.8.D-TRA-630B SHOWS THE PORTION OF THIS LINE INSIDE OF THE TRA-630 PUMP VAULT.

9. THE GAMMA BUILDING DRAIN LINE (4" WDC-641) IS NOT INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D). THIS LINE IS INCLUDED IN ITS ENTIRETY FROM THE CANAL DRAIN PUMP DISCHARGE IN TRA-641 TO THE CONNECTION WITH LINE 4" WDA-630-A IN VCO ACTION PLAN SITE-TANK-005 SYSTEM TRA-009.

10. THE VENT SCRUBBER DRAIN LINE (4" HDB-604-A) IS INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D) FROM THE POINT AT WHICH IT IS CUT AND CAPPED IN THE BASEMENT OF TRA-604 TO ITS CONNECTION WITH LINE 4" WDC-632. THE REMAINDER OF THIS LINE INSIDE TRA-604 IS INCLUDED IN VCO ACTION PLAN SITE-TANK-005 SYSTEM TRA-008. SCHEMATIC P-VCO-5.8.D-TRA-630G SHOWS THE PORTION OF THIS LINE INSIDE TRA-604.

11. THE RADIOCHEMISTRY LABORATORY DRAIN LINE (4" HDC-604-B) IS INCLUDED IN THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.D) IN ITS ENTIRETY FROM THE INDIVIDUAL DRAIN ASSEMBLIES IN TRA-604 AND -661 TO THE TRA-630 CTS PUMP VAULT. BOTH THE INACTIVE PORTION OF THE LABORATORY DRAIN SYSTEM, WHICH CONSISTS OF THE CUT AND CAPPED LINE FROM THE TRA-604 BASEMENT TO THE TRA-630 CTS PUMP VAULT, AND THE ACTIVE PORTION, WHICH INCLUDES THE DRAINS AND PIPING CONNECTED TO THE REACTOR DRAIN TANK, ARE INCLUDED IN THE SYSTEM. SCHEMATIC P-VCO-5.8.D-TRA-630G SHOWS THE PORTION OF THIS LINE INSIDE TRA-604 AND -661. SCHEMATIC P-VCO-5.8.D-TRA-630B SHOWS THE PORTION OF THIS LINE INSIDE THE TRA-630 CTS PUMP VAULT.

12. THE CATCH TANK OFF-GAS LINE IS NOT INCLUDED IN THE TRA-630 CLOSURE BECAUSE IT HAS NEVER MANAGED HAZARDOUS WASTE. SCHEMATIC P-VCO-5.8.D-TRA-630A SHOWS THE OUTSIDE PORTION OF THIS LINE. SCHEMATIC P-VCO-5.8.D-TRA-630C SHOWS THE PORTION OF THIS LINE INSIDE THE TRA-730 CTS TANK VAULT.

REVISIONS

REV	DESCRIPTION	DATE	INIT
1	UPDATED INTERNAL COMMENTS RESULTING DURING IDEQ REVIEW CYCLE - PHASE 1	5/14/01	BDW

VOLUNTARY CONSENT ORDER PROGRAM

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

REFERENCE DRAWINGS

007428, REVISION 12
008851, REVISION 26

REFERENCE DOCUMENTS

BRISCOE 1984
NEBEKER AND LAKEY 1970
NRTS 1971
ROLFE AND WILLS 1984

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
TEST REACTOR AREA (TRA)
TRA-630 CATCH TANK SYSTEM
SITE PIPING PLAN AND SYSTEM BOUNDARIES

SCHEMATIC NUMBER: P-VCO-5.8.d-TRA-630A

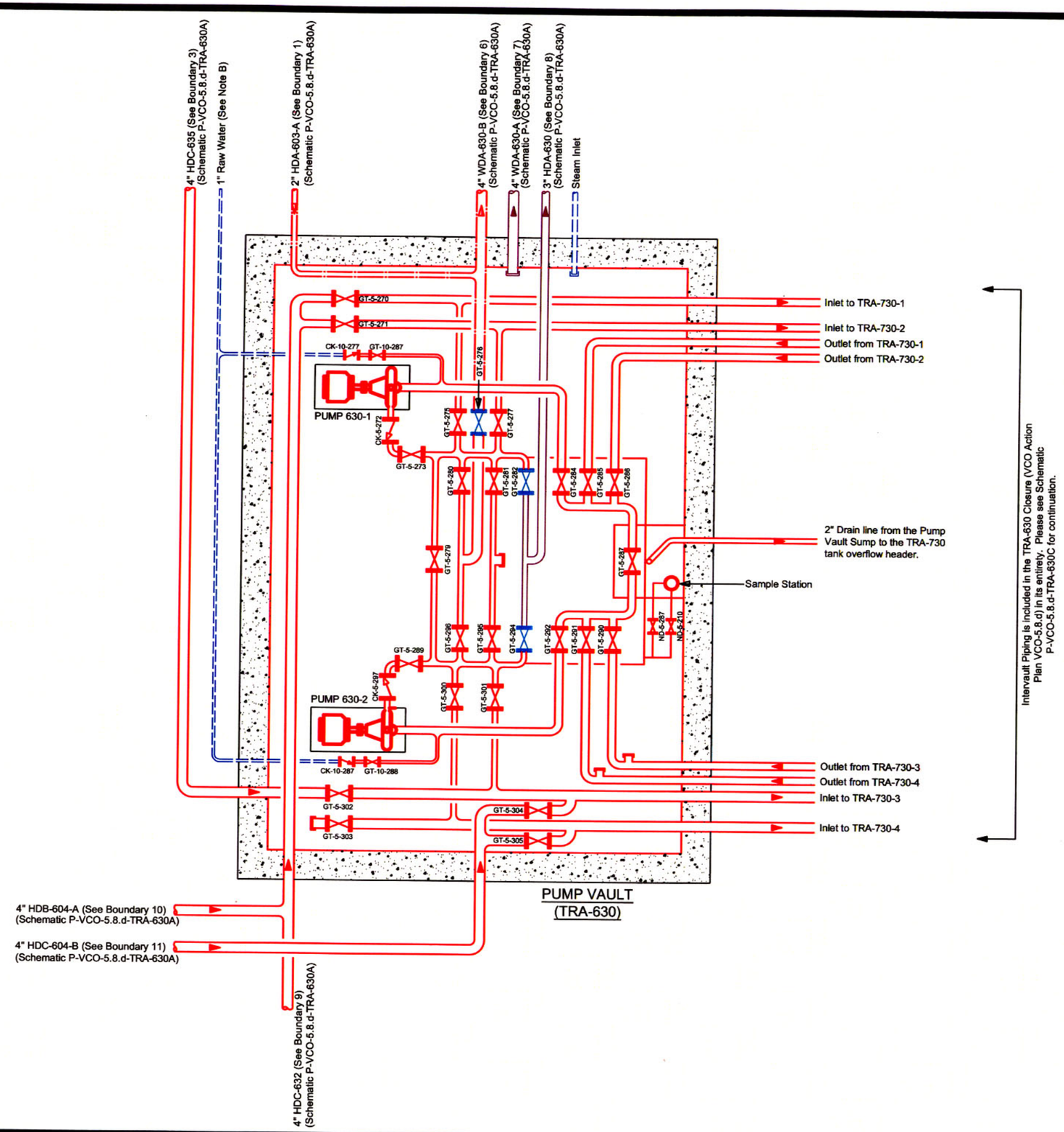
REVISION: 1

SCALE: SHOWN

DATE: 3/21/00

RESEARCH: B. WELTY

DRAWING: B. WELTY



LEGEND

- BUILDINGS
- UNITS INCLUDED IN THE TRA-630 CLOSURE
- LINES AND COMPONENTS INCLUDED IN THE TRA-630 CLOSURE
- VCO ACTION PLAN SITE-TANK-005 EVALUATION
- ACTIVE WASTE PIPING
- LINES EXCLUDED FROM THE TRA-630 CLOSURE
- PROPOSED VALVES TO BE REMOVED TO ISOLATE THE SYSTEM (SEE NOTE A)

VCO UNITS

TRA-630 CATCH TANK SYSTEM (VCO ACTION PLAN VCO-5.8.d)

REFERENCE DRAWINGS

007428, REVISION 12
008851, REVISION 26
165936, REVISION 1

REFERENCE DOCUMENTS

BRISCOE 1984
ROLFE AND WILLS 1984

NOTES

A. THE VALVES SHOWN ARE PROPOSED FOR REMOVAL TO ISOLATE THE SYSTEM FROM ACTIVE WASTE PIPING. VALVE REMOVAL AND REPLACEMENT WITH BLANK FLANGES WILL BE PERFORMED ASSUMING THE VALVE FLANGES ARE NOT WELDED. IF VALVE FLANGES ARE WELDED, OTHER MEANS WILL BE USED TO ISOLATE THE SYSTEM NEAR THESE POINTS.

B. AIR LINES (NOT SHOWN), WATER LINES, AND STEAM LINES ARE NOT INCLUDED AS PART OF THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.d) BECAUSE THEY HAVE NEVER MANAGED OR CONTACTED HAZARDOUS WASTE.

C. FOR BOUNDARY NOTES, PLEASE SEE SCHEMATIC P-VCO-5.8.d-TRA-630A.

REVISIONS

REV	DESCRIPTION	DATE	INIT
2	UPDATED TECH EDIT REVIEW	5/21/01	WP
1	UPDATED INTERNAL COMMENTS RESULTING DURING IDEQ REVIEW CYCLE - PHASE 1	5/14/01	BDW

VOLUNTARY CONSENT ORDER PROGRAM

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

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
TEST REACTOR AREA (TRA)
TRA-630 CATCH TANK SYSTEM
PUMP VAULT AND INTERVAULT PIPING PLAN

SCHEMATIC NUMBER: P-VCO-5.8.d-TRA-630B

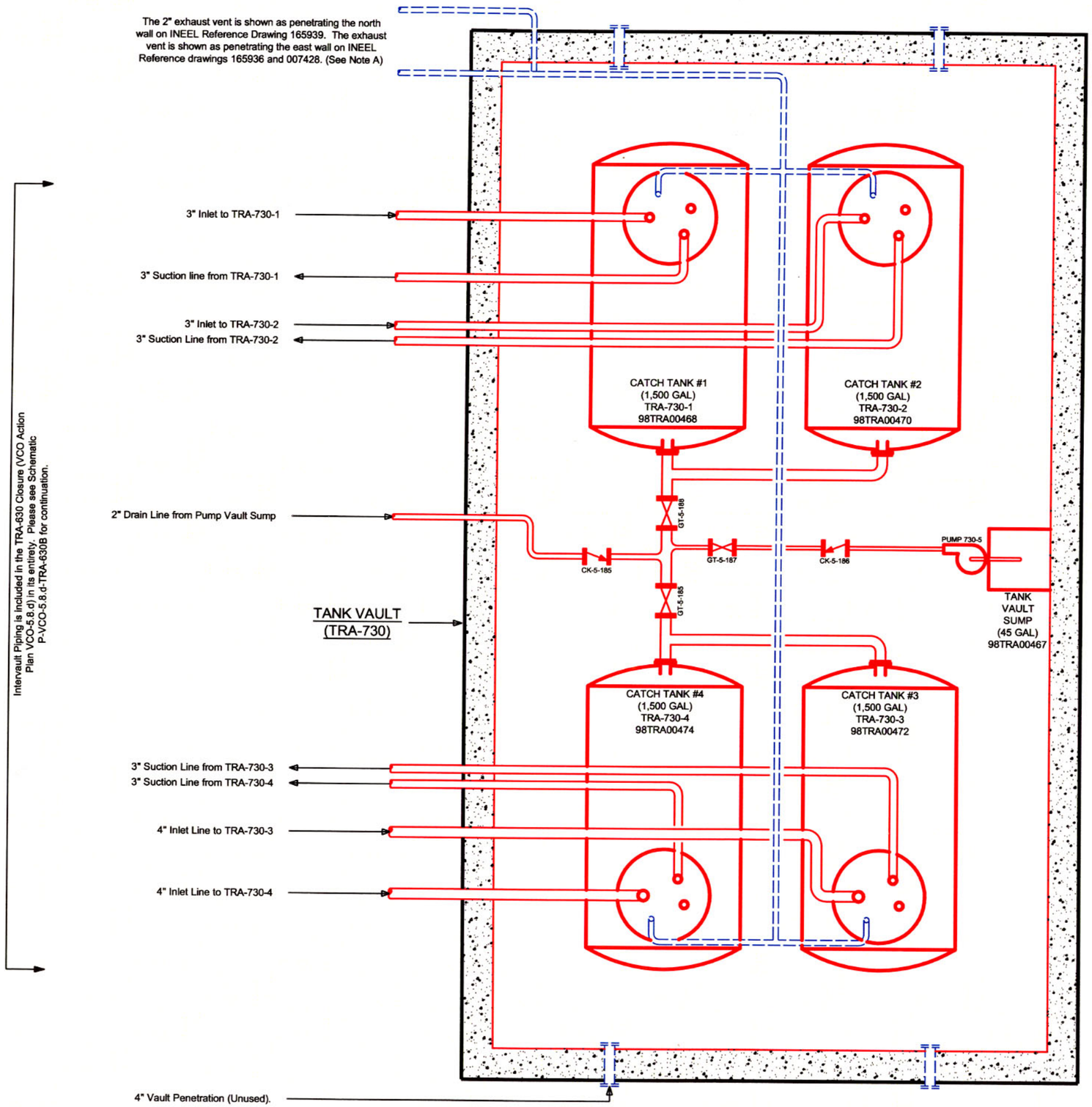
REVISION: 1

SCALE: NONE

DATE: 3/22/00

RESEARCH: B. WELTY

DRAWING: B. WELTY



LEGEND

- BUILDINGS
- UNITS INCLUDED IN THE TRA-630 CLOSURE
- LINES AND COMPONENTS INCLUDED IN THE TRA-630 CLOSURE
- LINES EXCLUDED FROM THE TRA-630 CLOSURE

VCO UNITS

TRA-630 CATCH TANK SYSTEM (VCO ACTION PLAN VCO-5.8.d)

REFERENCE DRAWINGS

007428, REVISION 12
008851, REVISION 26
165932, REVISION 1
165935, REVISION 1
165936, REVISION 1
165939, REVISION 1
165940, REVISION 1

REFERENCE DOCUMENTS

BRISCOE 1984
NRTS 1971
ROLFE AND WILLS 1984

NOTES

A. AIR LINES (NOT SHOWN) ARE NOT INCLUDED AS PART OF THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.d) BECAUSE THEY HAVE NEVER MANAGED OR CONTACTED HAZARDOUS WASTE.

REVISIONS

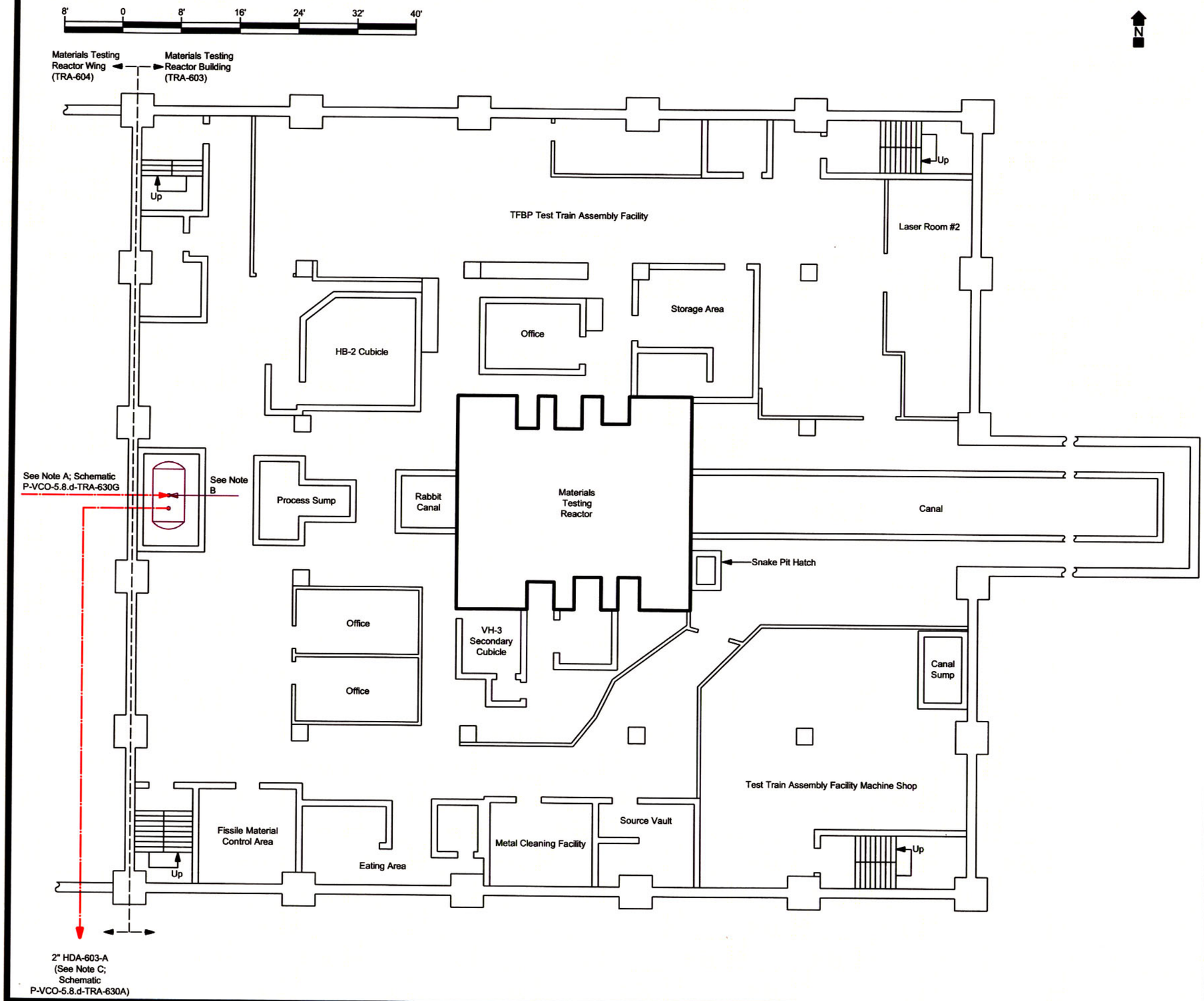
REV	DESCRIPTION	DATE	INIT
2	UPDATED TECH EDIT REVIEW	5/21/00	WP
1	UPDATED INTERNAL COMMENTS RESULTING DURING IDEQ REVIEW CYCLE - PHASE 1	5/14/00	BDW

VOLUNTARY CONSENT ORDER PROGRAM

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

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
TEST REACTOR AREA (TRA)
TRA-630 CATCH TANK SYSTEM
TANK VAULT AND INTERVAULT PIPING PLAN

SCHEMATIC NUMBER: P-VCO-5.8.d-TRA-630C
REVISION: 1
SCALE: NONE
DATE: 3/27/00
RESEARCH: B. WELTY
DRAWING: B. WELTY



LEGEND

- BUILDINGS
- LINES AND COMPONENTS INCLUDED IN THE TRA-630 CLOSURE
- ACTIVE WASTE PIPING
- VCO ACTION PLAN SITE-TANK-005 EVALUATION

VCO UNITS

TRA-630 CATCH TANK SYSTEM (VCO ACTION PLAN VCO-5.8.d)

REFERENCE DRAWINGS

008924, REVISION 6

REFERENCE DOCUMENTS

ROLFE AND WILLS 1984

NOTES

A. RADIOCHEMISTRY LAB DRAIN LINE. THIS LINE IS INCLUDED AS PART OF THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.d). SEE SCHEMATIC P-VCO-5.8.d-TRA-630G FOR CONTINUATION OF THIS LINE.

B. MTR REACTOR BUILDING FLOOR DRAIN HEADER. THIS LINE DISCHARGES TO THE REACTOR DRAIN TANK. THIS LINE AND ALL FLOOR DRAIN PIPING ARE INCLUDED AS PART OF SITE-TANK-005 VCO SYSTEM TRA-007. SEE VCO SYSTEM TRA-007 FOR CONTINUATION OF THIS LINE.

C. REACTOR DRAIN TANK DISCHARGE LINE. THIS LINE IS INCLUDED AS PART OF THE TRA-630 CLOSURE (VCO ACTION PLAN VCO-5.8.d) FROM THE REACTOR DRAIN TANK PUMP DISCHARGE. THE REACTOR DRAIN TANK AND ASSOCIATED PIPING ARE INCLUDED AS PART OF SITE-TANK-005 VCO SYSTEM TRA-007. SEE SCHEMATIC P-VCO-5.8.d-TRA-630A FOR CONTINUATION OF THIS LINE.

REVISIONS

REV	DESCRIPTION	DATE	INIT
2	UPDATED TECH EDIT REVIEW	5/21/01	WP
1	UPDATED INTERNAL COMMENTS RESULTING DURING IDEQ REVIEW CYCLE - PHASE 1	5/14/01	BDW

VOLUNTARY CONSENT ORDER PROGRAM

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

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
TEST REACTOR AREA (TRA)
TRA-630 CATCH TANK SYSTEM
MTR REACTOR BUILDING (TRA-603) BASEMENT WASTE PIPING PLAN

SCHEMATIC NUMBER: P-VCO-5.8.d-TRA-630D

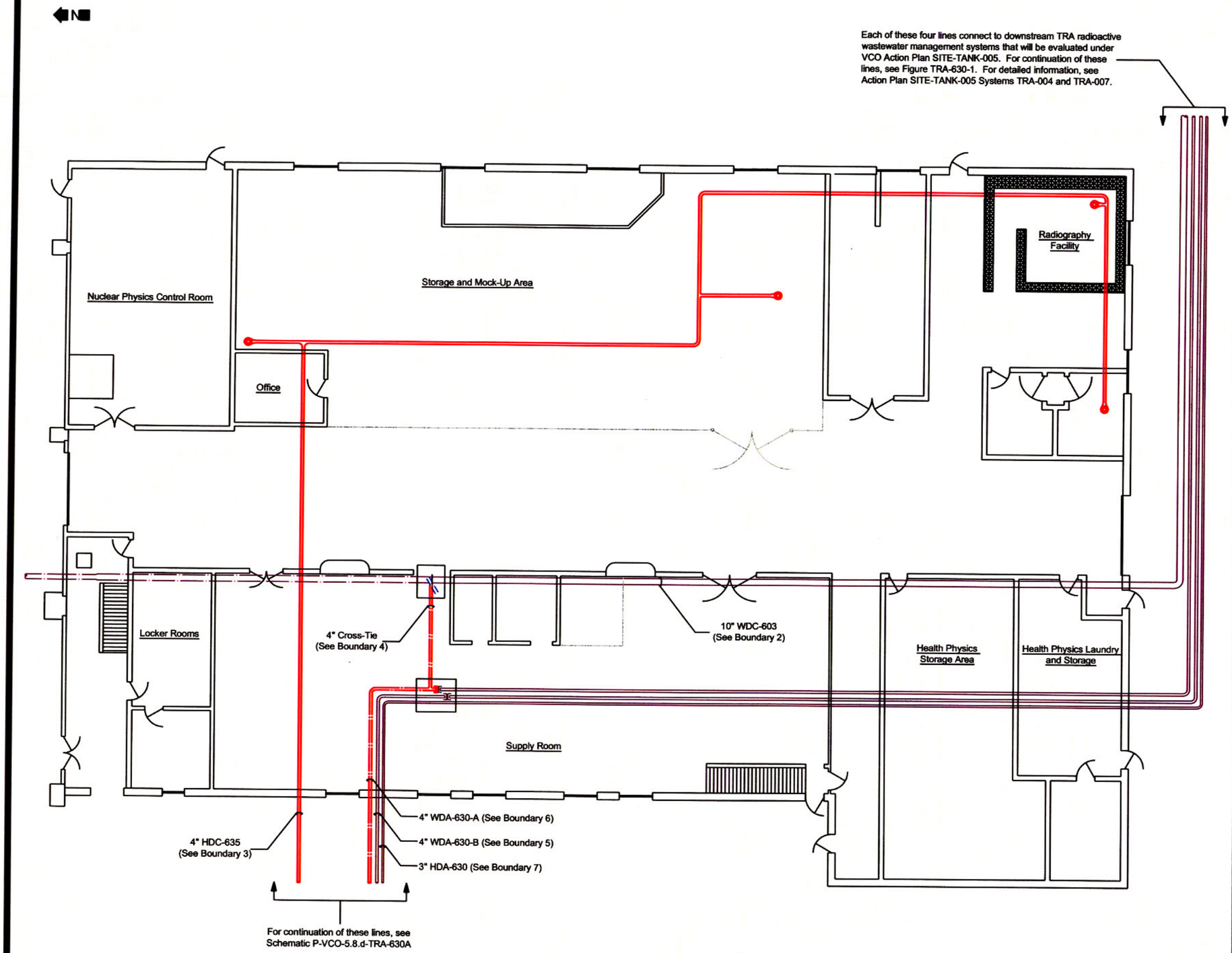
REVISION: 1

SCALE: SHOWN

DATE: 07/31/00

RESEARCH: B. WELTY

DRAWING: B. WELTY



LEGEND

- BUILDINGS
- LINES AND COMPONENTS INCLUDED IN THE TRA-630 CLOSURE
- ACTIVE WASTE LINES
- VCO ACTION PLAN SITE-TANK-005 EVALUATION

VCO UNITS

TRA-630 CATCH TANK SYSTEM (VCO ACTION PLAN VCO-5.8.d)

REFERENCE DRAWINGS

008851, REVISION 26

REFERENCE DOCUMENTS

NEBEKER AND LAKEY 1970
NRTS 1971
ROLFE AND WILLS 1984

NOTES

A. FOR BOUNDARY NOTES, SEE SCHEMATIC P-VCO-5.8.d-TRA-630A.

REVISIONS

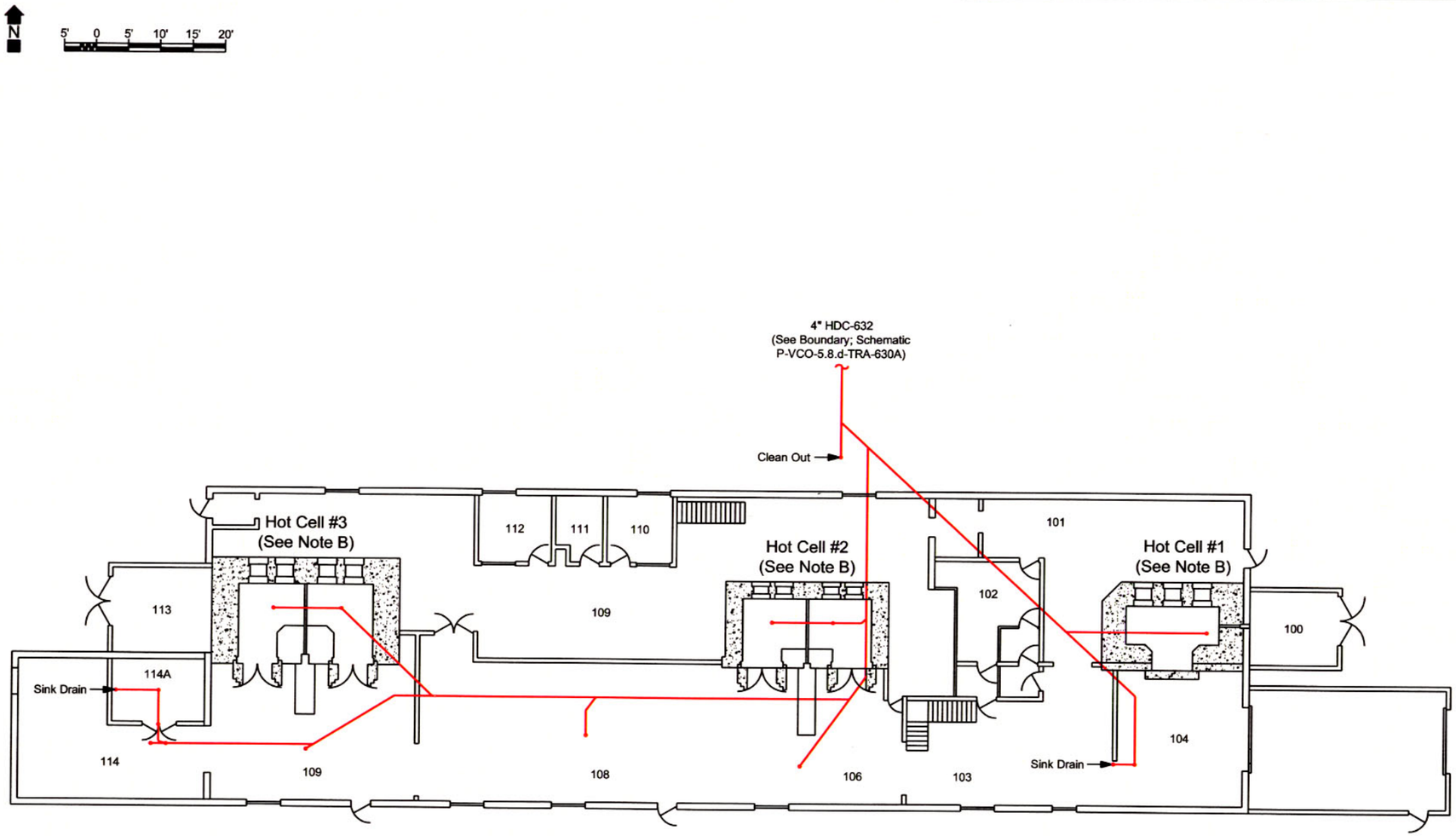
REV	DESCRIPTION	DATE	INIT
2	UPDATED TECH EDIT REVIEW	5/21/01	WP
1	UPDATED INTERNAL COMMENTS RESULTING DURING IDEQ REVIEW CYCLE - PHASE 1	5/14/01	BDW

VOLUNTARY CONSENT ORDER PROGRAM

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

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
TEST REACTOR AREA (TRA)
TRA-630 CATCH TANK SYSTEM
REACTOR SERVICES BUILDING (TRA-635) PIPING PLAN

SCHEMATIC NUMBER:			REVISION:
P-VCO-5.8.d-TRA-630E			1
SCALE: NONE	DATE: 3/27/00	RESEARCH: B. WELTY DRAWING: B. WELTY	



LEGEND

BUILDINGS
LINES AND COMPONENTS INCLUDED IN THE VCO SYSTEM

VCO UNITS

TRA-630 CATCH TANK SYSTEM (VCO ACTION PLAN VCO-5.8.d)

REFERENCE DRAWINGS

157117, REVISION 2
445773, REVISION A

REFERENCE DOCUMENTS

NEBEKER AND LAKEY 1970
NRTS 1971
ROLFE AND WILLS 1984

NOTES

A. FOR BOUNDARY NOTES, PLEASE SEE SCHEMATIC P-VCO-5.8.d-TRA-630A.

B. ALL DRAINS WITHIN THE HOT CELLS HAVE BEEN GROUTED. THE DRAINS OUTSIDE THE CELLS ARE ADMINISTRATIVELY CONTROLLED.

REVISIONS

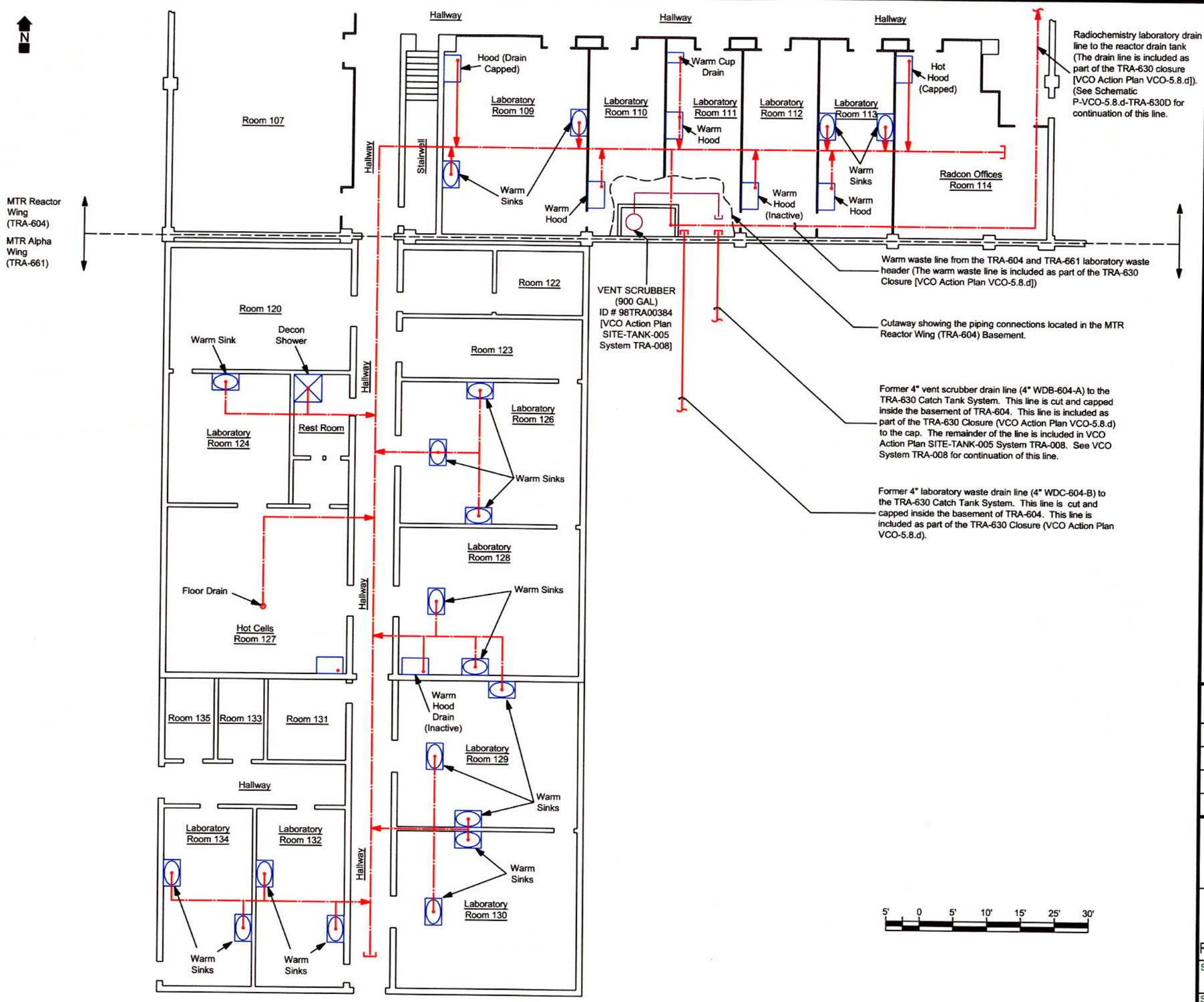
REV	DESCRIPTION	DATE	INIT
2	UPDATED TECH EDIT REVIEW	5/21/01	WP
1	UPDATED INTERNAL COMMENTS RESULTING DURING IDEQ REVIEW CYCLE - PHASE 1	5/14/01	BDW

VOLUNTARY CONSENT ORDER PROGRAM

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

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
TEST REACTOR AREA (TRA)
TRA-630 CATCH TANK SYSTEM
HOT CELL BUILDING (TRA-632) PIPING PLAN

SCHEMATIC NUMBER: P-VCO-5.8.d-TRA-630F
REVISION: 1
SCALE: SHOWN
DATE: 05/29/00
RESEARCH: B. WELTY
DRAWING: B. WELTY



LEGEND

- BUILDINGS
- LINES AND COMPONENTS INCLUDED IN THE TRA-630 CLOSURE
- ACTIVE WASTE LINES
- VCO ACTION PLAN SITE-TANK-005 EVALUATION
- UNITS AND COMPONENTS EXCLUDED FROM THE TRA-630 CLOSURE

VCO UNITS

TRA-630 CATCH TANK SYSTEM (VCO ACTION PLAN VCO-5.8.d)

REFERENCE DRAWINGS

432575, REVISION A
432579, REVISION A

REFERENCE DOCUMENTS

NOTES

REVISIONS

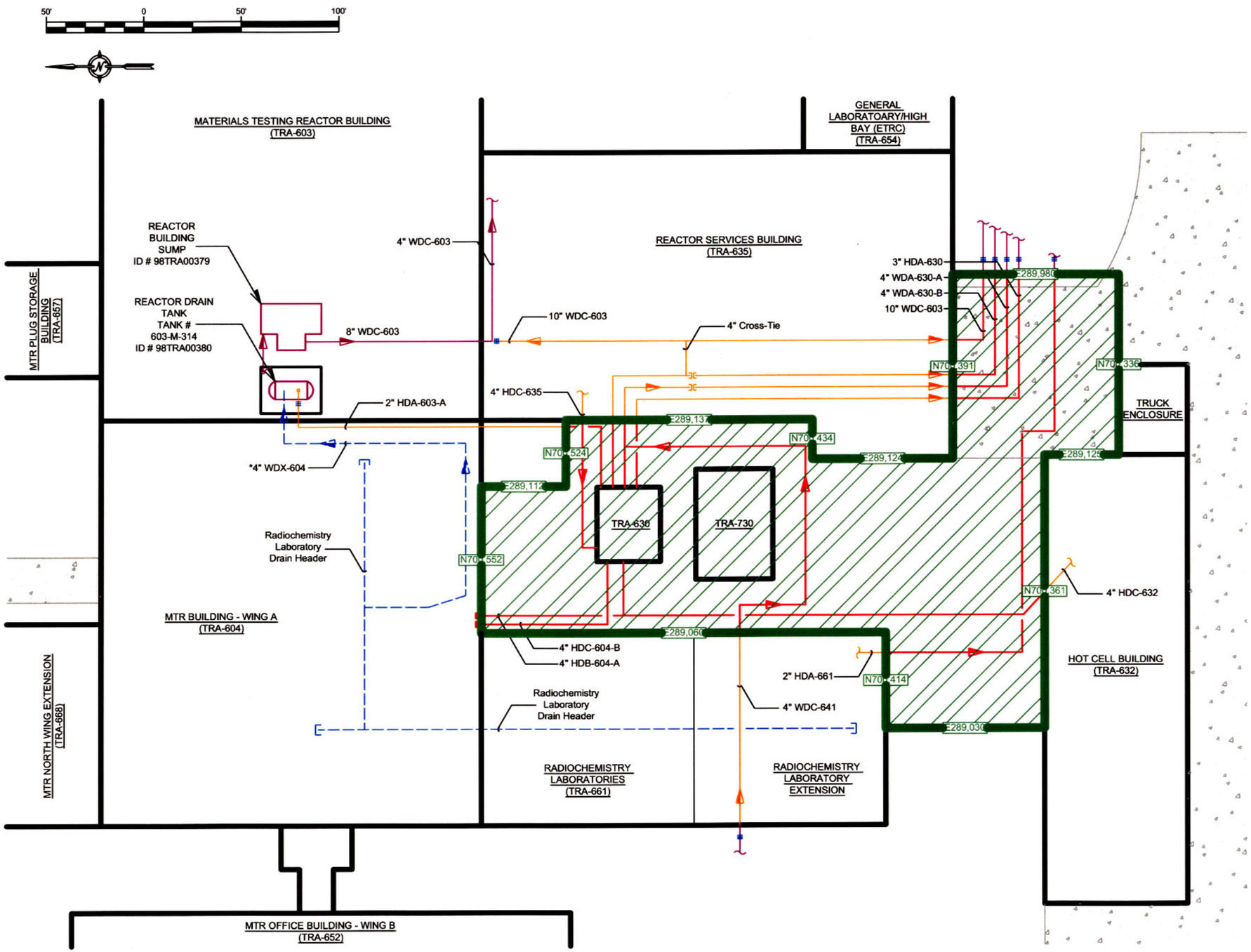
REV	DESCRIPTION	DATE	INIT
2	UPDATED TECH EDIT REVIEW	5/21/01	WP
1	UPDATED INTERNAL COMMENTS RESULTING DURING IDEQ REVIEW CYCLE - PHASE 1	5/14/01	BDW

VOLUNTARY CONSENT ORDER PROGRAM

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

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
TEST REACTOR AREA (TRA)
TRA-630 CATCH TANK SYSTEM
RADIOCHEMISTRY LABORATORIES (TRA-604 AND 661) WASTE PIPING PLAN

SCHEMATIC NUMBER:			REVISION:
P-VCO-5.8.d-TRA-630G			1
SCALE: SHOWN	DATE: 08/02/00	RESEARCH: B. WELTY	
		DRAWING: B. WELTY	



LEGEND

- BUILDINGS
- EXISTING CONCRETE
- BURIED LINES INCLUDED IN THE TRA-630 LANDFILL
- VCO ACTION PLAN SITE-TANK-005 EVALUATION
- FOOTPRINT OF THE TRA-630 LANDFILL
- LINES INCLUDED IN THE TRA-630 LANDFILL THAT ARE INTEGRAL TO SURROUNDING BUILDINGS. THE BUILDINGS IN WHICH THESE LINES ARE CONTAINED WILL SERVE AS INTERIM COVERS UNTIL SUCH TIME AS THE BUILDINGS AND LINES ARE REMOVED
- LINES INCLUDED IN THE ORIGINAL TRA-630 CLOSURE THAT WILL BE EXCLUDED FROM THE TRA-630 LANDFILL. THESE LINES ARE ACTIVE LINES THAT WILL BE RETURNED TO SERVICE AS RADIOACTIVE-ONLY WASTE LINES. THESE LINES WILL BE DECONTAMINATED TO SPECIFIED ACTION LEVELS OR WILL BE REPLACED
- EXISTING CAP
- LANDFILL ISOLATION POINT

VCO UNITS

TRA-630 CATCH TANK SYSTEM (VCO ACTION PLAN VCO-5.8.d)

REFERENCE DRAWINGS

007428, REVISION 12
008851, REVISION 26

REFERENCE DOCUMENTS

BRISCOE 1984
NEBEKER AND LAKEY 1971
NRTS 1971
ROLFE AND WILLS 1984

NOTES

ALL SYSTEM COMPONENTS WILL BE FILLED WITH GROUT TO STABILIZE WASTE RESIDUES.

ALL ABOVEGROUND STRUCTURES LOCATED IN THE LANDFILL FOOTPRINT WILL BE REMOVED. STRUCTURES TO BE REMOVED INCLUDE THE BUNKHOUSE TRAILER (TRA-637), THE PLUG STORAGE - SOUTH FACILITY (TRA-611), THE WEATHER ENCLOSURE ATOP THE TRA-630 CTS PUMP VAULT, AND THE BULLY BARN ATOP THE TRA-730 TANK VAULT MANHOLE.

ALL NONSYSTEMIC LINES (WATER, SANITARY WASTE, FIREWATER, STEAM, ETC.) THAT PENETRATE THE LANDFILL AREA WILL BE ISOLATED.

LINES LEADING TO INDIVIDUAL DRAINS INSIDE THE BUILDINGS (4" HDC-635, 4" HDC-632, AND 2" HDA-661) WILL BE ISOLATED AT THE INDIVIDUAL DRAIN ASSEMBLIES.

LANDFILL LONGITUDES AND LATITUDES ARE EXPRESSED AS "EASTERS AND NORTHERS."

REVISIONS

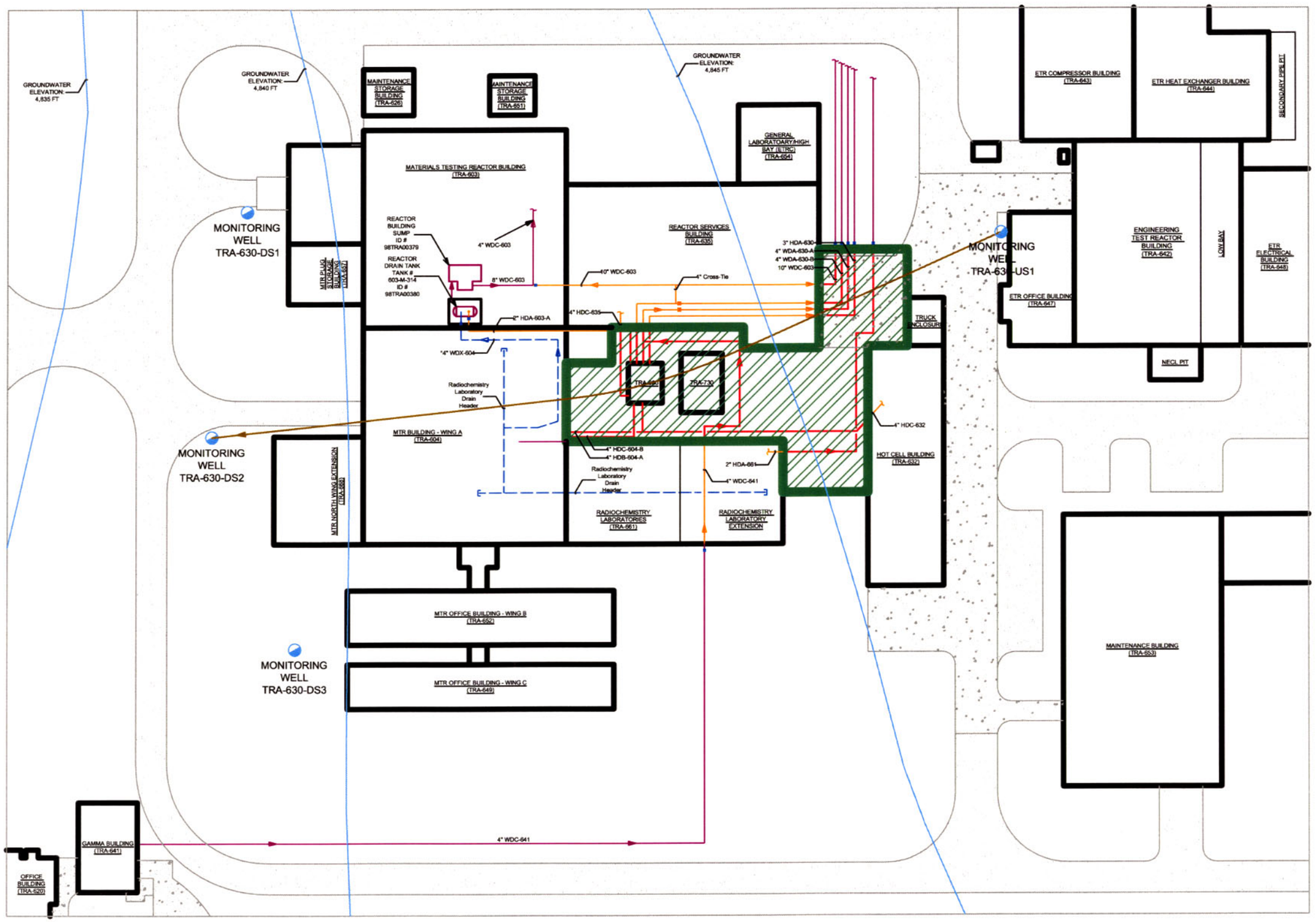
REV	DESCRIPTION	DATE	INIT

VOLUNTARY CONSENT ORDER PROGRAM

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

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
TEST REACTOR AREA (TRA)
TRA-630 CATCH TANK SYSTEM
PROPOSED LANDFILL FOOTPRINT, BOUNDARIES, AND ISOLATION POINTS

SCHEMATIC NUMBER:			REVISION:
P-VCO-5.8.d-TRA-630N			0
SCALE: SHOWN	DATE: 5/18/01	RESEARCH: B. WELTY	
		DRAWING: B. WELTY	



LEGEND

- BUILDINGS
- EXISTING CONCRETE
- BURIED LINES INCLUDED IN THE TRA-630 LANDFILL
- VCO ACTION PLAN SITE-TANK-005 EVALUATION
- FOOTPRINT OF THE TRA-630 LANDFILL
- GROUNDWATER FLOW PATH
- GROUNDWATER ELEVATION CONTOURS (EACH CONTOUR INTERVAL CORRESPONDS TO 5 FT OF GROUNDWATER ELEVATION)
- LINES INCLUDED IN THE TRA-630 LANDFILL THAT ARE INTEGRAL TO SURROUNDING BUILDINGS. THE BUILDINGS IN WHICH THESE LINES ARE CONTAINED WILL SERVE AS INTERIM COVERS UNTIL SUCH TIME AS THE BUILDINGS AND LINES ARE REMOVED
- LINES INCLUDED IN THE ORIGINAL TRA-630 CLOSURE THAT WILL BE EXCLUDED FROM THE TRA-630 LANDFILL. THESE LINES ARE ACTIVE LINES THAT WILL BE RETURNED TO SERVICE AS RADIOACTIVE-ONLY WASTE LINES. THESE LINES WILL BE DECONTAMINATED TO SPECIFIED ACTION LEVELS OR WILL BE REPLACED
- EXISTING CAP
- LANDFILL ISOLATION POINT
- PROPOSED MONITORING WELL LOCATION

VCO UNITS

TRA-630 CATCH TANK SYSTEM (VCO ACTION PLAN VCO-5.8.d)

REFERENCE DRAWINGS

007428, REVISION 12
008851, REVISION 26

REFERENCE DOCUMENTS

BRISCOE 1984
NEBEKER AND LAKEY 1971
NRTS 1971
ROLFE AND WILLS 1984

NOTES

CONTOUR PLOT ASSEMBLED IN SURFER VERSION 7.0 (GOLDEN SOFTWARE) FROM A GRIDDED FILE OF 27 PERCHED WATER WELLS' WATER ELEVATIONS. THE GRID FILE WAS CREATED USING ORDINARY KIRGING.

ALLUVIUM/BASALT INTERFACE AVERAGE DEPTH: 49 FT BELOW SURFACE

1ST INTERBED AVERAGE DEPTH: 79 FT BELOW SURFACE

REVISIONS

REV	DESCRIPTION	DATE	INIT

VOLUNTARY CONSENT ORDER PROGRAM

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

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY
TEST REACTOR AREA (TRA)
TRA-630 CATCH TANK SYSTEM
GROUNDWATER CONTOUR MAP AND PROPOSED WELL LOCATIONS

SCHEMATIC NUMBER:			REVISION:
P-VCO-5.8.d-TRA-630O			0
SCALE: SHOWN	DATE: 5/22/01	RESEARCH: B. WELTY	
		DRAWING: B. WELTY	