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**ICPP WATER INVENTORY STUDY
LEAK TEST REPORT**

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1. INTRODUCTION

Data from the Idaho Chemical Processing Plant (ICPP) indicate that there are three areas where perched water bodies (groundwater) are suspect to exist beneath the ICPP. Questions have been raised between the U.S. Department of Energy, Idaho Field Office (DOE-ID), and the State of Idaho, Idaho National Engineering Laboratory (INEL) Oversight Program concerning the recharge sources for the northwest (NW) perched water body which is located below the northwest area of the ICPP (Figure 1.1).

In response to these questions, a Water Inventory Study was initiated to determine the extent and the potential impacts of the ICPP water systems as a recharge source. The Water Inventory Study is a joint effort between the DOE-ID, INEL Oversight Program, United States Geological Survey (USGS), and Westinghouse Idaho Nuclear Co., Inc. (WINCO) with technical support from Golder Associates.

A key part of the Water Inventory Study was the leak test investigation, performed to leak test the ICPP water piping distribution system, or portions thereof, which could potentially contribute to the recharge of the NW perched water body. This report provides an overview and the results of the leak test investigation and will be incorporated into the overall Water Inventory Study Report.

1.1 Purpose and Scope

The purpose of this investigation was to determine if the ICPP water distribution systems contribute to the recharge of the northwest perched water body. During a Value Engineering Session, described in Section 3.1 of this report, it was concluded that only portions of the water distribution and collection systems at the ICPP would be relevant to recharging the NW perched water body and that those relevant portions were bound by an "area of interest" depicted in Figure 1.2. The "area of interest" is supported by the hypothesized configuration of the NW perched water body. The leak test investigation was confined to the ICPP water distribution and collection systems and employed the following test methods: 1) ultrasonic flow meter, 2) equalized pressure, 3) water column, and 4) tracer injection leak testing.

1.2 Report Organization

The balance of this report is organized by sections; the following provides a brief summary for each of those sections:

- Section 2 Background. Describes the location and history of the ICPP site and provides an overview of perched water bodies, as they relate to the ICPP.
- Section 3 Leak Test Project Description; describes the project objectives and investigation methodology.
- Section 4 Water System Description; describes the piping systems and areas of interest evaluated during the investigation.

Figure 1.1 Location of ICPP Perched Water Bodies

Figure 1.2 Major ICPP Facilities

Section 5 Investigation Methods and Results; describes the test methods used for each system and the test results.

Section 6 Conclusions; provides a summary of the test results.

2. BACKGROUND

2.1 Location and History

The ICPP is one of the principal facilities at the U.S. DOE INEL located near Idaho Falls, Idaho. The original ICPP mission was to receive, store, and process spent nuclear fuel from test and research reactors in the United States, foreign countries, and from the U.S. Navy's ship propulsion reactors. In 1992, ICPP's mission was changed to receive, store, and prepare spent fuel for final disposition. ICPP began operation in 1953. The facility consists of four process buildings and numerous support buildings. It covers an area of approximately 200 acres and employs approximately 1800 people. Figure 1.2 provides an area map of the ICPP denoting the major facilities.

2.2 Perched Water Zone

During the 40 year history of the ICPP, water has entered the surficial alluvium underlying the plant via natural sources (i.e., rain and snowmelt) and artificial sources (i.e., percolation ponds, sewer ponds, and water distribution piping leaks). Once water contacts the surficial alluvium, it evaporates to the atmosphere, percolates downward to the Snake River Plain Aquifer (SRPA), or accumulates in "perched water bodies." It has been hypothesized that a combination of these natural and artificial water sources contribute to the perched water bodies beneath the ICPP.

Perched water occurs when a sufficient amount of water moves downward through a higher conductivity zone and encounters a lower conductivity zone. For the geological conditions at the ICPP, this lower conductivity zone can be a fine grained sedimentary interbed, a massive basalt flow or the upper surface of a basalt flow where the fractures and pores have been filled with fine grained sediments and secondary minerals.

"Perching" of water often takes place within and above the interbeds where water is being recharged through the surface alluvium and basalt. Evidence indicates that the most significant perching layer exists approximately 110 feet below ground surface (bgs) at the ICPP. A generalized map displaying the postulated locations of the three ICPP perched water bodies, which occur on top of the 110 foot bgs perching layer, is depicted in Figure 1.1. The recharge source of the southern body has been determined to be the ICPP percolation ponds. A second perched water body is expected in the northeastern portion of the ICPP resulting from the operation of the ICPP Sewage Treatment Plant. The third perched water body, associated with the area of interest for this report, is speculated to be in the northwest area of ICPP centered beneath the Tank Farm.

There is at least one, if not several, perched water bodies on top of the 110 ft perching layer near the Tank Farm. This perched water contains dissolved concentrations of radionuclides, suggesting contamination from past releases at the ICPP. Because the perched water body

represents a potential pathway for the migration of the contaminants to the SRPA, it is important to understand the potential sources of recharge to the perched water body.

3. LEAK TEST PROJECT DESCRIPTION

In response to questions related to the ICPP perched water bodies, a Water Inventory Study was initiated. The Water Inventory Study is designed to determine:

- a. The identity of the source of water infiltrating into the ICPP Tank Farm sumps,
- b. Water system leaks and alternative sources of water that recharge the perched water body located beneath the northwest portion of the ICPP, and
- c. The measurement imbalance of water usage at the ICPP and upgrade the metering capabilities to better manage the ICPP water distribution system.

3.1 Investigation Description

The leak test investigation was initiated to satisfy the Water Inventory Study objective of determining the water system leaks and alternative recharge sources (3.b. above). The investigation was confined to identifying piping system leaks or alternative recharge sources that may contribute to the ICPP NW perched water body.

A study using Value Engineering (VE) techniques was held on June 9-11, 1993. The purpose of this study was to develop a list of sources which could potentially contribute to water found in the sump system of the Tank Farm. One of the primary potential leak sources identified during the VE session was the water piping systems in and around the vicinity of the Tank Farm, which could potentially contribute to the NW perched water body.

The VE session performed an evaluation to identify 1) all potential contributing systems; 2) which of the systems had the highest probability of leaking (due to contributing factors such as age, material of pipe, configuration, use, etc.); and 3) the boundary or "area of interest" where leaks were most likely to occur. From this the relevant piping systems and "area of interest" (Figure 1.2) were established.

A modified Kepner-Tregoe decision analysis process was used to establish criteria with associated weight factors for evaluating each type of piping system. Each piping system was rated and ranked. The results were a list of prioritized pipes to be investigated in the area of interest. The highest ranking piping system for potential to contributing to the NW perched water body from this evaluation are raw water, fire water, treated water, demineralized water, steam condensate, landscape irrigation, service waste, potable water, and sanitary sewer. During this study it was also decided that investigation of the piping systems should first begin with the pipes that are in the immediate vicinity of the Tank Farm.

The systems that were identified as potential contributors are described in Section 4 of this report. Because both pressurized and non-pressurized systems were identified, the use of more than one leak test method was required. Dependent upon the design and configuration

constraints of each system, an appropriate test method or combination thereof, was selected and performed. Leak test plans consisting of test configuration, system descriptions, test methods, and results were maintained in test field logs, the results of which are provided in the balance of this report.

4. WATER SYSTEM DESCRIPTION

The ICPP uses approximately 2.1 million gallons of water per day (Raytheon Engineers, 1993). Water is supplied by three wells: two raw water wells and one potable water well. The water is used for process cooling; equipment cooling; steam production; process solutions; decontamination; fuel storage basin makeup; chemical laboratory use; regeneration of ion exchange units; and human uses such as drinking, personal showers, food preparation, restroom facilities, and fire protection.

The majority of the water systems are "once through" systems; water is used once and then discharged to either the service waste system or the sewage waste system. Exceptions are: 1) a small amount of steam condensate (approximately 20 percent of 74 gallons per minute between September and April) is returned for boiler feed water, and 2) approximately 300 gallons per minute (gpm) of raw water, used for heat pumps in four office buildings, is recirculated back to the raw water storage tanks (DOE, 1993).

Piping systems external to facility buildings are either buried or placed in utility tunnels. As depicted in Figure A-1, the ICPP utility tunnel system distributes utility systems (i.e., electrical, treated water, demineralized water, steam, etc.) to the plant. The tunnel provides easy access to the piping systems and acts as a secondary containment allowing for continuous leak detection and monitoring. Therefore, piping systems housed by the utility tunnel(s) were not considered for leak testing. The portion of the utility tunnel within the area of interest has a total length of 1,361 feet. This length includes the tunnel from CPP-606 (beginning) to CPP-659 and to the middle of CPP-666. The following text provides a general description for each of these systems.

4.1 Raw Water System

The raw water piping system has an approximate total length of 6,250 feet, with an average flow of 389 gpm, of which 205 gpm is recycled back to the raw water holding tanks (DOE, 1993). Figure A-2 provides the site plan of the raw water piping system.

Raw water is pumped from production wells WEL-UTI-501 and -502 to the fire water storage tanks VES-UTI-111 and -112. Raw water overflows from the fire water tanks through internal stand pipes to the two raw water feed tanks, VES-UTI-600 and -608. The overflow stand pipes ensure that an adequate supply of fire water remains in storage at all times and allows flow through the tanks to prevent freezing.

The raw water tanks supply water to three raw water distribution pumps, P-UTI-502, -503 and -504 in CPP-606, which distribute raw water through the piping system to the ICPP facilities. The raw water system also supplies water to softeners and demineralizes, located in building CPP-606, for the production of treated (softened) water and demineralized water.

Figure A-3 depicts the raw water piping that is in the area of interest for leak testing. For the area of interest, Table B-1 lists the buildings serviced by the raw water piping system, the respective piping lengths, and designates those lines located in the utility tunnel.

4.2 Fire Water

The fire water piping system has an approximate total length of five miles, with an average flow of ~ 45 gpm (see Section 5.2.2). Because fire systems are normally considered to be a static load, a breakdown of the ~ 45 gpm is provided in Table 4.1. Figure A-4 depicts the site plan of the fire water piping system. Raw water wells WEL-UTI-501 and -502 supply water to the fire water storage tanks VES-UTI-111 and -112. The tanks supply water to fire pumps P-UTI-672 and -673 located in CPP-1643 and 1642, which distribute fire water through the piping systems to fire hydrant and fire protection systems.

Figure A-5 depicts the fire water piping that is in the area of interest for leak testing. For the area of interest, Table B-2 lists the buildings serviced by the fire water piping system and respective piping lengths.

4.3 Treated Water

The treated water piping system has an approximate total length of 4,000 feet, with an average flow of 900 gpm (Raytheon Engineers, 1993). Distribution of the treated water to the ICPP originates in building CPP-606.

Figure A-6 is the site plan and depicts the treated water piping that is in the area of interest for leak testing. For the area of interest, Table B-3 lists the buildings serviced by the treated water system, the respective piping lengths, and designates those lines located in the utility tunnel.

4.4 Demineralized Water

The demineralized water piping system has an approximate total length of 4,200 feet, with an average flow of 1.5 gpm (Raytheon Engineers, 1993). Figure A-7 provides the site plan for the demineralized water system. Distribution of the demineralized water system originates in building CPP-606.

For the area of interest, Table B-4 lists the buildings serviced by the system, the respective piping lengths, and designates those lines located in the utility tunnel.

4.5 Steam Condensate

The steam condensate piping system has an approximate total length of 4200 feet, with an average flow of 74 gpm between September and April. Figure A-8 provides the site plan for the steam condensate piping system. Primary steam use occurs between the months of September and March due to seasonal demands such as heating, freeze protection, etc. Steam is supplied from CPP-606 and the Coal Fired Steam Plant.

Table 4.1 ICPP Fire Water System Use

ICPP Building	Service	Maximum Flow / Use
CPP-637	Lawn sprinklers - 3 Stations	15 gpm / 20 minutes o\per station - April thru Sept. - 7 days/wk.
CPP-640	Safety shower / eye wash safety shower / eye wash	10 gpm / emergency purpose only 10 gpm / emergency purpose only
CPP-641	Cooling water for waste tank	20 gpm / used once every four years
CPP-648	Prime contaminated waste pump	10 gpm / 10 gallons per month
CPP-652	Lawn sprinklers - 4 stations	15 gpm / 30 minutes per station - April thru Sep - 7 days/wk
CPP-654	Wash down ramp and floors	10 gpm / 20 gallons per month
CPP-699	Two heat pumps and outside hose bib	25 gpm / constant use, disposed into service waste
CPP-699	Lawn sprinklers - 4 stations and 2 hose bibs	20 gpm / 30 minutes per station - April thru Sep - 7 days/wk
CPP-1608	Air handling unit	3 gallons per hour / May thru Sep.
CPP-1619	6 hose bib stations	10 gpm / emergency use only
CPP-734	2 sump pumps (cool bearings) and 2 radiation monitoring bowls (flush)	10 gpm/ constant use for now
CPP-796	Flush radiation monitoring bowls (2)	10 gpm / 3 gallons per day
CPP-797	Flush radiation monitoring bowls (2)	10 gpm / 3 gallons per day
Total Constant Use gpm (1)		35 gpm

(1)- This value does not account for the system leak (~ 16 gpm) discussed in Section 5.2.2

Buildings located on the northwest side of Birch Street (including CPP-640) return steam condensate to CPP-606 for reuse and have average flow rate of 39 gpm between September and March, with a 1.2 gpm flow rate for the balance of the year. All other buildings discharge their used steam to service waste unless it is vented or disposed directly to the ground. Steam condensate from the steam lines which are located in the utility tunnel discharge steam condensate directly to ground. Steam is also vented to the atmosphere via condensate return tanks and pressure relief valves. The relief valves at the coal fire steam plant regulate the entire steam system pressure and release the largest quantity of steam to the atmosphere.

Figure A-8 depicts the condensate piping located in the area of interest for leak testing. For the area of interest, Table B-5 lists the buildings serviced, the respective pipe lengths, and designates those lines located in the utility tunnel.

4.6 Landscape Irrigation

There are seven stations in the landscape irrigation system and all could potentially contribute to the NW perched water body. The total area of the seven stations is approximately 1.5 acres and total system flow is approximately 19,971 gallons per day during the summer months. Each station is operated by an automatic timer set to operate the sprinklers at night.

The landscape irrigation system is fed by the fire water system, raw water system, and the potable water system. Figure A-9 provides the locations of all seven systems and Table B-6 gives a breakdown of the amount of water used per day and source of the water feeding each station.

4.7 Potable Water System

The potable water piping system has an approximate total length of two miles, with an average flow rate of 61 gpm (DOE, 1993). Figure A-10 provides the site plan for the potable water system.

Potable water is supplied by the potable water well, WEL-UTI-504. Water is pumped from the well to potable water storage tank, VES-UTI-696 located just north of CPP-614. Three distribution pumps, P-UTI-662, -662 and -664, housed in building CPP-606 distribute the water to the ICPP facilities. The potable water system also includes a chlorinated system to meet potable water system requirements.

For the area of interest Figures and Tables for leak testing were not included for potable water because the entire system was leak tested.

4.8 Service Waste

The service waste piping system has an approximate total length of 2.4 miles, with an average flow rate of 1320 gpm (DOE, 1993). Figure A-11 provides the site plan for the service waste piping system. The service waste piping system was designed to be gravity fed to lift station CPP-797 and from there it is pressurized to the percolation ponds.

Raw water, treated water, demineralized water, and steam condensate are discharge to the service waste system which, in turn discharges into two percolation ponds located at the south end of the ICPP. Service waste streams are piped through service waste monitoring/diversion systems to monitor radiological contamination. If radiological contamination is detected, the water is diverted to a low level waste tank and stored for future processing. All water is monitored prior to discharge to the percolation ponds.

Figure A-12 depicts the service waste piping located in the area of interest for leak testing. For the area of interest, Table B-7 lists the buildings services and the respective pipe lengths.

4.9 Sanitary Sewer System

The sanitary sewer piping system has an approximate total length of 1.5 miles, with an average flow rate of 29 gpm (DOE, 1993). Figure A-13 provides the site plan for the sanitary sewer system. This is a gravity fed system which employs the use of lift stations (these lift stations do not pressurize the piping system).

Potable water and sanitary waste from various ICPP buildings is discharged into the waste system and flows to one of the four lift stations. Each lift station has a sump and pump from which the pumps transfer the sewage to the treatment lagoons. Sewage flows through two aeration lagoons, then through two quiescent lagoons and finally to infiltration trenches where the water percolates into the ground.

Figure A-14 depicts the sanitary waste piping located in the area of interest for leak testing. For the area of interest, table B-8 lists the buildings services and the respective pipe lengths (there are no sanitary pipes in the utility tunnel).

5. INVESTIGATION OBJECTIVES

This section of the report describes the leak test methods utilized, the elevation methods applied to each system, and the test results.

5.1 Test Methods

Leak testing methods were used for the pressurized systems (raw, fire, treated, demineralized, steam condensate, and potable); Ultrasonic Flow Meter, Equalized Pressure, and Water Column, tracer injection testing methods were used for the gravity feed systems (sanitary sewer, and service waste).

5.1.1 Ultrasonic Flow Meter Leak Test

This flow meter test method was performed by using an ultrasonic flow meter to measure the amount of flow of a given system while it was under pressure. Testing was performed by conducting an outage (isolating the system or reducing its flow to minimal and known rate) of the system, attaching the flow meter to the piping, calibrating the flow meter, and recording the flow rates over a period of time. While the flow meter was in operation, data was continuously transmitted and recorded on an electronic data logger. At the conclusion of each

test, a flow printout was obtained from the data logger identifying the flow rates. By comparing the flow rates to the known rates being supplied during the test, the difference between the two values would indicate if a leak did exist and what the leak rate was.

The ultrasonic flowmeter is a portable "clamp-on" unit which operates on any pipe which is sonically conductive, provided adequate mounting space is available at the pipe. Suitable pipe materials include most metals, plastics, and glass. Unsuitable pipes are concrete or other non-homogenous materials.

The flowmeter operates by transmitting an ultrasonic beam (sound wave) from the initial transducer, through the pipe and liquid to a transducer on the opposite side of the pipe which receives and reflects the beam back to the initial transducer. The time difference taken for each beam reflection is then used to calculate the velocity (flow) of the liquid flowing through the pipe. For example, if the time for both ultrasonic beams to be received by the transducers is the same then there is no flow.

5.1.2 Equalized Pressure Test

The equalized pressure test method was utilized to measure leakage in individual isolated sections of piping at operating pressure. This test method used a flow meter and garden hoses to connect in-service portions of the piping system and the piping section to be isolated (leak tested). The test piping section would then be isolated under normal working pressure via isolation valves. Flow passing through the meter to maintain pressure on the isolated section of pipe indicates leakage rate. The flow meter that was used for this method (Western Water Meter, Inc., Multi-Jet water meter) has an accuracy of ± 3 percent of the flow.

5.1.3 Water Column Leak Test

Water column leak testing is performed by placing a system under static pressure (hydraulic head) using a column of water and measuring the amount of drop or loss in the column over a given period of time. The flow rate would then be calculated by measuring the amount of water needed to replace the head and the time it took for the head to drop.

5.1.4 Tracer Injection Test

A tracer injection test method was used to leak test the buried unpressurized piping systems, i.e., sanitary waste and service waste systems. Tracer research Corporation certifies that the underground pipelines that are tested by means of Tracer Tight[®], which meets the criteria set forth in NFPA 329 for a precision leak test. According to EPA standard test procedure for evaluating leak detection methods, the Tracer Tight[®] method is capable of detecting leaks of 0.05 gallons per hour with a probability of detection of .97 percent and a possibility of false alarm of 2.9 percent.

to perform this test the piping was first inoculated with an organic tracer unique to the system tested. Sanitary waste system was inoculated with one tracer and the service waste system was inoculated with separate and unique tracer.

After inoculation, testing did not occur for 14 days. This allowed the tracer to disperse throughout the system and to diffuse into the soil if there were any leaks. Sampling probes were then driven into the ground above the test lines to a specified depth above the pipe, at a spacing interval of 5 to 15 feet. Probes were installed approximately 2 feet above the service waste lines and approximately 5 feet above the sanitary waste line, depths were determined based upon the different tracer characteristics and detection properties, and construction material utilized for the pipe. Each sample probe was then assigned a unique identifier and noted on site map.

After the fourteen day dwell time, soil vapor samples were collected by attaching a vacuum pump to the sample probe and evacuating the soil vapors. The soil vapor samples were then injected into specially designed sample canisters and shipped to a laboratory for analysis. The sample tractability data and chain of custody records (which also accompanied the samples to the laboratory) were maintained during the sample collection activities. Upon analysis, if the organic tracer is detected in the soil gases, a leak in the line has been located.

5.2 Test Results

All piping housed in the utility tunnels was not considered for the purpose of this report. Leak inspection in the utility tunnels is routinely performed on a weekly basis through the normal conduct of operations.

5.2.1 Raw Water System Test Results

The raw water piping system was hydrostatically pressure tested in early 1992 during a raw water construction upgrade project. A review of the project test records (WINCO, Raw) showed that all raw water lines in the area of interest (Figure A-3 and Table B-1), with the exception of one, were hydrostatically tested with no leaks detected.

For the line not tested during the upgrade project, running between buildings CPP-606 and CPP-1610, an equalized pressure leak test was performed during this investigation. The results from this test showed that pressure was maintained for a period of 30 minutes.

Therefore, based on leak test results of the 1992 upgrade project and the equalized pressure test conducted during this investigation, the raw water piping system is not considered to be a contributor to the NW perched water.

5.2.2 Fire Water System Test Results

The fire water system was tested by using a combination of first, the ultrasonic flow meter test method, and then the equalized pressure test method. Due to the size of the entire fire water system, the system was subdivided into sections and tested by section. This test was to monitor system, the entire fire water flow rate as each section was taken off line (valved out) for fifteen minutes and then put back on line. Evaluation of the flow meter data logger outputs would show that if a flow decreased was noted during the time a section was valved out, then that section

would be suspect of leaking. Further testing of the suspect section would then be performed, by the same process when available or with the use of the equalized pressure test method, until a leak or unidentified use was noted. During this testing of the entire ICPP fire water piping system an average flow rate of ~ 45 gpm was recorded on the data logger.

Using this process, the northeast section (area of interest), from Beech St. to the east and from Olive Ave. to the north (Figure A-5), was identified as leaking. By the process of elimination it was determined that the line was isolated and a leak of 16 gpm was found.

To confirm where the leaks were occurring an equalized pressure leak test was performed. Two leaks were identified using this process, an ~ 4 gpm leak from a fire hydrant and a 12 gpm leak from a service pipe that runs to CPP-751. No other leaks were found in the area of interest.

The fire hydrant that had a ~ 4 gpm leak was fixed at the time it was detected and work order has been issued to repair the hole in the service pipe that runs to CPP-751.

In addition to the flow meter testing, hydrostatic pressure test results from recent fire water upgrade projects were reviewed for new piping installed in the area of interest. The results of these reports showed no leaks were observed (WINCO, Fire water).

5.2.3 Treated Water System Test Results

Leak testing was accomplished using the ultrasonic flow meter method on the main treated water supply line which exits the west end of building CPP-606. The pipe at this location is a nominal 2-inch diameter steel pipe that supplies all treated water to buildings west of CPP-606.

During the test period, between 9/10/93 to 9/16/93 the ultrasonic flow meter was used to determine the average flow rate that the system supplies and record the flow rate while the system was isolated (Figure A-7). On 9/16/93, an outage of the system was obtained which isolated the entire system. The outage continued for 14 minutes in which time no flow was measured through the system. This indicates that there are no leaks in the treated water piping system and that this system is not a contributor to the NW perched water body.

5.2.4 Demineralized Water System Test Results

Leak testing was accomplished using the ultrasonic flowmeter method on the main demineralized water supply line at the distribution pumps in building CPP-606. The line at this location is a nominal 2-inch diameter steel pipe that supplies all demineralized water to the ICPP.

During the test period, between 9/9/93 and 9/10/93, an outage on this system was conducted (isolating the system). During this outage several zero flow rates were observed and the rest of the recorded flow rates during this outage were right at the accuracy of 0.3 gpm which indicates that there are no leaks in the system. Therefore, this system is not a contributor to the NW perched water body.

5.2.5 Stream Condensate Water System Test Results

The portion of the stream condensate system located in the area of interest, which is on the east side of building CPP-606 (see Figure A-8), is housed entirely in the utility tunnel and is inspected weekly. Therefore, it did not require leak testing. The portion of the system located on the west side of CPP-606 was not tested during this investigation period because the operation of the heating and freeze protection systems would not allow the condensate system to be taken out of service and it is not considered to be in the area of interest.

5.2.6 Landscape System Test Results

The landscape irrigation piping was not tested during this investigation. Actual leak testing was not warranted because the landscape irrigation systems are shallow depth systems in which leaks are readily apparent by soil erosion. Since these systems are only pressurized when operating and intended to discharge water to the ground it was deemed more appropriate to evaluate the amount of water deposited in the seven landscape irrigation station (1.5 acres) to determine how much water could potentially infiltrate below grade.

For evaluation purposes a mean water value (the amount of water needed to sustain 1.5 acres of grass in the given climate) was determined. This value was derived from the Bureau of Reclamations' daily recorded values for consumptive use and evapotranspiration for grass crop in the Aberdeen area. This information was the best available data for an area resembling the same general climate as the ICPP, from which a value was derived of 784,000 gallons per growing season (April 11, 1993 to October 4, 1993).

The total volume of water that is being supplied to the seven landscape irrigation stations between April and October is 2,352,000 gallons per growing seasons, leaving a balance of 1,568,000 gallons of water per growing season that is available to infiltrate and recharge the NW perched water body. There could also be some evaporation if puddling on the surface occurs, but it would be a minor amount.

5.2.7 Service Waste System Test Results

In the past year under normal operation four leaks in the service waste have been identified and repaired. Leak testing of the service waste system was accomplished by using the tracer leak detection method. Lines identified in the Value Engineering Session (area of interest) were inoculated at six points with a tracer.

During the test period, between 10/1/93 and 10/4/93, the suspect portions of the system (lines traveling down Olive Ave. and Beech St.) were inoculated. The test results indicate that the tracer that was used to inoculate the service waste system was not detected confirming that there are no leaks in the service waste lines tested, and that this system is not a contributor to the NW perched water body (see Appendix C).

5.2.8 Potable Waste System Test Results

Testing of the piping system was accomplished using two types of tests: 1) water column leak tests, and 2) installation of flow meters on the piping between CPP-614 and CPP-606 and on the 4-inch potable water supply main line above boiler B-UTI-605 in building CPP-606.

The water column leak test was designed to test the piping from the potable water well to building CPP-614 using the pressure from a full water storage tank standpipe. The pipe tested is a nominal 6-inch diameter steel pipe that carries potable water from the well to the storage tanks at CPP-614. The potable water storage tank was filled. The 14.5 foot high tank fill standpipe was monitored, using a pressure gauge located approximately 3.5 feet above the tank bottom. During testing, a loss of pressure was observed indicating a leak. The leak rate calculated from the results of this test was 0.15 gpm during supply well pump operation.

Testing was, in turn, conducted on the 4-inch nominal diameter steel pipe running between CPP-624 and CPP-606, using the ultrasonic flowmeter. During the outage on the system (isolation) no flow was measured indicating that this section of pipe was not leaking.

The ultrasonic flow meter was also installed on the nominal 4-inch diameter steel pipe in CPP-606, where the potable water is distributed to the entire plant. Outages were obtained, during which, the ultrasonic flow meter was calibrated. After calibration of the flowmeter, low flows that were observed during routine operations of the ICPP working shift between 12:00 am to 7:00 am were observed from 9/2/93 to 9/9/93 were 6.4 gpm and 7.6 gpm.

Because low flow rates of 6.4 gpm and 7.6 gpm were observed for the entire potable system, the system is considered to be tight and not a significant contributor. This is based on the logic that the potable water system is approximately two miles in length and supplies potable water to 54 buildings with numerous fixtures in each building. The flows observed were in the range expected for operation of single fixture or for minor leakage of fixture valves. Furthermore, normal human consumption of potable water is between 30 to 60 gallons per 8 hour shift per person (ASCE, 1982). Therefore, if 100 to 200 employees are on the site at night when the low flows were observed, the flow rate at the plant would be 6.25 to 25 gpm. These values do not include typical system loss (faucets and toilet leaks, etc.) and appear to be well within the range of normal consumption indicating that the potable water system is not recharging the NW perched water table.

5.2.9 Sanitary Sewer System Test Results

Leak testing of the sanitary sewer system was accomplished by using the tracer leak detection method. Lines identified in the Value Engineering Session (area of interest) were inoculated at four points with a tracer.

During the test period, between 10/22/93 and 11/11/93, the suspect portions of the system (lines traveling down Olive Ave. and Beech St.) were inoculated and sampled. The test results indicate that the tracer used to inoculate the sanitary sewer system was not detected confirming that there are no leaks in the sanitary sewer waste lines tested and that this system is not a contributor to the NW perched water body (see Appendix D).

6. CONCLUSIONS

The ICPP water systems are large systems collectively totaling over 15.4 miles in length. Of these systems, ~5 miles of piping were evaluated for leaks during this investigation, the results of which are presented in Table 6.1. The results of this evaluation concluded that there is a total of about 5.6 million gallons a year available for recharge to the NW perched water body. This volume of water are attributed to the fire water system, that landscape system and a minor amount from the potable water system.

The fire water system was found to have a four gpm fire hydrant leak, which was assumed to be a year round leak, and a 12 gpm leak from a branch connection which is known to be used at least once a week by facility operations. Because the use of the branch connection is not closely monitored, and it has been known to be pressurized for more than one week at a time, a conservation estimate of 48 hours a week (x 12 gpm) was used to calculate potential volume loss. The combination of both these leaks yielded a value of 3.9 million gallons a year available to recharge the NW perched water body. This is deemed to be a significant contributing source. This fire hydrant was fixed at the time the leak was located and a work order has been issued to repair the branch connection leak.

The landscape system was found to potentially contribute approximately 1.6 million gallons to the NW perched water body during its seasonal use. Although this amount of water is considered significant, acceptable landscape water values or alternative measures (e.g., discontinued use) will be addressed at a later date. Further investigation to be conducted under the ongoing CERCLA/RI/FS will determine if the landscape irrigation should be continued.

The potable water system was found to have a small leak of 79,000 gallons a year, which for the purpose of recharge is deemed to be insignificant. This leak will be evaluated under the CERCLA activities to determine if the impact warrants the cost to correct this leak.

In conclusion, both the fire water and landscape system were found to be significant contributors. However, the leaks or contributing operations will be corrected or managed more effectively to reduce the NW perched water body recharge to an acceptable level.

Table 6.1 Leak Test Investigation Summary Results

LEAK TEST INVESTIGATION SUMMARY RESULTS			
	Total System Length (ft) (1)	Area of Interest Pipe Length Tested (ft) (1)	Area of Interest Leaks Found (gallons/year)
Pressurized Systems			
Raw Water	6,250	4,590	0
Fire Water	26,400	5,150	3,900,000 (2)
Treated Water	4,000	2,662	0
Demineralized Water	4,200	2,425	0
Steam Condensate	4,200	3,790	0
Landscape Irrigation	N/A (3)	N/A (3)	1,600,000 (4)
Potable Water	10,600	4,000	79,000
SUB TOTAL	55,650 (10.5 miles)	22,617 (4.3 miles)	5,600,000
Gravity Feed Systems			
Service Waste	12,700	1,505	0
Sanitary Sewer System	7,900	1,240	0
SUB TOTAL	20,620 (3.9 miles)	2,745 (0.52 miles)	0
TOTAL	76,270 (14.4 miles)	25,362 (4.8 miles)	5,600,000 (5)(6)

(1)- Length were obtained from plant maps. All lengths are approximations.

(2)- This is calculated by having a 4 gpm leak at a fire hydrant for 365 days and having a 12 gpm leak for 48 hours per week.

(3)- Landscape piping has not been leak tested.

(4)- This value was calculated as discussed in Section 5.2.6

(5)- This is the total amount of water that is available for recharge in the area of interest.

(6)- The total amount of water that the ICPP uses per year is 2.1 million gallons per day @ 365 days = 770 million gallons per year. The leaks that were found in the area of interest are less than 0.73 percent of the total.

REFERENCES

1. ASCE (American Society of Civil Engineers), 1982, *Gravity Sanitary Sewer Design and Construction*, ASCE Manuals and Reports on Engineering Practice-NO.60, April.
2. DOE (U.S. Department of Energy), May 1993, *Idaho Chemical Processing Plant Water Inventory Study Progress Report*, U.S. Department of Energy, Idaho Field Office, Westinghouse Idaho Nuclear Co., State of Idaho INEL Oversight Program.
3. Leak Investigation Testing Field Log Book
4. Raytheon Engineers & Constructors, *Feasibility Study Report*, MS93-345, June 1993
5. U.S. Bureau of Reclamation, 1992, *Automatic Agricultural Weather Monitoring System*, Sept 1992.
6. WINCO, *Raw Water Upgrade Project*, LI-1
7. WINCO, *Fire Water Upgrade Project*, LI-2 & LI-3

APPENDIX A

System Figures

FIGURE A-1: SITE PLAN FOR THE UTILITY TUNNEL SYSTEM

FIGURE A-2: SITE PLAN FOR THE RAW WATER PIPING SYSTEM

FIGURE A-3: RAW WATER PIPING IN THE AREA OF INTEREST

FIGURE A-4: SITE PLAN FOR THE FIRE WATER PIPING SYSTEM

FIGURE A-5: FIRE WATER PIPING IN THE AREA OF INTEREST

FIGURE A-6: TREATED WATER PIPING SYSTEM SITE PLAN AND AREA OF INTEREST

FIGURE A-8: STEAM CONDENSATE WATER PIPING SYSTEM SITE PLAN AND AREA OF INTEREST

FIGURE A-9: LOCATIONS OF THE LANDSCAPE IRRIGATION STATIONS

FIGURE A-10: SITE PLAN FOR THE POTABLE WATER PIPING SYSTEM

FIGURE A-11: SITE PLAN FOR THE SERVICE WASTE WATER PIPING SYSTEM

A-11

FIGURE A-12: SERVICE WASTE WATER PIPING IN THE AREA OF INTEREST

FIGURE A-13: SITE PLAN FOR THE SANITARY SEWER WATER PIPING SYSTEM

FIGURE A-14: SANITARY SEWER WATER PIPING IN THE AREA OF INTEREST

APPENDIX B

System Tables

TABLE B-1: BUILDING SERVICED IN THE AREA OF INTEREST FOR RAW WATER

From	To	*Description	Length (ft)	Tunnel
Wells	CPP-614	N/A	140	NO
CPP-614	10" supply line	This line splits and runs to CPP-606, north end of utility tunnel, and north to Cypress Ave.	625	NO
Cypress Ave and Bach St.	8" supply main	This line runs parallel to Cypress Ave from Beach St. to CPP-1605.	390	NO
8" Supply Main	1605	Buried 6" line	110	NO
Supply line	1631	Buried 6" line	225	NO
North end of utility tunnel	South end of utility tunnel	This line runs in the utility tunnel down Beach St turns west at Ash Ave, turns south at Maple St.	3,100	YES

*To refer to the area of interest look at Figure A-3

TABLE B-2: BUILDING SERVICED IN THE AREA OF INTEREST FOR FIRE WATER

From	To	*Description	Length (ft)	Tunnel
CPP-699	CPP-633	This section includes the entire loop from valve 6519 which is just east of CPP-699 to valve to 4501 north of CPP-633	1,750	No
CPP-633	CPP-1662	Line also supplies fire water to CPP-605, 662, 1618, 649, 630, 619, 618, 628, and 606	2,000	No
CPP-633	Valve 6519	Includes the rest of the loop and supplies fire water to CPP-664, 1645, 1648, 654, TR-35.	1,400	No

*To refer to the area of interest look at Figure A-5

TABLE B-3: BUILDING SERVICED IN THE AREA OF INTEREST FOR TREATED WATER

From	To	*Description	Length (ft)	Tunnel
CPP-606	North End of Utility Tunnel	Line go's straight east of CPP-606	100	yes
North End of Utility Tunnel	East and south of the ICPP	This section supplies treated water to CPP-604, 659, 663, 684 that are in the area of interest.	1,625	yes
CPP-606	CPP-601, 602, and 627	This is in the piping tunnel	375	yes
CPP-606	CPP-637, 652	The line splits and one go's to CPP-652 and the other to CPP-637	562	no

*To refer to the area of interest look at Figure A-7

TABLE B-4: BUILDING SERVICED IN THE AREA OF INTEREST FOR DEMINERALIZED WATER

From	To	*Description	Length (ft)	Tunnel
CPP-606	CPP-628	N/A	250	no
CPP-606	Utility Tunnel	Line supplies demineralized water to CPP-604, 684	1,250	yes
CPP-606	CPP-602,601,627,631	This is in the piping tunnel	425	yes
CPP-606	Cpp-637	N/A	500	no

*To refer to the area of interest look at Figure A-9

TABLE B-5: BUILDING SERVICED IN THE AREA OF INTEREST FOR STEAM CONDENSATE

From	To	*Description	Length (ft)	Tunnel
CPP-606	CPP-666	Line supplies the southeast portion of the condensate through the utility tunnel	2,000	Yes
CPP-606	CPP-668	Line also supplies CPP-645	563	No
CPP-606	CPP-686	line also supplies CPP-652. Length is taken at split from CPP-668.	625	no
CPP-606	CPP-637	Line also supplies CPP-640, 620, 1616. Length is taken from split of line from CPP-606 to CPP-686.	600	no

*To refer to the area of interest look at Figure A-11

TABLE B-6: LANDSCAPE STATIONS

*Station	Area of Lawn (ft²)	Amount Used (gal/d ay)	System Suppling the Water
1	6,946	1,560	Fire Water
2	9,830	1,574	Fire Water
3	9,440	1,210	Raw Water
4	7,742	2,076	Potable Water
5	22,700	1,488	Fire Water
6	14,874	6,330	Raw Water
7	6,286	5,733	Raw Water

*To refer to the area of interest look at Figure A-12

TABLE B-7: BUILDING SERVICED IN THE AREA OF INTEREST FOR SERVICE WASTE WATER

From	To	*Description	Length (ft)	Tunnel
CPP-659	CPP-754 via Olive Ave. and Beech St.	Line also services CPP-605, 1618, 633.	625	No
CPP-606	Manhole near CPP-709	Connects with line that comes from CPP-659.	750	No
CPP-636	Beech St.	Line goes through the tank farm and connects with the line that goes from CPP-606.	690	No
CPP-601	Manhole via CPP-752	Line connects with the line that runs down Beech St.	190	No
CPP-604	Manhole near CPP-709	Length also include distance to CPP-752	625	No

*To refer to the area of interest look at Figure A-14

TABLE B-8: BUILDING SERVICED IN THE AREA OF INTEREST FOR SANITARY SEWER

From	To	*Description	Length (ft)	Tunnel
CPP-1648	CPP-669	This line branches at several places along Cypress Avenue to connect buildings CPP-1645, -1649, -1631, -1604, -1604, -645, -648, -652, and -657, as well as those branches shown below.	1,600	NO
Cypress Avenue	CPP-637	This is a branch of the previous line to CPP-637.	250	NO
Cypress Avenue	Treatment Plant	This branch runs to buildings CPP-664, -654, and -699 and the north lift station and then to the treatment plant.	500	NO
Cypress Avenue	CPP-684	This branch runs south from the piping at Cypress Ave. through a lift station located on Beech St. with connections to buildings CPP-606, -630, and -684.	1,000	NO
Lift Station on Beech Street	CPP-695	The line branches from the Beech St. lift station, runs east and connects buildings CPP -662/663, -1608, -659, and -695 to the system.	1,094	NO

*To refer to the area of interest look at Figure A-17

APPENDIX C
Service Waste Tracer Test Results

Arizona Instrument

4114 East Wood Street • Phoenix, Arizona 85040-1941 • (602) 470-1414

CERTIFICATION

Contract No: 5804-93

Test Date: November 5, 1993

Customer: Westinghouse Idaho Nuclear

Attn: Bart Richards

Idaho Falls ID 83401

Site: Winco-Chem Plant

Contact: Bart Richards

Idaho Falls ID 83401

Tank No.	Tank Product	Line Test Result
1	Wastewater	Pass

Technician

Name: Don Feist

License No.: 9213168

State: ID

Technician's Signature

Donald M Feist

IDAHO PETROLEUM CLEAN WATER TRUST FUND
PETROLEUM STORAGE TANK FUND BUREAU
PST TIGHTNESS TESTING REPORT (CONFIDENTIAL)

Business Name Winco-Chem Plant
Owner's Name Westinghouse Idaho Nuclear Company
Address Idaho Falls City Idaho Falls County
Phone Number 208-526-5060
Tester's Name Don Feist
State Tester Certification Number 9213168
Test Equipment Manufacturer/Name of Test Tracer Tight
Manufacturer's Certification Number N/A
Tightness Testing Company Name Arizona Instrument
Address 4114 East Wood Street Phoenix, AZ 85040-1941
Phone Number (602) 470-1414

Groundwater elevation (Both a. and b. must be completed.)

a. Check one: groundwater above the tank(s) base _____
or below the tank(s) base ☒ _____

b. Depth to groundwater >3 ft _____ feet.

Tank System Test Report - Attached to this form should be the actual test data and quality assurance/
quality control information for each tank system (including piping) tested, which must include the
following:

- Date of test.
- Operational test conditions (volume, product temperature, waiting period before start of test,
method calibration data and other specific operating conditions).
- Time of initiation and conclusion of test.
- All recorded volume and/or temperature changes and times.
- Correction factors and all calculations.
- Calculated leak rate in Gal./Hr.
- Type of petroleum product in tank(s) tested.
- Provide a diagram showing layout of tanks and piping systems (i.e., orientation and depth), their
location with respect to buildings and other surface & subsurface features, and denote type of
product in each tank.
Number each tank as instructed on reverse.

Tanks and piping test reports not containing the above information will not be accepted by the PSTF Bureau.

I, the undersigned, certify under penalty of law that I have personally examined and am familiar with the information
submitted in this and all attached documents, and I believe that the submitted information is true, accurate, and
complete.

Donald M Feist
Signature of tank tester

11/15/93

Date

TRQ Job #: 012384
Date: 10-18-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 1 of 8Client: WINGO Westinghouse Idaho Nuclear Co., Idaho Falls City: Idaho Falls State: Id Contact: _____
Site / Program: WINGO - CHEM PLANT Project #: 5840-93 Phone: _____
Affiliate: HORIZON ENGINEERING Collected By: FRANCIS KELLY 01021

Probe #	Depth	Cluster #	Sampling Date	Time	Vacuum	Remarks	Analyte Requested	Received	Date Analyzed	By	LAB	Remarks
1	3'		10-18	11:10	7							
12	3'			11:24	13							
3	3'			11:56	5							
4	3'			12:10	5							
12,3,4	3'			12:20	6	Cluster Sample						
5	4'			12:22	5							
6	4'			12:40	5							
7	4'			12:58	5							
8	4'			1:10	5							
5,6,7,8	4'			1:23	5	Cluster						
9	4'			1:45	5							
10	4'			1:55	5							
11	4'			2:10	5							
12	4'			2:16	5							
9,10,11,12	4'			2:26	5	Cluster						
13	4'			2:32	5							
14	4'			2:40	5							
15	4'			2:52	5							
16	4'			3:02	5							
Blank	-			3:15	5							

Signature: <u>FRANCIS KELLY</u> Date: <u>10-19-93</u>	Signature: _____ Date: _____	Signature: _____ Date: _____	Signature: _____ Date: _____	Signature: _____ Date: _____
---	------------------------------	------------------------------	------------------------------	------------------------------

Maximum Pump Vacuum (Inches Hg) 21

Remarks

Final Sample Disposition

Date Billed:

WHITE - Return with samples to lab

YELLOW - Return with samples to lab

PINK - Return with samples to lab

ORANGE - Sender's copy

TRC Job # 012384
Date: 10-19-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 1 of 2Client: WE STINKHOUSE Idaho Nuclear Co. Address: Idaho Falls City: Idaho Falls State: Id Contact: _____
Site / Program: WINCO - CHEM Plant Project #: 5840-93 Phone: _____
Affiliate: HORIZON ENGINEERING Collected By: Faircliff Pettit 01081 VA

Probe #	Depth	Cluster #	Sampling		Vacuum	Remarks	Analysis Requested	Received	Date Analyzed	By	LAB	Remarks
			Date	Time								
13,14,15,16		5'	10-18	3:20	5							
21		4'		3:32	5							
22		4'		3:50	5							
23		4'	10-19	8:47	5							
24		4'		9:10	5							
21,22,23,24		4'		9:18	5	cluster sample						
25		4'		10:00	5							
26		4'		10:22	5							
27		4'		10:40	5							
25,26,27		4'		10:51	5	cluster sample						
28		4'		11:20	5							
29		4'		12:22	5							
30		3'		12:35	5							
31		3'		12:43	5							
28,29,30,31		3'		12:50	5	cluster sample						
32		3'		1:00	5							
33		3'		1:06	5							
34		3'		1:15	5							
35		2'		1:27	5							
Blank	B			1:40	5							

Received By: <u>F. Pettit</u> Date: <u>10-19-93</u>	Received By: _____ Date: _____	Received By: _____ Date: _____	Received By: _____ Date: _____
Received By: _____ Date: _____	Received By: _____ Date: _____	Received By: _____ Date: _____	Received By: _____ Date: _____

Maximum Pump Vacuum (inches Hg) 21 Remarks _____
Final Sample Disposition _____ Date Billed: _____

TRC # 013384
Date: 10-19-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 3 of 5Client: WESTINGHOUSE Idaho Nuclear Co. Address: Idaho Falls City: Idaho Falls State: Idaho Contact: _____
Site / Program: WIND-CHERI PLANT Project #: 5840-F-2 Phone: _____
Affiliate: HORIZON ENGINEERING Collected By: Garrett Feltz 21021 UA

Probe #	Depth	Cluster #	Sampling Date	Time	Vacuum	Remarks	Analyte Requested	Received	Date Analyzed	By	LAB	Remarks
32,33,34,35	3'		10-19	1:54	6							
36	3'			2:02	6							
37	3'			2:09	6							
38	3'			2:16	6							
39	2.5'			2:25	6							
36,32,35,37				2:33	6							
40	2.5'			2:41	6							
41	2.5'			2:50	6							
42	2.5'			2:58	6							
40,41,42	2.5'			3:05	6							
17	4'		10-20	9:46	6							
18	4'			9:52	6							
19	4'			9:58	6							
20	4'			10:02	6							
17,18,19,20	4'			10:04	6							
43	4'			10:24	6							
44	4'			10:33	13							
45	4'			10:40	6							
46	5'			10:52	6							
Blank	-			10:54	3							

Signature: <u>[Signature]</u> Date: <u>10-20-93</u>	Signature: _____ Date: _____	Signature: _____ Date: _____	Signature: _____ Date: _____	Signature: _____ Date: _____
---	------------------------------	------------------------------	------------------------------	------------------------------

Maximum Pump Vacuum (Inches Hg) <u>21</u>	Remarks
Final Sample Disposition	

Date Billed:

WHITE - Return with sample to lab

YELLOW - Return with sample to lab

PINK - Return with sample to lab

ORANGE - Sender's copy

TRC Job #: 002384
Date: 10-20-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 4 of 8Client: Westinghouse Idaho Nuclear Co. Address: Idaho Falls City: Idaho Falls State: Idaho Contact: _____
Site / Program: WINCO - CHEM PLANT Project #: 5840-93 Phone: _____
Affiliate: HARVEY ENGINEERING Collected By: FARRELL PETTIT 01031 WA

Probe #	Depth	Cluster #	Sampling Date	Time	Vacuum	Remarks	Analyte Requested	Received	Date Analyzed	By	LAB	Remarks
43,44,45,46			10-26	11:05	6	cluster						
47	5'			11:40	6							
48	5'			11:17	6							
49	5				6							
50	5			12:25	6							
47,48,49,50	5			12:30	6	cluster						
51	5'			12:37	6							
52	5'			12:50	6							
53	5'			1:05	6							
54	5'			1:14	6							
55,56,57				1:30	6	cluster						
55	5'			1:36	6							
56	5'			1:56	6							
57	5'			2:05	6							
58	5'			2:08	6							
59,60,61				2:10		cluster						
59	5'			2:19	6							
60	5'			2:21	6							
61	5'			2:30	6							
Blank				2:35								

Signature: <u>Hester</u> Date: <u>10-20-93</u>	Signature: _____ Date: _____	Signature: _____ Date: _____	Signature: _____ Date: _____
--	------------------------------	------------------------------	------------------------------

Maximum Pump Vacuum (Inches Hg) 21 Remarks _____

Final Sample Disposition

Date Billed: _____

WHITE - Return with samples to lab

YELLOW - Return with samples to lab

PINK - Return with samples to lab

ORANGE - Sender's copy

C-6

TRC Job #: 013384
Date: 10-20-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 5.8

Client: Westwater Inc Idaho Nuclear Co Address: Idaho Falls City: Idaho Falls State: Idaho Contact: _____
Site / Program: Windsor-Cherry Plant Project #: 584043 Phone: _____
Affiliate: Horizon Engineering Collected By: Barry Patten 21031 UA

Probe #	Depth	Cluster #	Sampling Date	Time	Vacuum	Remarks	Analyte Requested	Received	Date Analyzed	By	LAB	Remarks
62	2'40"		10-20	2:40	L							
62, 61, 62	2'45"			2:45	6	Cluster sample						
63	2'48"			2:48	L							
64	5'			2:55	6							
65	5'6"			3:00	6							
66	5'6"			3:05	6							
63, 64, 65, 66				3:08	6	Cluster sample						
67	5'8"		10-21	8:41	6							
68	5'8"			8:55	6							
69	5'8"			9:06	6							
70	5'6"			9:20	6							
67, 68, 69, 70				9:30	6							
71	5'			10:04	6							
72	5'			10:22	6							
73	5'			10:30	6							
74	5'			10:36	6							
71, 72, 73, 74				10:41	6	Cluster						
75	10'3"			10:44	6	Unable to probe any deeper						
76	5'			11:02	6							
BLANK				11:05	3							

Prepared by: Barry Patten Date: 10-21-93
Reviewed by: _____ Date: _____
Approved by: _____ Date: _____

Maximum Pump Vacuum (inches Hg) 21 Remarks: _____

Final Sample Disposition: _____ Date Billed: _____
WHITE - Return with samples to lab YELLOW - Return with samples to lab PINK - Return with samples to lab ORANGE - Sender's copy

C-7

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 1 of 3

TRACER
Job # 013384
Date: 10-25-93
Client: WESTINGHOUSE TIDAL NUCLEAR CO., ADDRESS: IDAHO FALLS
Site / Project: WINCO-CHEM PLANT Project #: 5840-93
Affiliate: AZI Collected By: D. THOMPSON #01032
Contact: BART RICHARDS State: ID.
Phone: 208-526 5060

Probe #	Depth	Cluster #	Sampling Date	Time	Remarks	Received By	Date Received	LAB	Remarks
92	6'		10-25	09:45	6				
93	6'			09:50	6				
94	6'			10:01	6				
95	6'			10:12	6				
96	6'			10:30	6				
97	6'			10:43	6				
98	6'			10:50	6				
99	6'			10:59	6				
100	6'			11:11	6				
101	6'			11:17	6				
102	6'			11:23	6				
103	6'			11:31	6				
104	6'			12:25	6				
105	6'			12:53	6				
106	6'			13:10	6				
107	6			13:45	6				
BLANK	—			14:15	2				
<i>David Thompson</i>									

Vacuum Pump Testimony (Inches Hg) 22

Remarks

Final Sample Disposition: WHITE - Return with sample to lab YELLOW - Return with sample to lab PINK - Return with sample to lab ORANGE - Sender's copy

Date Billed:

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 1 of 2

TRC Job # 10-25-84
Date: 10-25-83

Client: WESTINGHOUSE IDAHO NUCLEAR CO. Address: IDAHO FALLS City: IDAHO FALLS State: ID.
Project #: 5840-93 Contact: BART RICHARDS
Site / Program: WINCO-CHEM PLANT Phone: 208-526-5060

Affiliate: AZI Collected by: D. THOMPSON #01032

Received by: [Signature]
Date Received: 10/25/83
LAB

Probe #	Depth	Sampling Date	Time	Remarks	Remarks
101, 105, 106, 107	6'	10-25	—	6	CLUSTER SAMPLE
108	6'		15:03	6	
109	6'		15:18	6	
110	4'	10-26	10:50	9	
111	4'		11:05	6	
108, 109, 110, 111	—		—	6	CLUSTER SAMPLE
112	4'		11:15	6	
113	4'		11:26	6	
114	4'		11:40	6	
115	4'		12:04	6	
112, 113, 114, 115	—		—	6	CLUSTER SAMPLE
116	4'		12:21	6	
117	4'		12:34	6	
118	4'		12:50	6	
119	4'		13:04	6	
116, 117, 118, 119	—		13:09	6	CLUSTER SAMPLE
120	3'		13:22	6	
121	3'		13:28	6	
122	3'		13:38	6	
BLANK	—		13:46	2	

Remarks: and Thompson
Maximum Pump Vacuum (Inches Hg) 22
Final Sample Disposition: and Thompson
Date Billed: ORANGE - Return with samples to lab
Date Billed: ORANGE - Return with samples to lab
Date Billed: ORANGE - Return with samples to lab

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 1 of 1

Client: WESTINGHOUSE IDAHO NUCLEAR CO. Address: IDAHO FALLS

FILE: IDAHO FALLS

State: IL

Contact: BART RICHARDS
Phone: 208-526-5060

Client: WEST. VALLEY - BAYVIEW - CHRYSLER Address: 5040-93
Site / Program: WINCO - CHEM PLANT Project #: 5040-93

Attitude: AZI

Collected By: D. THOMPSON #01032

Analysts

Received
Data Analyzed
By

LAB

Remarks

Probe #	Depth	Sampling		Turbidity
		Date	Time	
123	2'	10-26	13:51	6
120, 121, 122, 123	—		—	6
124	1 1/2'		13:58	6
125	1 1/2'		14:02	6
126	1 1/2'		14:10	6
127	1 1/2'		14:15	6
128, 125, 126, 127	—		—	6
BLANK	—		14:30	2

RemarksMaximum Pump Vacuum (Inches Hg) 44

Remarks

Date Billed:

Final Sample Disposition

WHITE - Return with samples to lab

YELLOW - Return with samples to lab

PINK - Return with samples to lab

ORANGE - Sender's copy

C-10

PREPARED FOR:

Arizona Instrument
4114 E. Wood Street
Phoenix, Arizona 85040-1941

Tracer Tight® Test
of
1 Underground Wastewater Pipeline
at the
Winco-Chem Plant
Idaho Falls
Idaho Falls, ID
November 5, 1993

SUBMITTED BY:

TRACER RESEARCH CORPORATION

JOB # 013384

INTRODUCTION

Arizona Instrument and Tracer Research Corporation performed Tracer Tight® leak testing of 1 underground wastewater pipeline the Winco-Chem Plant site in Idaho Falls, ID. The wastewater in the pipeline was inoculated with tracer on October 1, 1993. Samples were collected on October 18, 19, 20, 21, 25 and 26, 1993 with sample vacuums of 2-13 inches Hg.

The depth to water was not determined. The groundwater conditions were not reported.

CONCEPT OF OPERATION AND IMPLEMENTATION

The tracer leak detection method relies upon the addition of a highly volatile liquid chemical to the product in the pipeline. If a leak occurs in the underground pipeline, product is released into the surrounding soil. The tracer escapes from the product by vaporization and disperses into the soil by molecular diffusion. Various means are used to sample the soil vapors in the immediate vicinity of the underground pipeline. Each probe has an effective detection radius of approximately 10 feet. This means that a given probe should detect a leak anywhere within the area described by the 10 foot radius around the probe. The tracer must be placed in the pipeline at least two weeks prior to the probe sampling for this method to be effective. This process of leak detection by placing a liquid or gas tracer in a liquid product followed by detection of the tracer underground in the vapor phase is protected under *TRACER* patents.

Pipelines are located using radio frequency induction and/or connection equipment.

LEAK DETECTION CRITERIA

The classification of leakage is based on the presence or absence of tracer.

PASS

Criteria:

NO tracer detected

FAIL

Criteria:

tracer detected

If requested, total volatile hydrocarbon (TVHC) concentrations are measured to give additional information about site conditions. The TVHC data provide information about the severity of the leakage, and the degree of any possible environmental damage that may have occurred. The TVHC data is not used as a criterion factor to determine the status of a particular tank(s) or piping and is provided as supplemental information only.

CERTIFICATION

Job Number : 013384

Date : 11/05/93

Location: Winco-Chem Plant
Idaho Falls
Idaho Falls, ID

LINE #	PRODUCT	LENGHT(R)	TRACER	LEAK STATUS TANK	LINE
Line 1	Wastewater	1505	D	N/A	Pass

Tracer Research Corporation certifies that the underground pipeline listed in the above table have been tested by means of Tracer Tight®, which meets the criteria set forth in NFPA 329 for a precision leak test. According to EPA standard test procedures for evaluating leak detection methods, the Tracer Tight® method is capable of detecting leaks of 0.05 gallons per hour with a Probability of Detection (P_D) of 0.97 and Probability of False Alarm (P_{FA}) of 0.029.

Submitted by:

Ian Harris
Tracer Research Corporation

Testers State License Number:

The following criteria are used for the classification of leakage based on the presence or absence of tracer.

PASS

Criteria:

No tracer detected

FAIL

Criteria:

tracer detected

APPENDIX A - Results of U.S. EPA Test Evaluation

Results of U.S. EPA Standard Evaluation Nonvolumetric Tank Tightness Testing Method

This form tells whether the tank tightness testing method described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Nonvolumetric Tank Tightness Testing Methods." The full evaluation report also includes a form describing the method and a form summarizing the test data.

Tank owners using this leak detection system should keep this form on file to prove compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

Method Description

Name: Tracer Research Corporation
Vendor: Tracer Research Corporation
3855 North Business Center Drive
(street address)
Tucson Arizona 85705 (602) 888-9400
(city) (state) (zip) (phone)

Evaluation Results

This method, which declares a tank to be leaking when a threshold amount of Tracer chemical is detected as a vapor in the soil outside the tank, has an estimated probability of false alarms [P(FA)] of 2.9 % based on the test results of 1 false alarms out of 34 tests. A 95% confidence interval for P(FA) is from 0 to 8.5 %.

The corresponding probability of detection [P(D)] of a 0.005 gallon per hour leak is 97.1 % based on the test results of 33 detections out of 34 simulated leak tests. A 95% confidence interval for P(D) is from 91.5 to 100 %.

Does this method use additional modes of leak detection? ☐ Yes ☒ No

If Yes, complete additional evaluation results on page 3 of this form.

Based on the results above, and on page 3 if applicable, this method ☒ does ☐ does not meet the federal performance standards established by the U.S. Environmental Protection Agency (0.10 gallon per hour at P(D) of 95% and P(FA) of 5%).

Test Conditions During Evaluation

The evaluation testing was conducted in a varying size gallon ☒ steel ☒ fiberglass tank that was _____ inches in diameter and _____ inches long, installed in _____ backfill.

The ground-water level was varying inches above the bottom of the tank.

Nonvolumetric TTT Method Tracer Tight (TM)
Version _____

Test Conditions During Evaluation (continued)

The tests were conducted with the tank varying percent full.

The temperature difference between product added to fill the tank and product already in the tank ranged from N/A °F to N/A °F, with a standard deviation of N/A °F.

The product used in the evaluation was varying gasoline, diesel, jet fuel and heating oil.

This method may be affected by other sources of interference. List these interferences below and give the ranges of conditions under which the evaluation was done. (Check None if not applicable.)

☐ None

Interferences

Range of Test Conditions

Limitations on the Results

- The performance has not been substantially changed.
- The vendor's instructions for using the method are followed.
- The tank contains a product identified on the method description form.
- The tank capacity is _____ gallons or smaller.
- The difference between added and in-tank product temperatures is no greater than + or - _____ degrees Fahrenheit.

☐ Check if applicable:

Temperature is not a factor because Tracer detection outside of tank does not depend on fuel temperature inside tank. Temperature does not affect the amount of Tracer released.

- The waiting time between the end of filling the test tank and the start of the test data collection is at least _____ hours.
- The waiting time between the end of "topping off" to final testing level and the start of the test data collection is at least < 8 hours.
- The total data collection time for the test is at least _____ hours.
- The product volume in the tank during testing is 0-100 % full.
- This method ☐ can ☐ cannot be used if the ground-water level is above the bottom of the tank.

Other limitations specified by the vendor or determined during testing:

1. After Tracer chemical is added, you must wait at least 14 days to collect samples from vapor probes. 2. Alternative approaches must be used if top of tank is under water. These approaches are available through Tracer Research Corp.

Nonvolumetric TTT Method Tracer Tight (TM)
Version _____

- > Safety Disclaimer: This test procedure only addresses the issue of the method's ability to detect leaks. It does not test the equipment for safety hazards.

Additional Evaluation Results (if applicable)

This method, which declares a tank to be leaking when _____ has an estimated probability of false alarms [P(FA)] of _____ % based on the test results of _____ false alarms out of _____ tests. Note: A perfect score during testing does not mean that the method is perfect. Based on the observed results, a 95% confidence interval for P(FA) is from 0 to _____ %.

The corresponding probability of detection [P(D)] of a _____ gallon per hour leak is _____ % based on the test results of _____ detections out of _____ simulated leak tests. Note: A perfect score during testing does not mean that the method is perfect. Based on the observed results, a 95% confidence interval for P(D) is from 0 to _____ %.

> Water detection mode (if applicable)

Using a false alarm rate of 5%, the *minimum water level* that the water sensor can detect with a 95% probability of detection is N/A inches.

Using a false alarm rate of 5%, the *minimum change in water level* that the water sensor can detect with a 95% probability of detection is N/A inches.

Based on the minimum water level and change in water level that the water sensor can detect with a false alarm rate of 5% and a 95% probability of detection, the *minimum time* for the system to detect an increase in water level at an incursion rate of 0.10 gallon per hour is N/A minutes in a N/A - gallon tank.

Certification of Results

I certify that the nonvolumetric tank tightness testing method was installed and operated according to the vendor's instruction. I also certify that the evaluation was performed according to the standard EPA test procedure to nonvolumetric tank tightness testing methods and that the results presented above are those obtained during the evaluation.

H. Kendall Wilcox
(printed name)

Ken Wilcox Associates
(organization performing evaluation)

H. Kendall Wilcox

(signature)

Blue Springs, Missouri 64015
(city, state, zip)

October 4, 1990
(date)

(816) 229-0860
(phone number)

APPENDIX B - ANALYTICAL DATA

Tracer Research Corporation

Horizon/Winco-Chem Plant
Idaho Falls, ID

013384

11/12/93	CONDENSED DATA		Page 1
Location	Compound	Concentration	
001	D	0.0000	
002	D	0.0000	
003	D	0.0000	
004	D	0.0000	
005	D	0.0000	
006	D	0.0000	
007	D	0.0000	
008	D	0.0000	
009	D	0.0000	
010	D	0.0000	
011	D	0.0000	
012	D	0.0000	
013	D	0.0000	
014	D	0.0000	

Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-9999999999 = No sample

Horizon/Winco-Chem Plant
Idaho Falls, ID
013384

Tracer Research Corporation

11/12/93	CONDENSED DATA		Page 2
Location	Compound	Concentration	
015	D	0.0000	
016	D	0.0000	
017	D	0.0000	
018	D	0.0000	
019	D	0.0000	
020	D	0.0000	
021	D	0.0000	
022	D	0.0000	
023	D	0.0000	
024	D	0.0000	
025	D	0.0000	
026	D	0.0000	
027	D	0.0000	
028	D	0.0000	
029	D	0.0000	

Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-9999999999 = No sample

Horizon/Winco-Chem Plant
Idaho Falls, ID
013384

Tracer Research Corporation

11/12/93

CONDENSED DATA

Page 3

Location	Compound	Concentration
030	D	0.0000
031	D	0.0000
032	D	0.0000
033	D	0.0000
034	D	0.0000
035	D	0.0000
036	D	0.0000
037	D	0.0000
038	D	0.0000
039	D	0.0000
040	D	0.0000
041	D	0.0000
042	D	0.0000
043	D	0.0000

Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-9999999999 = No sample

Horizon/Winco-Chem Plant
Idaho Falls, ID

013384

Tracer Research Corporation

11/12/93	CONDENSED DATA	Page 4
Location	Compound	Concentration
044	D	0.0000
045	D	0.0000
046	D	0.0000
047	D	0.0000
048	D	0.0000
049	D	0.0000
050	D	0.0000
051	D	0.0000
052	D	0.0000
053	D	0.0000
054	D	0.0000
055	D	0.0000
056	D	0.0000
057	D	0.0000
058	D	0.0000

Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-999999999999 = No sample

Horizon/Winco-Chem Plant
Idaho Falls, ID

Tracer Research Corporation

013384

Page 5

11/12/93

CONDENSED DATA

Concentration

Location

Compound

059	D	0.0000
060	D	0.0000
061	D	0.0000
062	D	0.0000
063	D	0.0000
064	D	0.0000
065	D	0.0000
066	D	0.0000
067	D	0.0000
068	D	0.0000
069	D	0.0000
070	D	0.0000
071	D	0.0000
072	D	0.0000

Tracers in mg/L
0.0000 = Not detected
-9999999999 = No sample

Detection Limits: Tracer (0.0001)

Horizon/Winco-Chem Plant
Idaho Falls, ID

Tracer Research Corporation

013384

11/12/93

CONDENSED DATA

Page 7

Location	Compound	Concentration
088	D	0.0000
089	D	0.0000
090	D	0.0000
091	D	0.0000
092	D	0.0000
093	D	0.0000
094	D	0.0000
095	D	0.0000
096	D	0.0000
097	D	0.0000
098	D	0.0000
099	D	0.0000
100	D	0.0000
101	D	0.0000

Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-99999999999 = No sample

Horizon/Winco-Chem Plant
Idaho Falls, ID

013384

Tracer Research Corporation

11/12/93	CONDENSED DATA		Page 8
Location	Compound	Concentration	
102	D	0.0000	
103	D	0.0000	
104	D	0.0000	
105	D	0.0000	
106	D	0.0000	
107	D	0.0000	
108	D	0.0000	
109	D	0.0000	
110	D	0.0000	
111	D	0.0000	
112	D	0.0000	
113	D	0.0000	
114	D	0.0000	
115	D	0.0000	
116	D	0.0000	

Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-99999999999 = No sample

Horizon/Winco-Chem Plant
Idaho Falls, ID

013384

Tracer Research Corporation

11/12/93	CONDENSED DATA	Page 9
Location	Compound	Concentration
117	D	0.0000
118	D	0.0000
119	D	0.0000
120	D	0.0000
121	D	0.0000
122	D	0.0000
123	D	0.0000
124	D	0.0000
125	D	0.0000
126	D	0.0000
127	D	0.0000
BLANK01	D	0.0000

Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-999999999999 = No sample

APPENDIX C - FIGURES

C-29

Asphalt

* Blank

8

7

6

5

4

3

2

1

Gravel

Sidewalk

Gravel

CCP 63

Dirt

25

26

27

CCP 62

29

28

013384

EXPLANATION

- Sampling Probe Location
- - - Approximate Pipeline Location
- ◆ Monitoring Well Location

N

0 5 10
feet

WINCO-CHEM PLANT

IDAHO FALLS, IDAHO

SAMPLING LOCATIONS

Figure 2

Gravel

Concrete

Concrete

Asphalt

Asphalt

Blank

C-32

29

30

31

32

33

34

35

013384

EXPLANATION

- Sampling Probe Location
- - - Approximate Pipeline Location
- ◆ Monitoring Well Location

WINCO-CHEM PLANT

IDAHO FALLS, IDAHO

SAMPLING LOCATIONS

FIGURE 4

CCP 659

C-34

Area Evacuated to Top of Line
(Radiation Contaminated)

44

50

49

48

46

47

43

Sidewall

013384

EXPLANATION

- Sampling Probe Location
- - - Approximate Pipeline Location
- ◆ Monitoring Well Location

WINCO-CHEM PLANT

IDAHO FALLS, IDAHO

SAMPLING LOCATIONS

Figure 6

EXPLANATION

- Sampling Probe Location
- Approximate Pipeline Location
- + Monitoring Well Location

013384

WINCO-CHEM PLANT

IDAHO FALLS, IDAHO

SAMPLING LOCATIONS

Street

Asphalt

Gravel

86

85

84

83

82

81

80

Underground Building

□ Risers □

C-36

013384

EXPLANATION

- Sampling Probe Location
- Approximate Pipeline Location
- ◆ Monitoring Well Location

WINCO-CHEM PLANT

IDAHO FALLS, IDAHO

SAMPLING LOCATIONS

FIGURE 8

C-37

Gravel

79

78

Concrete
Tunnel

77

76

Street

Blank

75 SW 107

Gravel

03

02

01

00

71

72

74

73

CCP 754

70

69

00

07

08

Asphalt

Asphalt

013384

EXPLANATION

- Sampling Probe Location
- - - - - Approximate Pipeline Location
- ⬆ Monitoring Well Location

WINCO-CHEM PLANT

IDAHO FALLS, IDAHO

SAMPLING LOCATIONS

Street

Gravel

98

97

Trap

96

95

94

93

92

91

Gravel

Concrete

C-38

Asphalt

BUILDING

013384

EXPLANATION

- Sampling Probe Location
- Approximate Pipeline Location
- ⬮ Monitoring Well Location

WINCO-CHEM PLANT

IDAHO FALLS, IDAHO

SAMPLING LOCATIONS

EXPLANATION

- Sampling Probe Location
- Approximate Pipeline Location
- ◆ Monitoring Well Location

WINCO - CHEM PLANT

IDAHO FALLS, IDAHO

SAMPLING LOCATIONS

Street

Gravel

89

88

87

86

85

84

83

Asphalt

Concrete

BUILDING

013304

WINCO - CHEM PLANT

EXPLANATION

- Sampling Probe Location
- - - - - Approximate Pipeline Location
- ◆ Monitoring Well Location

IDAHO FALLS
IDAHO FALLS, IDAHO
SAMPLING LOCATIONS

C-42

APPENDIX D
Sanitary Waste Tracer Test Results

Arizona Instrument

4114 East Wood Street • Phoenix, Arizona 85040-1941 • (602) 470-1414

CERTIFICATION

Contract No: 5178-93Test Date: November 18, 1993Customer: Westinghouse Idaho NuclearAttn: Bart RichardsIdaho FallsID 83401Site: Winco-Sewer LinesContact: Bart RichardsIdaho FallsID 83401

Tank No.	Tank Product	Line Result
1	Sewage	Pass

Technician

Name: Don FeistLicense No.: 9213168State: ID

Technician's Signature

Donald M Feist

TRC Job #: 11-9-93
Date: 11-9-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 1 of 1

Client: Westinghouse Nuclear Company Address: Idaho Falls City: Idaho Falls State: Id Contact: _____
Site / Program: Windsor/Choco - Plant Project #: 5840-93 Phone: _____
Affiliate: Horizon Engineering Collected By: Jacqui Potter 01021

Probe #	Depth	Cluster #	Sampling Date	Time	Termin	Remarks	Analyte Requested	Received Date	Analyte #	LAB Remarks
D	5'	D	11-9	5:15	6	From 213, 214, 215, 216				
217	5'		1	5:20	6					
218	5'		11-9	7:47	6					
219	5'			7:20	6					
220	5'			7:31	6					
E		E		5:40	6	From 217, 218, 219, 220				
221	5'			5:15	6					
222	5'			5:20	6					
223	5'			5:26	6					
F		F		5:35	6	From 221, 222, 223				
224	2'			9:30	6					
225	2'			9:36	6					
226	2'			9:42	6					
227	2'			9:50	6					
G	2'	G		9:50	6					
228	2'			10:15	6					
229	2'			10:30	6					
230	2'			10:45	6					
231	2'			11:00	6					
Blank				11:05	2					

Signature: Jacqui Potter Date: 11-9-93
Signature: [Signature] Date: 11-12-93
Maximum Pump Vacuum (Inches Hg): 21 Remarks: _____
Final Sample Disposition: _____ Date Billed: _____

TRC Job #
Date: 11-10-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1603 Page 1 of 1

Client: WESTINGHOUSE NUCLEAR COMPANY Address: IDAHO FALLS City: IDAHO FALLS State: ID. Contact: _____
 Site / Program: WINCO / CHEM PLANT Project #: 5840-93 Phone: _____
 Affiliate: HORIZON ENGINEERING Collected By: D. THOMPSON 01032

Probe #	Depth	Cluster #	Sampling		Vacuum	Remarks	Analysis Requested	F	Received	Date Analyzed	By	LAB	Remarks
			Date	Time									
247	2'		11-9	3:50	6								
L	—	L		3:55	6	244, 245, 246, 247							
248	2'			4:20	6								
249	2'			4:24	6								
250	2'			4:29	6								
251	2'			4:36	6								
M	—	M		4:40	6	248, 249, 250, 251							
252	2'			5:01	6								
253	2'			5:04	6								
254	2'			5:08	6								
255	2'			5:11	6								
N	—	N		5:15	6	252, 253, 254, 255							
256	2'			5:30	6								
257	2'			5:33	6								
258	2'			5:36	6								
259	3'		11-10	06:50	6								
O	—	O		07:00	6	256, 257, 258, 259							
260	3'			07:20	6								
261	3'			07:23	6								
Blank	—				2								

Signature: David Thompson Signature: Em. Kalani Carter
 Date: _____ Date: _____

Maximum Pump Vacuum (inches Hg) 22 Remarks: _____

Final Sample Disposition

Date Billed:

WHITE - Return with samples to lab

YELLOW - Return with samples to lab

PINK - Return with samples to lab

ORANGE - Sender's copy

SENT BY: AZ1

11-8-93 10:29AM ARIZONA INSTRUMENT-

208 526 0665 6/12

D-4

TBC Job #:

Date: 11-9-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order

Form 1803 Page 1 of 1

Client: Westinghouse Nuclear Company Address: Idaho Falls City: Idaho Falls State: Idaho Contact: _____
 Site / Program: WYKO/CHEN-Plant Project #: 5840-93 Phone: _____
 Affiliate: HORIZON ENGINEERING Collected By: Farril Pettit, MA

Probe #	Depth	Cluster #	Sampling Date	Time	Remarks	Analysis Requested	Received Date	Lab	Remarks
H		H	11/9	11:35	6	228, 229, 230, 231			
232	2'			12:05	6				
233	2'			12:11	6				
234	2'			12:17	6				
235	2'			12:25	6				
I		I		12:30	6	232, 233, 234, 235			
236	2'			1:00	6				
237	2'			1:05	6				
238	2'			1:10	6				
239	2'			1:12	6				
J		J		1:17	6	236, 237, 238, 239			
240	2'			2:05	6				
241	2'			2:12	6				
242	2'			2:17	6				
243	2'			2:27	6				
K		K		2:30	6	240, 241, 242, 243			
244	2'			3:26	6				
245	2'			3:31	6				
246	2'			3:40	6				
Blank				3:44	3				

Farril Pettit, MA 11-9-93 *[Signature]* 11-12-93

Maximum Pump Vacuum (inches Hg) 21

Remarks

Final Sample Disposition

Date Filed:

D-5

SENT BY: AZI

12-6-93 10:28AM - ANILONA LABORATORY

TRC Job #

Date

11-11-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order

Form 1003 Page 1 of 1

Client:

WESTINGHOUSE NUCLEAR COMPANY

Address:

IDAHO FALLS

City:

IDAHO FALLS

State:

ID.

Contact:

Site / Program:

WINCO / CHEM PLANT

Project #:

153 000-113

Phone:

Affiliate:

AZI

Collected By:

D. THOMPSON #01032

Probe #	Depth	Cluster #	Sampling Date	Time	Volume	Remarks	Analysis Performed	Analysis Date	Analysis By	LAB	Remarks
277	5'		11-10	13:15	6						
278	5'			13:28	6						
279	5'			13:23	6						
T	5'	T		13:26	6	276, 277, 278, 279					
280	5'			14:00	6						
281	5'			14:03	6						
282	5'			14:10	6						
283	5'			14:15	6						
U	—	U		14:19	6	280, 281, 282, 283					
284	5'			14:40	6						
285	5'			14:50	6						
286	5'			14:56	6						
287	5'			15:07	6						
V	—	V		15:15	6	284, 285, 286, 287					
288	5'			16:03	6						
289	5'			16:10	6						
290	5'			16:17	6						
291	5'			16:21	6						
W	—	W		16:29	6	288, 289, 290, 291					
BLANK	—			16:33	2						

David Thompson

Erin L. Thompson

Maximum Pump Volume (inches Hg) 22

Remarks

Final Sample Disposition

Date Filed:

D-6

2 of 2

TRC Job # 11-12-93
Date: 11-12-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order:
Form 1003 Page 1

Client: WESTINGHOUSE NUCLEAR COMPANY Address: IDAHO FALLS City: IDAHO FALLS State: ID. Contact: _____
Site / Program: WINCO/CHEM PLANT Project #: 5840-93 Phone: _____
Affiliate: AZI Collected By: D. THOMPSON #01032

Probe #	Depth	Cluster #	Sampling Date	Time	Vacuum	Remarks	Analyte Requested	Received	Date Analyzed	By	LAB	Remarks
262	5'		11-10	07:35	6							
263	5'			07:39	6							
P	—	P		07:42	6	260, 261, 262, 263						
264	5'			08:03	6							
265	5'			08:10	6							
266	5'			08:13	6							
267	5'			08:16	6							
Q	—	Q		08:21	6	264, 265, 266, 267						
268	5'			08:46	6							
269	5'			08:53	6							
270	5'			08:57	6							
271	5'			09:01	6							
R	—	R		09:06	6	268, 269, 270, 271						
272	5'			09:25	6							
273	5'			09:32	6							
274	5'			09:45	6							
275	5'			09:51	6							
S	—	S		10:00	6	272, 273, 274, 275						
276	5'			10:30	6							
BLANK	—			10:40	2							

Signature: David Thompson Date: 11-15-93
Signature: San Jose Date: 11-15-93

Maximum Pump Vacuum (inches Hg) 22 Remarks: _____

Final Sample Disposition: _____ Date Billed: _____
WHITE - Return with samples to lab YELLOW - Return with samples to lab PINK - Return with samples to lab ORANGE - Sender's copy

D-7

ENT BY: AZI

12-6-93 10:00AM ARIZONA INSTRUMENT-

206 526 06651 7/12

(807) 888-9100

TRACTS RESEARCH CORPORATION, 3848 W. Broadway Center Dr., Tucson, AZ 85708

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 1 of 1

TIC Job # 11-11-93

Client: WESTINGHOUSE NUCLEAR COMPANY Address: IDAHO FALLS City: IDAHO FALLS State: ID

Contact:

Phone:

Site / Program: WINGO / CHEM PLANT Project #: 5840-93 Collected by: D. THOMPSON #01032

Artifact #: AZI

LAB
Analyze Requested
Received
Date Analyzed
Remarks

Probe #	Depth	Sampling Date	Time	Remarks
292	5'	11-10-93	16:47	6
293	5'		16:52	6
294	5'		16:55	6
295	5'		17:00	6
X	—		17:03	6
296	5'		17:15	6
297	5'		17:18	6
298	5'		17:22	6
299	5'		17:26	6
Y	—		17:34	6
300	5'	11-11-93	08:15	6
301	5'		08:32	6
302	5'		08:36	6
303	5'		08:45	6
Z	—		08:50	6
304	5'		09:35	6
305	5'		09:39	6
306	5'		09:45	6
307	5'		09:53	6
BLACK	—		10:00	2

Signature: *[Signature]*
Name: David Thompson
Date: 11/15/93

Maximum Pump Volume (Inches Hg) 22

Remarks

Date Billed:

and Sample Disposition

TRACER RESEARCH CORPORATION, 3885 N. Business Center Dr., Tucson, AZ 85705

Enclosure with each shipping order
Form 1003 Page 1 of 1

CHAIN OF CUSTODY RECORD

TSC Job # 11-11-93

Date:

Client: WESTINGHOUSE NUCLEAR COMPANY

Address: IDAHO FALLS

City: IDAHO FALLS

Contact:

State: ID

Project #: 5840-93

Collector: D. J. HANSEN

Phone:

Affiliate: AZI

Collected By: D. J. HANSEN 4-01032

Requested by: LAB

Remarks

Chain of Custody

Sampling Date

Time

Depth

Probe #

Remarks

304, 305, 306, 307

308, 309, 310, 311

312, 313, 314, 315

316, 317, 318, 319

320, 321, 322

Blank

Dated: Hanson

G. J. Hansen

5-15-93

22

Minimum Pump Volume (inches Hg)

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

Return with samples to lab

TRC Job #

Date: 11-11-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order.

Form 1003 Page 1 of 1

Client: WESTINGHOUSE NUCLEAR COMPANY Address: IDAHO FALLS City: IDAHO FALLS State: ID. Contact: _____
 Site / Program: WINCO / CHEM PLANT Project #: 5804-93 Phone: _____
 Attribute: AZI Collected By: D. THOMPSON #01032

Probe #	Depth	Coder	Sampling Date	Time	Volume	Remarks	Analysis Requested	Received	Date Analyzed	By	LAB	Remarks
323	3'		11-11	14:06	6	320, 321, 322, 323						
EE	—	EE		14:11	6	↓ ↓ ↓ ↓						
324	3'			14:40	6							
325	3'			14:44	6							
326	3'			14:47	6							
327	3'			14:53	6							
FF	—	FF		14:59	6							
328	2'			15:21	6							
329	2'			15:26	6							
330	2'			15:38	6							
331	2'			15:33	6							
GG	—	GG		15:37	6							
332	2'			15:40	6							
333	2'			15:45	6							
334	2'			15:48	6							
335	2'			15:52	6							
HH	—	HH		15:58	6							
336	2'			16:00	6							
337	2'			16:06	6							
BLANK	—			16:10	2							

Signature: David Thompson Date: 11-15-93
 Signature: [Signature] Date: _____
 Signature: _____ Date: _____
 Signature: _____ Date: _____

Maximum Pump Vacuum (inches Hg) 22

Remarks

Final Sample Disposition

(File No. 1)

D-10

SENT BY AZI

11-8-93 10:00AM - ANILSON INVESTMENT

100 JIN CUST 11-11-93

CHAIN OF CUSTODY RECORD

Enclose with each shipping order
Form 1003 Page 1 of 1

JRC Job #

Date: 11-11-93

Client: WESTINGHOUSE NUCLEAR COMPANY, Address: DAND FALLS

City: DAND FALLS

State: ID

Site / Program

WINEO/CHEM PLANT Project #: 5840-93

Latitude: AZA

Longitude: 111-11-11

Collected By: D. THOMPSON

Sample ID: #01032

Probe #	Depth	Core #	Sampling Date	Time	Remarks	LAB
---------	-------	--------	---------------	------	---------	-----

338	2'		11-11	16:14	6	
339	2'			16:20	6	
340	2'	II		16:23	6	
341	2'			16:40	6	
342	2'			16:49	6	
343	2'			16:51	6	
344	2'			16:55	6	
345	2'	III		16:59	6	
346	2'			17:02	2	

David Thompson

Maximum Pump Volume (bokeh kg) 22

Remarks

PREPARED FOR:

Arizona Instrument
4114 E. Wood Street
Phoenix, Arizona 85040-1941

Tracer Tight® Test
of
1 Underground Sewer Line
at the
Winco-Chem Plant
Idaho Falls
Idaho Falls, ID
November 18, 1993

SUBMITTED BY:

A handwritten signature in dark ink, appearing to read "Ken Davis". The signature is written in a cursive, flowing style.

TRACER RESEARCH CORPORATION

JOB # 013384

TABLE OF CONTENTS

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INTRODUCTION

Arizona Instrument and Tracer Research Corporation performed Tracer Tight® leak testing of 1 underground sewer line the Winco-Chem Plant site in Idaho Falls, ID. The sewer was inoculated with tracer on October 21, 1993. Samples were collected on November 9, 1993 with sample vacuums of 2-9 inches Hg.

The depth to water was not determined. The groundwater conditions were not reported.

CONCEPT OF OPERATION AND IMPLEMENTATION

The tracer leak detection method relies upon the addition of a highly volatile liquid chemical to the product in the pipeline. If a leak occurs in the underground pipeline, product is released into the surrounding soil. The tracer escapes from the product by vaporization and disperses into the soil by molecular diffusion. Various means are used to sample the soil vapors in the immediate vicinity of the underground pipeline. Each probe has an effective detection radius of approximately 10 feet. This means that a given probe should detect a leak anywhere within the area described by the 10 foot radius around the probe. The tracer must be placed in the pipeline at least two weeks prior to the probe sampling for this method to be effective. This process of leak detection by placing a liquid or gas tracer in a liquid product followed by detection of the tracer underground in the vapor phase is protected under *TRACER* patents.

Pipelines are located using radio frequency induction and/or connection equipment.

LEAK DETECTION CRITERIA

The classification of leakage is based on the presence or absence of tracer.

PASS

Criteria:

NO tracer detected

FAIL

Criteria:

tracer detected

If requested, total volatile hydrocarbon (TVHC) concentrations are measured to give additional information about site conditions. The TVHC data provide information about the severity of the leakage, and the degree of any possible environmental damage that may have occurred. The TVHC data is not used as a criterion factor to determine the status of a particular tank(s) or piping and is provided as supplemental information only.

CERTIFICATION

Job Number : 013384

Date : 11/18/93

Location: Winco-Chem Plant
Idaho Falls
Idaho Falls, ID

LINE	PRODUCT	TRACER	LEAK STATUS TANK LINE
Sewer	Sewage	F	N/A Pass

* The portion of the pipeline between probes 217 and 218 was not tested.

Tracer Research Corporation certifies that the underground pipeline listed in the above table have been tested by means of Tracer Tight®, which meets the criteria set forth in NFPA 329 for a precision leak test. According to EPA standard test procedures for evaluating leak detection methods, the Tracer Tight® method is capable of detecting leaks of 0.05 gallons per hour with a Probability of Detection (P_D) of 0.97 and Probability of False Alarm (P_{FA}) of 0.029.

Submitted by:

Ian Harris
Tracer Research Corporation

Testers State License Number: null

The following criteria are used for the classification of leakage based on the presence or absence of tracer.

PASS

Criteria:

No tracer detected

FAIL

Criteria:

tracer detected

APPENDIX A - Results of U.S. EPA Test Evaluation

Results of U.S. EPA Standard Evaluation Nonvolumetric Tank Tightness Testing Method

This form tells whether the tank tightness testing method described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Nonvolumetric Tank Tightness Testing Methods." The full evaluation report also includes a form describing the method and a form summarizing the test data.

Tank owners using this leak detection system should keep this form on file to prove compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

Method Description

Name: Tracer Research Corporation
Vendor: Tracer Research Corporation
3855 North Business Center Drive
(street address)
Tucson Arizona 85705 (602) 888-9400
(city) (state) (zip) (phone)

Evaluation Results

This method, which declares a tank to be leaking when a threshold amount of Tracer chemical is detected as a vapor in the soil outside the tank has an estimated probability of false alarms [P(FA)] of 2.9 % based on the test results of 1 false alarms out of 34 tests. A 95% confidence interval for P(FA) is from 0 to 8.5 %.

The corresponding probability of detection [P(D)] of a 0.005 gallon per hour leak is 97.1 % based on the test results of 33 detections out of 34 simulated leak tests. A 95% confidence interval for P(D) is from 91.5 to 100 %.

Does this method use additional modes of leak detection? ☐ Yes ☒ No
If Yes, complete additional evaluation results on page 3 of this form.

Based on the results above, and on page 3 if applicable, this method ☒ does ☐ does not meet the federal performance standards established by the U.S. Environmental Protection Agency (0.10 gallon per hour at P(D) of 95% and P(FA) of 5%).

Test Conditions During Evaluation

The evaluation testing was conducted in a varying size gallon ☒ steel ☒ fiberglass tank that was _____ inches in diameter and _____ inches long, installed in _____ backfill.

The ground-water level was varying inches above the bottom of the tank.

Nonvolumetric TTT Method Tracer Tight (TM)
Version _____

Test Conditions During Evaluation (continued)

The tests were conducted with the tank varying percent full.

The temperature difference between product added to fill the tank and product already in the tank ranged from N/A °F to N/A °F, with a standard deviation of N/A °F.

The product used in the evaluation was varying gasoline, diesel, jet fuel and heating oil.

This method may be affected by other sources of interference. List these interferences below and give the ranges of conditions under which the evaluation was done. (Check None if not applicable.)

☐ None

Interferences

Range of Test Conditions

Limitations on the Results

- The performance has not been substantially changed.
- The vendor's instructions for using the method are followed.
- The tank contains a product identified on the method description form.
- The tank capacity is _____ gallons or smaller.
- The difference between added and in-tank product temperatures is no greater than + or - _____ degrees Fahrenheit.

☐ Check if applicable:

Temperature is not a factor because Tracer detection outside of tank does not depend on fuel temperature inside tank. Temperature does not affect the amount of Tracer released.

- The waiting time between the end of filling the test tank and the start of the test data collection is at least _____ hours.
- The waiting time between the end of "topping off" to final testing level and the start of the test data collection is at least <x hours.
- The total data collection time for the test is at least _____ hours.
- The product volume in the tank during testing is 0-100 % full.
- This method ☐ can ☐ cannot be used if the ground-water level is above the bottom of the tank.

Other limitations specified by the vendor or determined during testing:

1. After Tracer chemical is added, you must wait at least 14 days to collect samples from vapor probes. 2. Alternative approaches must be used if top of tank is under water. These approaches are available through Tracer Research Corp.

Nonvolumetric TTT Method Tracer Tight (TM)
Version _____

- > **Safety Disclaimer:** This test procedure only addresses the issue of the method's ability to detect leaks. It does not test the equipment for safety hazards.

Additional Evaluation Results (if applicable)

This method, which declares a tank to be leaking when _____ has an estimated probability of false alarms [P(FA)] of _____ % based on the test results of _____ false alarms out of _____ tests. Note: A perfect score during testing does not mean that the method is perfect. Based on the observed results, a 95% confidence interval for P(FA) is from 0 to _____ %.

The corresponding probability of detection [P(D)] of a _____ gallon per hour leak is _____ % based on the test results of _____ detections out of _____ simulated leak tests. Note: A perfect score during testing does not mean that the method is perfect. Based on the observed results, a 95% confidence interval for P(D) is from 0 to _____ %.

> Water detection mode (if applicable)

Using a false alarm rate of 5%, the *minimum water level* that the water sensor can detect with a 95% probability of detection is N/A inches.

Using a false alarm rate of 5%, the *minimum change in water level* that the water sensor can detect with a 95% probability of detection is N/A inches.

Based on the *minimum water level* and *change in water level* that the water sensor can detect with a false alarm rate of 5% and a 95% probability of detection, the *minimum time* for the system to detect an increase in water level at an incursion rate of 0.10 gallon per hour is N/A minutes in a N/A - gallon tank.

Certification of Results

I certify that the nonvolumetric tank tightness testing method was installed and operated according to the vendor's instruction. I also certify that the evaluation was performed according to the standard EPA test procedure to nonvolumetric tank tightness testing methods and that the results presented above are those obtained during the evaluation.

H. Kendall Wilcox
(printed name)

Ken Wilcox Associates
(organization performing evaluation)

H. Kendall Wilcox
(signature)

Blue Springs, Missouri 64015
(city, state, zip)

October 4, 1990
(date)

(816) 229-0860
(phone number)

APPENDIX B - ANALYTICAL DATA

AZI/Winco/Chem Plant
Idaho Falls, ID

93-8410-01

Tracer Research Corporation

11/18/93

CONDENSED DATA

Page 1

Location	Compound	Concentration
0201	F	0.0000
0202	F	0.0000
0203	F	0.0000
0204	F	0.0000
0205	F	0.0000
0206	F	0.0000
0207	F	0.0000
0208	F	0.0000
0209	F	0.0000
0210	F	0.0000
0211	F	0.0000
0212	F	0.0000
0213	F	0.0000
0214	F	0.0000

TVHC in mg/L, Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-9999999999 = No sample TVHC (0.05)

D-22

93-8410-01

11/18/93	CONDENSED DATA	Page 2
Location	Compound	Concentration
0215	F	0.0000
0216	F	0.0000
0217	F	0.0000
0218	F	0.0000
0219	F	0.0000
0220	F	0.0000
0221	F	0.0000
0222	F	0.0000
0223	F	0.0000
0224	F	0.0000
0225	F	0.0000
0226	F	0.0000
0227	F	0.0000
0228	F	0.0000
0229	F	0.0000

TVHC in mg/L, Tracers in mg/L

0.0000 = Not detected Detection Limits: Tracer (0.0001)

-9999999999 = No sample TVHC (0.05)

AZI/Winco/Chem Plant
Idaho Falls, ID

93-8410-01

Tracer Research Corporation

11/18/93

CONDENSED DATA

Page 3

Location	Compound	Concentration
0230	F	0.0000
0231	F	0.0000
0232	F	0.0000
0233	F	0.0000
0234	F	0.0000
0235	F	0.0000
0236	F	0.0000
0237	F	0.0000
0238	F	0.0000
0239	F	0.0000
0240	F	0.0000
0241	F	0.0000
0242	F	0.0000
0243	F	0.0000

TVHC in mg/L, Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-9999999999 = No sample TVHC (0.05)

D-24

93-8410-01

11/18/93

CONDENSED DATA

Page 4

Location	Compound	Concentration
0244	F	0.0000
0245	F	0.0000
0246	F	0.0000
0247	F	0.0000
0248	F	0.0000
0249	F	0.0000
0250	F	0.0000
0251	F	0.0000
0252	F	0.0000
0253	F	0.0000
0254	F	0.0000
0255	F	0.0000
0256	F	0.0000
0257	F	0.0000
0258	F	0.0000

TVHC in mg/L, Tracers in mg/L

0.0000 = Not detected Detection Limits: Tracer (0.0001)

-9999999999 = No sample TVHC (0.05)

AZI/Winco/Chem Plant
Idaho Falls, ID

Tracer Research Corporation

93-8410-01

11/18/93

CONDENSED DATA

Page 5

Location

Compound

Concentration

0259

F

0.0000

0260

F

0.0000

0261

F

0.0000

0262

F

0.0000

0263

F

0.0000

0264

F

0.0000

0265

F

0.0000

0266

F

0.0000

0267

F

0.0000

0268

F

0.0000

0269

F

0.0000

0270

F

0.0000

0271

F

0.0000

0272

F

0.0000

TVHC in mg/L, Tracers in mg/L

0.0000 = Not detected Detection Limits: Tracer (0.0001)

-99999999999 = No sample

TVHC (0.05)

93-8410-01

11/18/93

CONDENSED DATA

Page 6

Location	Compound	Concentration
0273	F	0.0000
0274	F	0.0000
0275	F	0.0000
0276	F	0.0000
0277	F	0.0000
0278	F	0.0000
0279	F	0.0000
0280	F	0.0000
0281	F	0.0000
0282	F	0.0000
0283	F	0.0000
0284	F	0.0000
0285	F	0.0000
0286	F	0.0000
0287	F	0.0000

TVHC in mg/L, Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-99999999999 = No sample TVHC (0.05)

11/18/93

CONDENSED DATA

Page 7

Location	Compound	Concentration
0288	F	0.0000
0289	F	0.0000
0290	F	0.0000
0291	F	0.0000
0292	F	0.0000
0293	F	0.0000
0294	F	0.0000
0295	F	0.0000
0296	F	0.0000
0297	F	0.0000
0298	F	0.0000
0299	F	0.0000
0300	F	0.0000
0301	F	0.0000

TVHC in mg/L, Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-9999999999 = No sample TVHC (0.05)

CONDENSED DATA

Page 8

11/18/93 Location	Compound	Concentration
0302	F	0.0000
0303	F	0.0000
0304	F	0.0000
0305	F	0.0000
0306	F	0.0000
0307	F	0.0000
0308	F	0.0000
0309	F	0.0000
0310	F	0.0000
0311	F	0.0000
0312	F	0.0000
0313	F	0.0000
0314	F	0.0000
0315	F	0.0000
0316	F	0.0000

TVHC in mg/L, Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-9999999999 = No sample TVHC (0.05)

AZI/Winco/Chem Plant
Idaho Falls, ID
93-8410-01

Tracer Research Corporation

11/18/93

CONDENSED DATA

Page 9

Location	Compound	Concentration
0317	F	0.0000
0318	F	0.0000
0319	F	0.0000
0320	F	0.0000
0321	F	0.0000
0322	F	0.0000
0323	F	0.0000
0324	F	0.0000
0325	F	0.0000
0326	F	0.0000
0327	F	0.0000
0328	F	0.0000
0329	F	0.0000
0330	F	0.0000

TVHC in mg/L, Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-9999999999 = No sample TVIC (0.05)

AZI/Winco/Chem Plant
Idaho Falls, ID

93-8410-01

Tracer Research Corporation

11/18/93

CONDENSED DATA

Page 10

Location	Compound	Concentration
0331	F	0.0000
0332	F	0.0000
0333	F	0.0000
0334	F	0.0000
0335	F	0.0000
0336	F	0.0000
0337	F	0.0000
0338	F	0.0000
0339	F	0.0000
0340	F	0.0000
0341	F	0.0000
0342	F	0.0000
0343	F	0.0000
BLANK01	F	0.0000
BLANK02	F	0.0000

TVHC in mg/L, Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-9999999999 = No sample TVHC (0.05)

AZI/Winco/Chem Plant
Idaho Falls, ID

Tracer Research Corporation

93-8410-01

11/18/93

CONDENSED DATA

Page 11

Location

Compound

Concentration

BLANK03

F

0.0000

BLANK04

F

0.0000

BLANK05

F

0.0000

BLANK06

F

0.0000

BLANK07

F

0.0000

BLANK08

F

0.0000

BLANK09

F

0.0000

BLANK10

F

0.0000

TVHC in mg/L, Tracers in mg/L
0.0000 = Not detected Detection Limits: Tracer (0.0001)
-99999999999 = No sample TVHC (0.05)

APPENDIX C - FIGURES

BUILDING

Concrete Ramp

This Section Of Pipeline Not Tested

★ Blank

93-8410-01

EXPLANATION

- Sampling Probe Location
- Approximate Pipeline Location

WINCO CHEMICAL PLANT

IDAHO FALLS, IDAHO
SAMPLING LOCATIONS

C P P 6 0 5

Oliver Street

BLDG

224

225

Beach Street

238

237

236

235

234

233

232

231

230

229

228

227

226

D-35

* Blank

93-8410-01

EXPLANATION

•224 Sampling Probe Location

----- Approximate Pipeline Location

WINCO CHEMICAL PLANT

IDAHO FALLS, IDAHO
SAMPLING LOCATIONS

FIGURE 2

EXPLANATION

- 1 Sampling Probe Location
- Approximate Pipeline Location
- ⬢ Monitoring Well Location

WINCO CHEMICAL PLANT

IDAHO FALLS, IDAHO
SAMPLING LOCATIONS

D-38

93-8410-01

EXPLANATION

- 1 Sampling Probe Location
- Approximate Pipeline Location
- ◆ Monitoring Well Location

WINCO CHEMICAL PLANT

IDAHO FALLS, IDAHO
SAMPLING LOCATIONS

EXPLANATION

- 1 Sampling Probe Location
- Approximate Pipeline Location
- ◆ Monitoring Well Location

IDAHO FALLS, IDAHO

SAMPLING LOCATIONS

Street

93-8410-01

EXPLANATION

- Sampling Probe Location
- Approximate Pipeline Location
- ◆ Monitoring Well Location

WINCO CHEMICAL PLANT

IDAHO FALLS, IDAHO
SAMPLING LOCATIONS

CCP-664

D-41

Propane Tank

336

335

334

333

332

331

327

328

329

330

321

322

323

324

325

326

320

Blank

93-8410-01

EXPLANATION

- Sampling Probe Location
- - - Approximate Pipeline Location
- ◆ Monitoring Well Location

WINCO CHEMICAL PLANT

IDAHO FALLS, IDAHO
SAMPLING LOCATIONS

EXPLANATION

- 1 Sampling Probe Location
- Approximate Pipeline Location
- ◆ Monitoring Well Location

WINCO CHEMICAL PLANT

IDAHO FALLS, IDAHO
SAMPLING LOCATIONS

DATE

FILMED

4 / 19 / 94

END