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Evaluation of Tc-99 in Groundwater at INTEC: Summary of Phase 1 Results

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Bechtel BWXT Idaho, LLC

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Idaho Completion Project
Idaho Falls, Idaho 83415

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U.S. Department of Energy
Assistant Secretary for Environmental Management
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ABSTRACT

This report summarizes the results of the Phase 1 evaluation of the radionuclide technetium-99 (Tc-99) in the Snake River Plain Aquifer underlying the Idaho Nuclear Technology and Engineering Center (INTEC). In May 2003, routine groundwater monitoring at monitor well ICPP-MON-A-230, located near the northern boundary of the INTEC, indicated that Tc-99 was present in the aquifer at concentrations approximately twice the derived maximum contaminant level for Tc-99 of 900 pCi/L. This was the first time that Tc-99 concentrations in the aquifer had been found to exceed the maximum contaminant level. The primary objective of this project was to determine the source or sources of Tc-99 to groundwater, with particular emphasis on the area surrounding monitor well ICPP-MON-A-230 in the northern portion of the INTEC. The investigation was performed in accordance with the *Supplemental Work Plan for Tc-99 Evaluation in Groundwater* (ICP/EXT-03-00029), which is a supplement to the *Monitoring System and Installation Plan for Operable Unit 3-13, Group 4, Perched Water* (DOE/ID-10774).

The results of the Phase 1 evaluation indicate that the elevated Tc-99 in groundwater at monitor well ICPP-MON-A-230 is most likely derived from historical liquid waste releases at the INTEC tank farm, including the CPP-28 and CPP-31 releases. The most likely mechanism for transport of Tc-99 to the aquifer is downward movement of contaminated water through the vadose zone to the water table. Tc-99 has been present in the aquifer beneath the northern portion of the INTEC since at least as early as 1995.

CONTENTS

ABSTRACT iii

ACRONYMS ix

1. INTRODUCTION 1-1

2. BACKGROUND 2-1

   2.1 Occurrence of Tc-99 in Spent Nuclear Fuel 2-1

   2.2 Environmental Behavior of Tc-99 2-1

   2.3 Tc-99 in the Snake River Plain Aquifer 2-2

3. EVALUATION OF TC-99 AT INTEC 3-1

   3.1 Phase 1 Scope of Work 3-1

   3.2 Tc-99 in Groundwater at Monitor Well ICPP-MON-A-230 3-2

   3.3 Monitoring of INEEL Water Supply Wells for Tc-99 3-2

   3.4 Evaluation of Well Construction and Vadose Zone Stratigraphy 3-7

   3.5 ICPP-MON-A-230 Pumping Test 3-10

   3.6 Radionuclide Results for Core Samples 3-16

   3.7 Colloidal Borescope Logging Results for ICPP-MON-A-230 3-17

   3.8 Capture Zone Analysis of INTEC Well Field 3-20

   3.9 Evaluation of Tc-99 Sources at INTEC 3-22

   3.10 Tc-99 Results for Archived Groundwater Samples 3-25

4. CONCLUSIONS AND RECOMMENDATIONS 4-1

5. REFERENCES 5-1

Appendix A—Water Quality Results for Monitor Well ICPP-MON-A-230 ..... A-1

Appendix B—Hydrograph and Neutron Log for Monitor Well ICPP-MON-A-230 ..... B-1

Appendix C—Core Photographs for ICPP-SCI-P-252 and ICPP-MON-A-230 ..... C-1

Appendix D—Radionuclide Results for Core Samples D-1

Appendix E—Colloidal Borescope Logging Results for Monitor Well ICPP-MON-A-230 ..... E-1

Appendix F—INTEC Well Field Capture Zone Analysis F-1

Appendix G—Tc-99 Sources at INTEC G-1

FIGURES

2-1. INTEC well locations 2-4

2-2. Distribution of Tc-99 in the SRPA in 2001 2-5

2-3. Distribution of Tc-99 in the SRPA in 2003 2-6

3-1. Tc-99 concentrations in monthly groundwater samples from ICPP-MON-A-230 3-4

3-2. Well completion diagram for ICPP-MON-A-230 3-8

3-3. Geologic cross section through Tank Farm Well Set and tank farm area 3-11

3-4. Cross section location map 3-12

3-5. Hydrograph and pumping rate for October 30, 2003, pumping test at ICPP-MON-A-230 3-13

3-6. Tc-99 concentrations in groundwater during step-drawdown test at ICPP-MON-A-230 3-14

3-7. Sr-90 concentrations in groundwater during step-drawdown test at ICPP-MON-A-230 3-15

3-8. Tritium concentrations in groundwater during step-drawdown test at ICPP-MON-A-230 3-15

3-9. Summary of groundwater flow directions inferred using colloidal borescope 3-19

3-10. Simulated well field capture zone for 784 days of bimonthly alternating pumping between well CPP-1 and well CPP-2 3-21

3-11. CERCLA sites at INTEC tank farm 3-23

3-12. Tc-99 results for groundwater samples from selected wells 3-27

4-1. Proposed Phase 2 monitor well locations 4-3

TABLES

3-1. Summary of Tc-99 concentrations in groundwater at ICPP-MON-A-230 3-3

3-2. Summary of 2003 groundwater results for selected constituents at ICPP-MON-A-230 3-5

3-3. Summary of Tc-99 concentrations in INEEL drinking water and drinking water supply wells 3-6

3-4. Summary of Tc-99 concentrations in INTEC raw water wells CPP-01 and CPP-02 3-6

3-5. Summary of radionuclide results for core samples.....3-18

3-6. Comparison of contaminants in groundwater and tank farm waste.....3-25

3-7. Summary of Tc-99 results for selected wells.....3-26

ACRONYMS

ARAR	applicable and relevant or appropriate requirement
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFA	Central Facilities Area
ICDF	INEEL CERCLA Disposal Facility
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
K_d	soil-water distribution coefficient
MCL	maximum contaminant level
MWTS	Monitoring Well and Tracer Study
OU	operable unit
PEW	Process Equipment Waste (evaporator)
R_f	retardation factor
RI/BRA	remedial investigation/baseline risk assessment
ROD	Record of Decision
SDWA	Safe Drinking Water Act
SNF	spent nuclear fuel
SRPA	Snake River Plain Aquifer
Tc-99	technetium-99
USGS	United States Geological Survey
WAG	waste area group

Evaluation of Tc-99 in Groundwater at INTEC: Summary of Phase 1 Results

1. INTRODUCTION

This report summarizes the results of the Phase 1 evaluation of the radionuclide technetium-99 (Tc-99) in the Snake River Plain Aquifer (SRPA) underlying the Idaho Nuclear Technology and Engineering Center (INTEC). In May 2003, routine groundwater monitoring at new monitor well ICPP-MON-A-230, located near the northern boundary of INTEC, indicated that Tc-99 was present in the aquifer at concentrations approximately twice the Tc-99 derived drinking water standard of 900 pCi/L. Reported Tc-99 concentrations in the May 2003 groundwater samples from ICPP-MON-A-230 were 2,220 ±37.7 pCi/L for the primary sample and 2,110 ±32.4 pCi/L for a duplicate sample. This was the first time that Tc-99 concentrations in the aquifer had been found to exceed the drinking water maximum contaminant level (MCL). The primary objective of this project was to determine the source or sources of Tc-99 to groundwater, with particular emphasis on the area surrounding monitor well ICPP-MON-A-230 in the northern portion of INTEC.

2. BACKGROUND

The following sections provide a brief overview of the occurrence of Tc-99, its behavior in soil and groundwater, and the results of historical monitoring of Tc-99 in groundwater at the Idaho National Engineering and Environmental Laboratory (INEEL).

2.1 Occurrence of Tc-99 in Spent Nuclear Fuel

Tc-99 is a long-lived radionuclide produced primarily as a fission product in nuclear fuel. The half-life of Tc-99 is approximately 213,000 years, and it decays to stable Ru-99 by beta emission. The relatively long half-life of Tc-99 results in much lower radioactivity per gram compared to other fission products, such as Cs-137 or Sr-90; but Tc-99 nevertheless exhibits radioactivity significantly greater than natural uranium. The specific activity of Tc-99 is 0.0169 Ci/g (DOE-ID 2000).

Although numerous other radioactive isotopes of technetium are known, only Tc-99 is produced in appreciable quantities in nuclear reactors. Fission yields of Tc-99 in nuclear reactors are approximately 6.1% from fission of U-235 and 5.9% from fission of Pu-239 (Rard et al. 1999). The fission yield of Tc-99 is similar to that of Cs-137, indicating that the initial molar concentrations of these two radionuclides are approximately the same in spent nuclear fuel (SNF). Because of its much longer half-life, however, the activity of Tc-99 in SNF is lower than that of Cs-137 by a factor of about 10,000 (Wenzel 2002). Approximately 1 kg of Tc-99 is produced per ton of uranium fuel (3% enriched) after burnup (Chen, Burns, and Ewing 2000). It is estimated that several tons of Tc-99 are produced annually in nuclear reactors worldwide (Rard et al. 1999).

As of July 1999, the total amount of Tc-99 present in the INTEC wastes was estimated as 3,680 Ci (Swenson 2003), which equates to a mass of about 218 kg Tc. This includes approximately 3,450 Ci in the calcine waste, 224 Ci in the remaining liquid and solid wastes in the INTEC tank farm, and 6 Ci that were shipped off-Site. The small amount of Tc-99 that may have been released to groundwater has not been quantified but is believed to be, at most, a fraction of 1% of the total quantity of Tc-99 in the SNF reprocessed at INTEC.[a] Section 3.9 provides details supporting this statement.

In addition to its production during nuclear fission, Tc-99 may also be produced as a neutron activation product of stable Mo-98; however, this source is generally insignificant in nuclear fuels compared to its abundance as a fission product. As a result of past aboveground testing of nuclear weapons, Tc-99 is also present in precipitation, but at very low concentrations (<<1 pCi/L) (Turcotte 1982; Ehrhardt and Attrep 1978).

2.2 Environmental Behavior of Tc-99

The chemistry of technetium is complex because it can exist in many different oxidation states. However, Tc exists primarily in the +7 oxidation state under the strongly oxidizing conditions present during SNF dissolution with the two predominant species being pertechnetic acid ($HTcO_4$) and the pertechnetate anion (TcO_4^-).[b] Similar to ruthenium and iodine, technetium can volatilize under some conditions, such as when concentrated nitric acid solutions containing Tc-99 are evaporated to dryness (Darab and Smith 1996).[b]

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a. Swenson, M. C., 2003, personal communication with J. Forbes, December 2, 2003.

b. Thomas, T. R., INEEL, to M. C. Swenson, INEEL, October 20, 2003, "Volatility of technetium from process evaporator and calciner operations."

Under environmental conditions, by far the most common aqueous species of technetium is the pertechnetate oxyanion (TcO_4^-) (Rard et al. 1999), the exception being strongly reducing conditions, where technetium may be reduced to the +4 oxidation state (Krupka and Serne 2002). Oxidizing conditions generally prevail in soil and groundwater beneath INTEC; therefore, any Tc-99 present is expected to exist almost entirely as pertechnetate anion.

Numerous studies have demonstrated that Tc-99 remains highly soluble and mobile in soil and groundwater. This is attributable to the high water solubility of most pertechnetate salts and to the fact that the pertechnetate anion does not appreciably adsorb to soil surfaces under most subsurface conditions. Thus, Tc-99 is considered highly mobile in the subsurface, being similar in this regard to tritium and I-129. Krupka and Serne (2002) report that soil-water distribution coefficients (K_d) for Tc-99 in low organic carbon soils range from 0 to 0.5 mL/g, with most values less than 0.1 mL/g. This indicates little if any sorption of Tc-99 onto soils; therefore, little or no retardation of Tc-99 occurs during groundwater transport. A laboratory study using water-saturated columns filled with INTEC alluvium, interbed sediment, and crushed basalt showed no retardation of pertechnetate ($R_f = 1$) (Del Debbio and Thomas 1989). This is consistent with the results of other laboratory studies that demonstrate that Tc-99 behaves as a "conservative" solute, traveling at essentially the same velocity as the soil water or groundwater.

The drinking water MCL for Tc-99 is 900 pCi/L. This value is a derived concentration assuming Tc-99 is the only beta-emitting radionuclide present and assuming a 4-mrem/yr dose rate (EPA 2000). While drinking water standards do not technically apply to groundwater in the aquifer, the State of Idaho has adopted groundwater quality standards that are numerically equivalent to the MCLs (IDAPA 58.01.11). Furthermore, federal MCLs are considered applicable and relevant or appropriate requirements (ARARs) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Therefore, in this report, *MCL* is used as a shorthand for referring to the Idaho groundwater quality standards.

2.3 Tc-99 in the Snake River Plain Aquifer

Groundwater samples collected at INEEL in 1991-92 by the U.S. Geological Survey (USGS) were the first to be analyzed for Tc-99, and the results are reported in Beasley et al. (1998). Based on sampling of approximately 46 wells, Beasley et al. (1998) showed that Tc-99 was present in groundwater of the SRPA at relatively low concentrations (<60 pCi/L) over a large area extending south from the INTEC. The dilute plume containing detectable Tc-99 concentrations in groundwater was shown to extend south from INTEC to the area of Big Southern Butte, located just outside the INEEL southern boundary. The observed Tc-99 plume was similar in shape and size to the known tritium plume south of INTEC. The highest Tc-99 concentration observed at that time was 55.6 pCi/L in perched water well USGS-50. Based on the geometry of the observed Tc-99 plume, Beasley et al. (1998) estimated that a total of approximately 15 Ci of Tc-99 were present in the SRPA and that the Tc-99 plume occupied an area of approximately 53 mi^2. Although no records for disposal or release of Tc-99 are known to exist, Beasley et al. (1998) attributed the presence of Tc-99 in the SRPA to its disposal at the former INTEC injection well, which was used from 1953 until 1986 for disposal of low-level radioactive wastewater (service waste) from INTEC operations. Because of the failure of the injection well casing in approximately 1968, it should be noted that service wastewater was also released into the vadose zone for several years (DOE-ID 2004a).

The Operable Unit (OU) 3-13 Remedial Investigation/Baseline Risk Assessment (RI/BRA) (DOE-ID 1997) and the OU 3-13 Record of Decision (ROD) (DOE-ID 1999) both discussed the occurrence of Tc-99 in groundwater at and downgradient of INTEC. The INTEC tank farm has stored wastes that contained Tc-99. The RI/BRA estimated that the CPP-31 liquid release that occurred in

November 1972 contained between 0.95 and 4.0 Ci Tc-99, with the average value being 2.58 Ci (DOE-ID 1997). This report further estimated that the CPP-31 release accounted for 95.9% of the Tc-99 mass released to the aquifer. The CPP-31 release site is located adjacent to the underground tanks at the INTEC tank farm.

Tc-99 concentrations in groundwater during 2001 and 2003 were presented in two annual INTEC well monitoring reports (DOE-ID 2002, 2003a). Figure 2-1 shows the locations of monitor wells at and near INTEC, and Figure 2-2 shows the Tc-99 groundwater plume present in 2001.

Prior to 2003, groundwater samples had not exceeded the Tc-99 drinking water MCL of 900 pCi/L. The maximum Tc-99 concentration observed in the aquifer prior to 2003 was 518 pCi/L, reported in a sample collected December 1994 from aquifer monitor well MW-18-4 (DOE-ID 2003a). Monitor well MW-18-4 is located in the central part of INTEC and southeast of the INTEC tank farm (Figure 2-1). During groundwater monitoring in 2001, the highest observed Tc-99 concentration was in aquifer monitor well USGS-52 located along the eastern INTEC fence line (Figure 2-1); this well contained 322 pCi/L of Tc-99. Perched water samples have also been analyzed for Tc-99, but none have exceeded the MCL of 900 pCi/L. The highest Tc-99 level reported historically in perched water was 736 ±6 pCi/L for a sample collected in June 1995 from deep perched monitor well MW-18-1 (DOE-ID 2003b). The highest Tc-99 concentration observed in the shallow perched water was 592 ±3 pCi/L in September 1994 at MW-10-2 (DOE-ID 2003b). Both of these perched monitor wells are located southeast of the INTEC tank farm (Figure 2-1).

During routine groundwater monitoring on May 13, 2003, the Tc-99 results for new monitor well ICPP-MON-A-230 indicated a higher concentration than had been observed previously in any other well. This monitor well is located within the INTEC security fence and approximately 300 ft outside the tank farm northern fence line (Figure 2-1). The well is screened from 443 to 483 ft with a pump intake depth at 474 ft below land surface. Depth to water prior to sample collection was 463.2 ft below the measuring point or approximately 460 ft below ground surface (bgs). The laboratory reported a Tc-99 concentration of 2,220 ±37.7 pCi/L for a groundwater sample collected May 13, 2003, from this well. This result was the first to exceed the Tc-99 groundwater quality standard of 900 pCi/L. Because the well had not been sampled prior to May 2003, no previous groundwater quality results were available. In contrast to the Tc-99 results, concentrations of tritium (3,700 ±178 pCi/L), Sr-90 (7.61 ±1.05 pCi/L), and I-129 (0.12 ±0.03 pCi/L) in the May 2003 groundwater sample from ICPP-MON-A-230 were below their respective MCLs and were similar to the concentrations observed in other INTEC monitor wells. Figure 2-3 shows the distribution of Tc-99 in the aquifer as reported in the 2003 Annual Well Monitoring Report (DOE-ID 2003a).

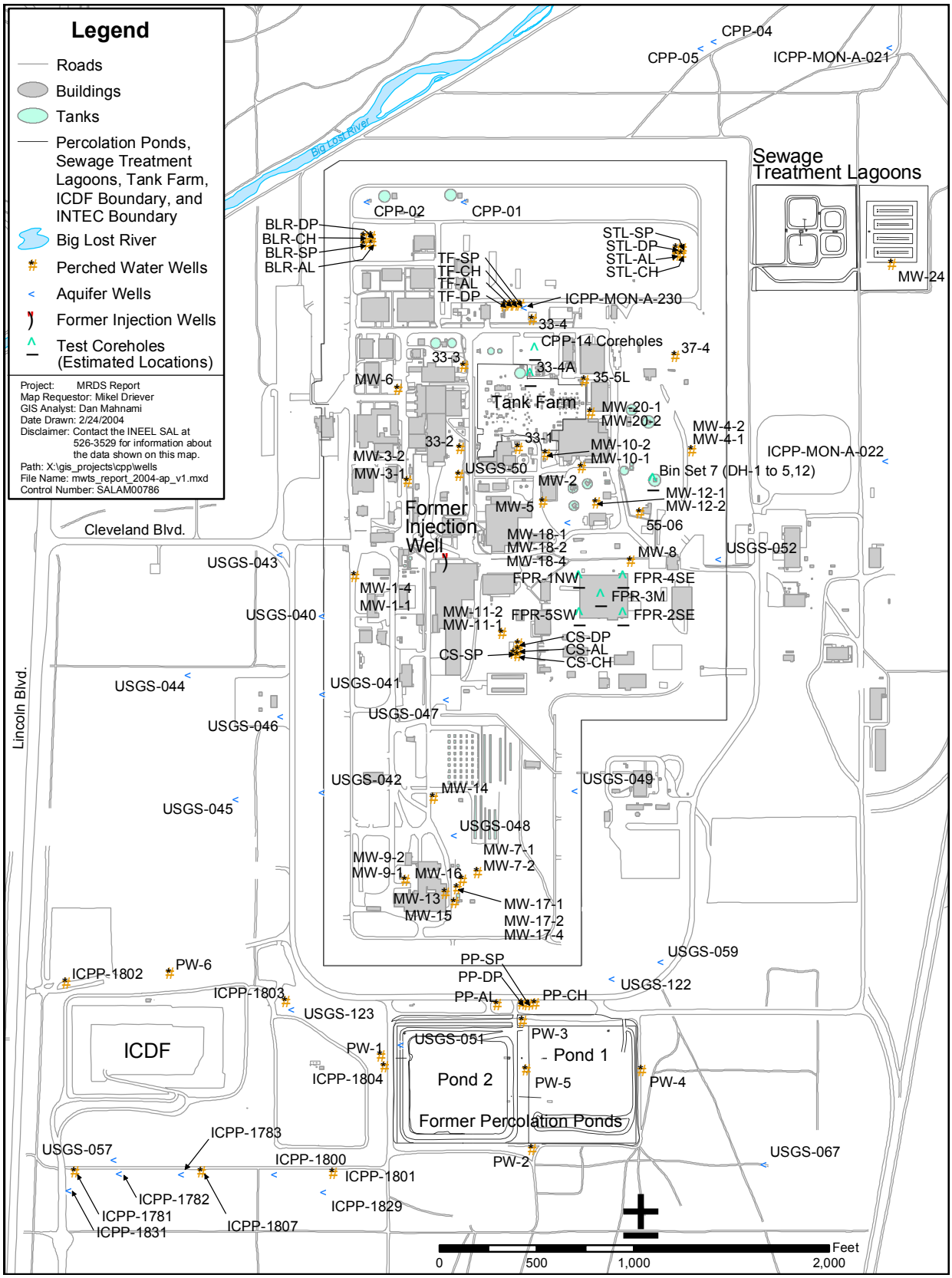

Figure 2-1. INTEC well locations.

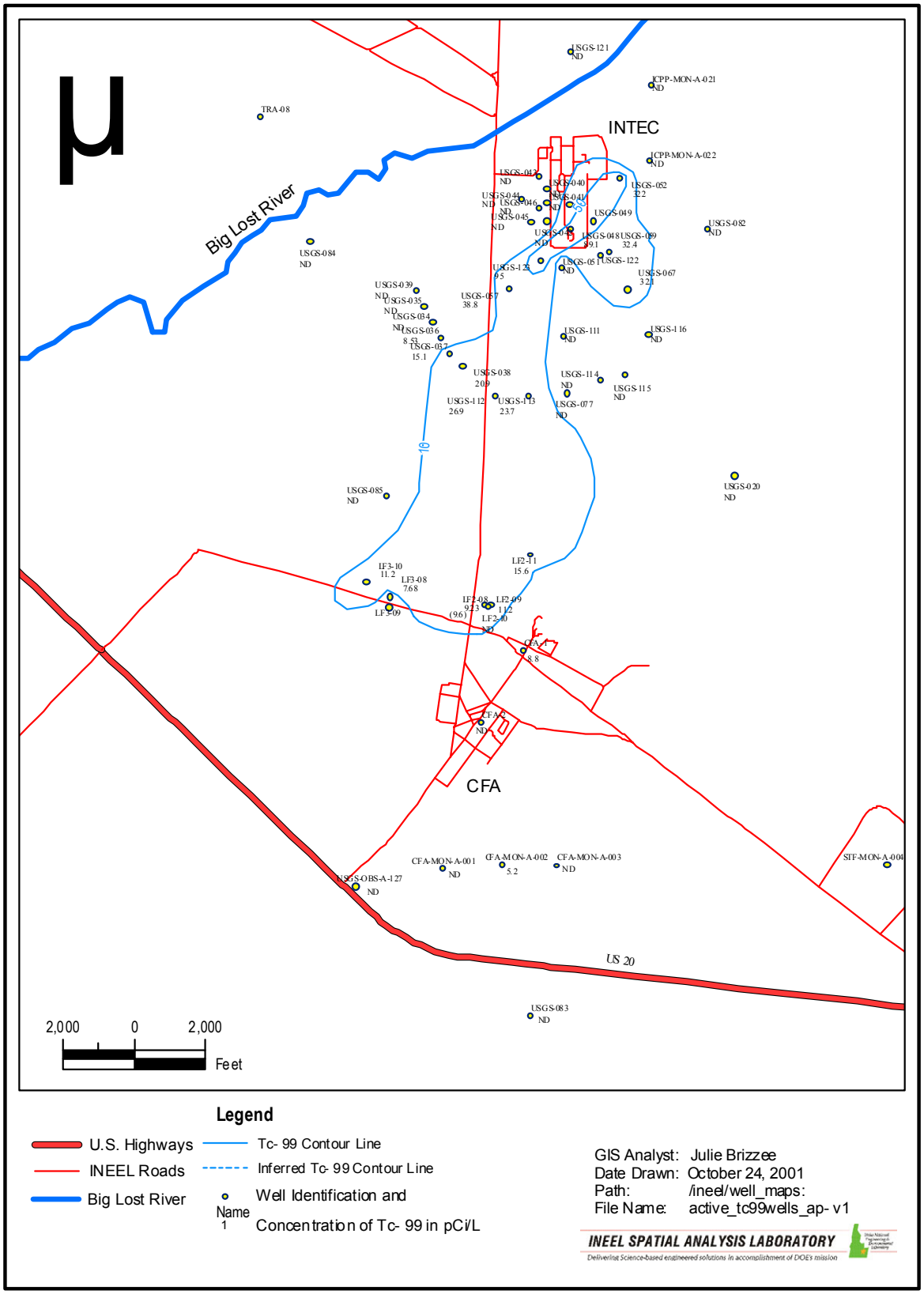

Figure 2-2. Distribution of Tc-99 in the SRPA in 2001. (Source: DOE-ID 2002.)

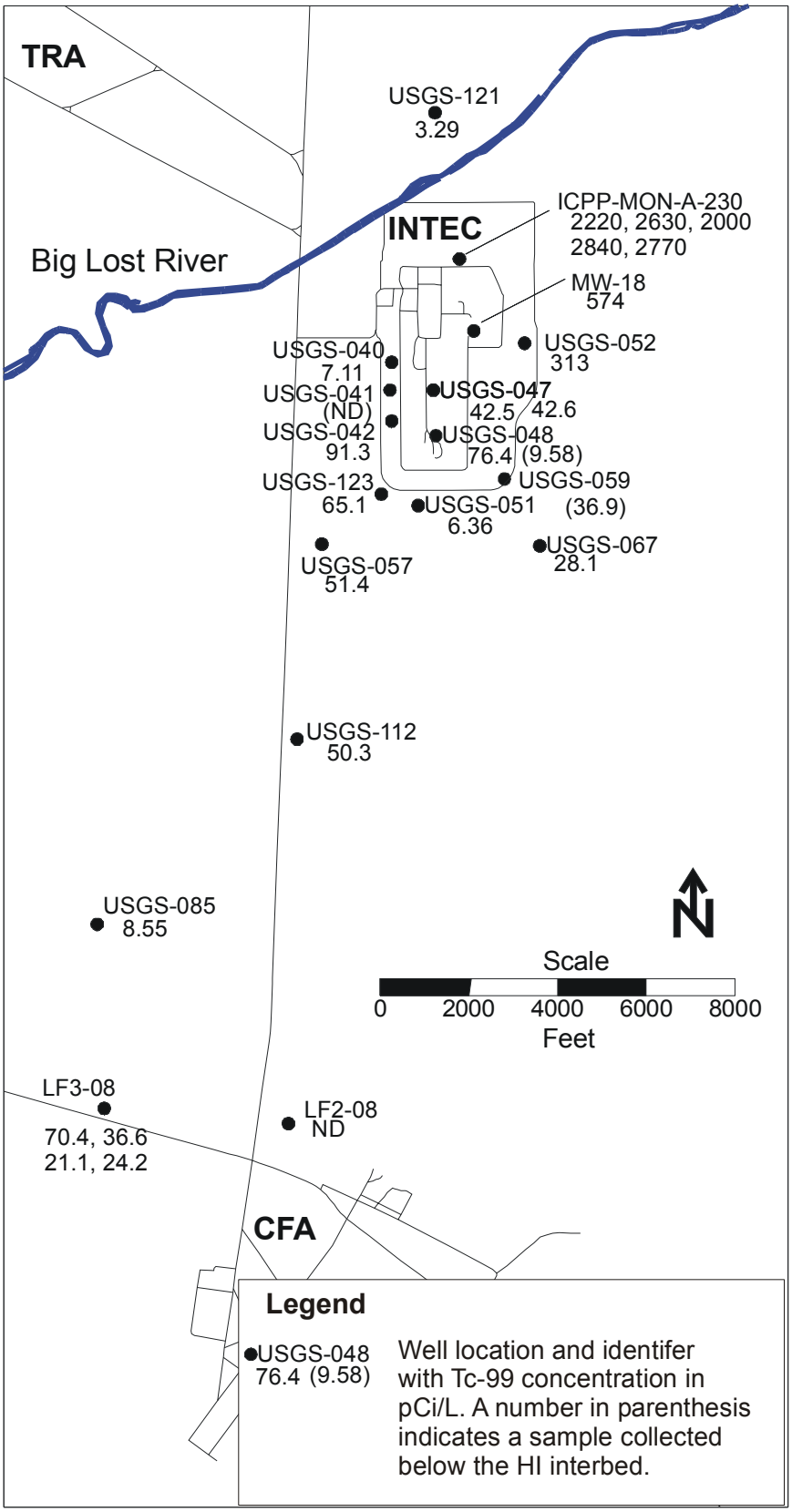

Figure 2-3. Distribution of Tc-99 in the SRPA in 2003 (concentrations in pCi/L, Source: DOE-ID 2003a).

3. EVALUATION OF TC-99 AT INTEC

As a result of the elevated Tc-99 concentration reported for the May 13, 2003, groundwater sample from monitor well ICPP-MON-A-230, an investigation was performed to assess the reasons for this unexpectedly high concentration. The investigation was performed in accordance with the *Supplemental Work Plan for Tc-99 Evaluation in Groundwater* (ICP 2003); this Work Plan is a supplement to the *Monitoring System and Installation Plan for Operable Unit 3-13, Group 4, Perched Water Well Installation* (DOE-ID 2003c). A phased approach was used, with the primary objective of Phase 1 to evaluate the extent of the elevated Tc-99 in the aquifer at monitor well ICPP-MON-A-230 and to assess potential source(s) of Tc-99 to the groundwater at INTEC. The Tc-99 Supplemental Work Plan was reviewed by the Department of Energy Idaho Operations Office, Environmental Protection Agency, and the Idaho Department of Environmental Quality, and the Phase 1 work was approved on October 21, 2003.

3.1 Phase 1 Scope of Work

The Phase 1 investigation was performed in accordance with the Supplemental Tc-99 Work Plan (ICP 2003) and included the following tasks:

- Perform monthly monitoring of Tc-99 concentrations and water levels at monitor well ICPP-MON-A-230 from August 2003 through January 2004 and bimonthly monitoring for tritium, Sr-90, and I-129
- Sample ICPP-MON-A-230 in October for a broad suite of analytes, including radionuclides, mercury, volatile organic compounds, and semivolatile organic compounds
- Sample production wells CPP-1 and CPP-2 in October and December for Tc-99, tritium, Sr-90, I-129
- Evaluate ICPP-MON-A-230 well construction details to assess the potential for downhole contamination
- Review and evaluate vadose zone stratigraphy in the vicinity of the INTEC tank farm to assess potential for downward transport of contaminants
- Develop well and perform step-drawdown pumping test at ICPP-MON-A-230, with collection of groundwater samples during pumping for radionuclide analysis
- Perform radiological screening and laboratory analysis of core samples from the Tank Farm Well Set for selected radionuclides
- Conduct geophysical neutron logging of ICPP-MON-A-230 to identify potential perched water zones
- Perform colloidal borescope logging of ICPP-MON-A-230 to determine groundwater flow direction and velocity in the well
- Perform computer capture zone analysis of the INTEC raw water production wells (CPP-1 and CPP-2) and potable water wells (CPP-4 and CPP-5) to assess areal extent of well field capture zones
- Evaluate Tc-99 sources at INTEC to identify potential for groundwater contamination

- Perform laboratory analysis of archived groundwater samples from selected INTEC wells to determine past Tc-99 concentrations in the aquifer.

The following sections provide descriptions of each task along with the results.

3.2 Tc-99 in Groundwater at Monitor Well ICPP-MON-A-230

To confirm the May 2003 Tc-99 results, the tank farm aquifer well was resampled on August 11, 2003, with duplicate samples from the well sent to two separate laboratories. In addition to samples collected by the INEEL contractor, the USGS co-sampled the well on the same date. The USGS sent duplicate samples from the well to two different laboratories, for a total of four laboratories analyzing groundwater samples from ICPP-MON-A-230. All of the results were consistent and indicated that Tc-99 was present in the groundwater at ICPP-MON-A-230 at a concentration in the range of 2,000 to 3,000 pCi/L (Appendix A).

Between August 2003 and January 2004, ICPP-MON-A-230 was sampled monthly to determine if the Tc-99 concentration was changing over time. The Tc-99 results for ICPP-MON-A-230 are summarized in Table 3-1 and are shown graphically in Figure 3-1. Reported Tc-99 concentrations in the groundwater samples collected at this location ranged from 2,000 ±200 pCi/L to 2,860 ±49.8 pCi/L, with a mean value of 2,557 pCi/L and standard deviation of 293 pCi/L for the 14 results (7 primary samples plus 7 field duplicates). The Tc-99 monthly sampling results appear to remain relatively constant over time, with no clear trend of increasing or decreasing Tc-99 concentration.

Analytical results for other radionuclides, inorganics, and organic compounds at ICPP-MON-A-230 are tabulated in Appendix A. Table 3-2 summarizes the results for selected constituents detected in this monitor well. Approximately half the results for Sr-90 exceeded the Sr-90 MCL of 8 pCi/L. Tritium activities were all below the MCL of 20,000 pCi/L. I-129 results were all below the derived MCL of 1 pCi/L. A gross alpha concentration of 32.7 ±2.72 pCi/L was reported for the groundwater sample collected May 13, 2003, which exceeds the gross alpha MCL of 15 pCi/L. Gross alpha values for the October 13, 2003, samples were rejected during the data validation process because the results for the sample and lab duplicate did not agree with each other. The reason for the slightly elevated gross alpha activity reported for the groundwater samples from ICPP-MON-A-230 is unknown, and the reported concentrations of individual alpha-emitting radionuclides were either very low or below detection limits. The results of the April 2004 sampling event should confirm whether gross alpha levels exceed the MCL in this well.

Gross beta results ranged up to a maximum of 1,220 ±9 pCi/L; there is no established MCL for gross beta radiation. The elevated gross beta results are consistent with the presence of elevated concentrations of Tc-99 in this well. The lack of agreement between the Tc-99 results and the gross beta results is likely attributable to the assumption implicit in the calculation of the gross beta results that all measured beta radiation is due to Sr-90 (which is used to calibrate the beta measuring instrument).

3.3 Monitoring of INEEL Water Supply Wells for Tc-99

Table 3-3 summarizes Tc-99 results for potable water supply wells and drinking water at INTEC and Central Facilities Area (CFA). The INTEC drinking water distribution system draws its water from the two potable water supply wells located north of the INTEC fence line (CPP-04 and CPP-05; see Figure 2-1). In the past, routine monitoring of the INTEC drinking water supply system has not included sampling and analysis for Tc-99. As a result of the 2003 results for the tank farm aquifer well, however, testing of the INTEC drinking water system for Tc-99 was performed on August 18, 2003, and again on December 18, 2003. Tc-99 was not detected in any of the INTEC drinking water samples (<1.5 pCi/L).

Table 3-1. Summary of Tc-99 concentrations in groundwater at ICPP-MON-A-230.

Well ID	Sample Date	Sample Collected By	Laboratory	Tc-99 Concentration (pCi/L)	Uncertainty (pCi/L, ±1 sigma)	MDA (pCi/L)
MON-A-230	05/13/03	INEEL	GEL	2,220	37.7	16.0
MON-A-230	05/13/03	INEEL	GEL	2,110[a]	32.4	6.75
MON-A-230	08/11/03	INEEL	GEL	2,840	43.4	8.18
MON-A-230	08/11/03	INEEL	GEL	2,770[a]	42.2	7.94
MON-A-230	08/11/03	INEEL	STL	2,630	260	3.0
MON-A-230	08/11/03	INEEL	STL	2,000	200	1.0
MON-A-230	08/11/03	USGS	RESL	2,340	10	NR
				2,290[b]	110	NR
MON-A-230	08/11/03	USGS	ISU	2,417	4.3	NR
MON-A-230	09/24/03	INEEL	GEL	2,580	40.0	19.1
MON-A-230	09/24/03	INEEL	GEL	2,140[a]	31.7	13.8
MON-A-230	10/13/03	INEEL	GEL	2,810	48.9	15.6
MON-A-230	10/13/03	INEEL	GEL	2,860[a]	49.8	15.7
MON-A-230	10/13/03	INEEL	RESL	2,460	10	NR
MON-A-230	10/13/03	INEEL	RESL	2,350[a]	10	NR
MON-A-230	11/12/03	INEEL	GEL	2,420	42.0	16.8
MON-A-230	11/12/03	INEEL	GEL	2,120[a]	36.9	16.2
MON-A-230	12/16/03	INEEL	GEL	2,640	46	15.8
MON-A-230	12/16/03	INEEL	GEL	2,720[a]	47.5	16.5
MON-A-230	01/07/04	INEEL	GEL	2,780	41.9	7.30
MON-A-230	01/07/04	INEEL	GEL	2,790[a]	41.6	7.56

a. Field duplicate.
b. Lab duplicate (repeat analysis).

Abbreviations:

GEL = General Engineering Laboratories, Charleston, South Carolina
INEEL = Idaho National Engineering and Environmental Laboratory
ISU = Idaho State University
MDA = minimum detectable activity
NR = not reported or unknown
RESL = Radiological and Environmental Sciences Laboratory, INEEL
STL = Severn-Trent Laboratories, St. Louis, Missouri
USGS = U.S. Geological Survey

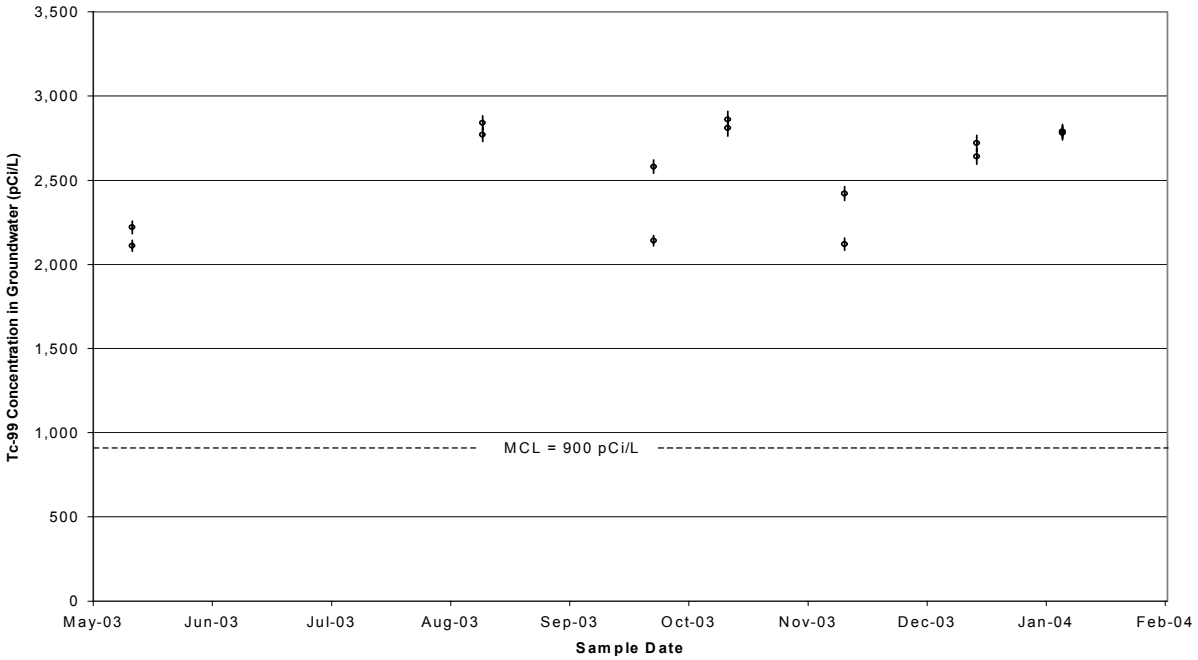

Figure 3-1. Tc-99 concentrations in monthly groundwater samples from ICPP-MON-A-230.

CFA water supply wells CFA-01 and CFA-02 have also been sampled periodically for Tc-99. Groundwater pumped from CFA-01 has consistently contained Tc-99 at very low concentrations, with a maximum of 8.04 ±1.06 pCi/L reported for a sample collected on August 20, 2002. Tc-99 has never been detected in well CFA-2. The CFA drinking water blended potable water supply had a maximum reported Tc-99 concentration of 4.49 ±0.304 pCi/L for a sample collected August 19, 2003 (Table 3-3). This trace concentration is just above the detection limit and more than 100-fold below the MCL.

In accordance with the Safe Drinking Water Act (SDWA), the INEEL drinking water system and water supply wells are regularly monitored for gross alpha and gross beta radiation. Because Tc-99 is a beta emitter, if elevated Tc-99 activity were ever to be present in the INEEL drinking water systems, elevated gross beta levels would be detected. Conversely, low gross beta activities demonstrate the absence of significant concentrations of beta-emitting radionuclides, including Tc-99. Based on data collected from 1995 to present, the highest gross beta values reported for the INTEC water supply wells CPP-04 and CPP-05 were 7 ±5 pCi/L for both wells when they were sampled on March 21, 1996. The highest gross beta values reported during this time period for CFA production wells CFA-1 and CFA-2 were 16.1 ±1.58 pCi/L (November 13, 2001) and 8.36 ±0.953 pCi/L (January 19, 2000), respectively. The low gross beta values confirm the absence of elevated Tc-99 concentrations in these water supply wells.

INTEC nonpotable raw water supply wells CPP-01 and CPP-02 have also been sampled for Tc-99, and the results are shown in Table 3-4. Raw water well CPP-01 is the easternmost of the two raw water wells (Figure 2-1) and has repeatedly shown slightly elevated Tc-99 concentrations, with a maximum concentration of 44.7 ±3.09 pCi/L reported for a sample collected October 2, 2003. A groundwater sample collected June 5, 1995, reportedly contained Tc-99 at 31 ±1 pCi/L. These observations appear to confirm that detectable concentrations of Tc-99 have been present in the aquifer near CPP-01 for at least 8 years. Groundwater quality at CPP-01 has also been impacted by service waste discharges to the former INTEC injection well, first in 1959 (Rhodes 1960) and later in 1970-71 (Amberson 1972a, b). In contrast, Tc-99 has not been detected in raw water well CPP-02, which is located approximately 500 ft west of CPP-01 (Figure 2-1).

Table 3-2. Summary of 2003 groundwater results for selected constituents at ICPP-MON-A-230.

Constituent	Units	Minimum	Maximum	Mean	Std. Dev.	Number of Samples
Radionuclides						
Tc-99	pCi/L	2,000	3,160	2,790	339	27
I-129	pCi/L	0.117	0.234	0.155	0.045	6
Sr-90	pCi/L	6.3	9.5	7.77	0.93	20
Tritium	pCi/L	4,640	5,730	5,210	351	19
U-233/-234	pCi/L	1.83	1.91	1.88	0.04	3
U-235	pCi/L	0.189	0.206	0.189	0.012	2
U-238	pCi/L	1	1.33	1.32	0.19	3
Gross alpha	pCi/L	32.7	92	61.5	29.6	3
Gross beta	pCi/L	931	1,220	1,120	147	3
Inorganics						
Total alkalinity	mg/L $CaCO_3$	135	136	135.5	0.71	3
Chloride	mg/L	64.4	65.6	65	0.85	3
Nitrate	mg/L as N	9.1	9.1	9.1	N/A[a]	1
Sulfate	mg/L	46.6	47.2	46.9	0.42	2
Calcium	mg/L	63.0	63.8	63.4	0.57	2
Magnesium	mg/L	20.1	20.3	20.2	0.14	2
Potassium	mg/L	4.42	4.48	4.45	0.04	2
Sodium	mg/L	28.9	29.6	29.2	0.49	2

a. N/A = not applicable.

Table 3-3. Summary of Tc-99 concentrations in INEEL drinking water and drinking water supply wells.

Location	Sample Date	Sample Collected By	Tc-99 Concentration (pCi/L)	Uncertainty (pCi/L, ±1 sigma)	Data Qualifier Flag
CFA drinking water	03/13/02	INEEL	3.75	1.94	U[a]
CFA drinking water	04/24/02	INEEL	**4.35**	**1.18**	J[b]
CFA drinking water	08/20/02	INEEL	3.27	0.817	UJ
CFA drinking water	08/19/03	INEEL	**3.51**[c]	**0.782**	—
CFA drinking water	08/19/03	INEEL	**4.49**	**0.304**	—
CFA drinking water	11/19/03	INEEL	4.71	1.73	U
CFA Well #1	03/13/02	INEEL	4.98	1.74	UJ
CFA Well #1	04/24/02	INEEL	**6.81**	**1.37**	J
CFA Well #1	08/20/02	INEEL	**8.04**	**1.06**	J
CFA Well #1	11/19/03	INEEL	3.59	2.06	U
CFA Well #2	03/13/02	INEEL	0.061	1.85	U
CFA Well #2	04/24/02	INEEL	1.30	1.25	U
CFA Well #2	08/20/02	INEEL	2.83	0.83	UJ
CFA Well #2	11/19/03	INEEL	1.08	1.72	U
INTEC drinking water	08/19/03	INEEL	1.50	0.979	U
INTEC drinking water	08/19/03	INEEL	0.358	0.36	U
INTEC drinking water	12/18/03	INEEL	-3.13	1.54	U

a. U = not detected.
b. J = estimated value.
c. **Bolded** values indicate Tc-99 was detected in sample.

Table 3-4. Summary of Tc-99 concentrations in INTEC raw water wells CPP-01 and CPP-02.

Location	Sample Date	Sample Collected By	Tc-99 Concentration (pCi/L)	Uncertainty (pCi/L, ±1 sigma)	Data Qualifier Flag
CPP-01	06/05/95	INEEL	31	1	J[a]
CPP-01	10/02/03	INEEL	44.7	3.09	J
CPP-01	10/13/03	INEEL	26.3	2.10	—
CPP-01	12/16/03	INEEL	10.5	1.88	—
CPP-02	06/05/95	INEEL	1.1	0.5	—
CPP-02	10/09/03	INEEL	2.84	1.43	U[b]
CPP-02[c]	10/09/03	INEEL	1.19	1.73	U
CPP-02	10/13/03	INEEL	0.797	1.45	—
CPP-02	12/16/03	INEEL	-4.32	2.38	—
Raw water[d]	10/22/02	INEEL	23.6	2.35	—

a. J = estimated value.
b. U = not detected.
c. Duplicate sample.
d. Raw water sample blend from CPP-01 and CPP-02 as reported in Cahn and Ansley (2003).

3.4 Evaluation of Well Construction and Vadose Zone Stratigraphy

Monitor well ICPP-MON-A-230 (also known as the tank farm aquifer well, or TF-Aquifer) was installed during 2001 as part of the Waste Area Group (WAG) 3, Group 4, Perched Water monitoring activities and was screened at a depth of 443 to 483 ft bgs in the uppermost portion of the SRPA. The well completion diagram for ICPP-MON-A-230 is shown in Figure 3-2. As shown on the well completion diagram, ICPP-MON-A-230 was completed with a telescoped well construction to minimize the potential for any shallow contamination to migrate to deeper depths. The casing sizes and depths installed at ICPP-MON-A-230 are

- 20-in. steel surface casing to 43 ft bgs
- 16-in. steel casing to 203 ft bgs
- 12-in. steel casing to 399 ft bgs
- 6-in. stainless steel casing to 443 ft bgs
- 6-in. stainless steel screen to 443 to 483 ft bgs.

The use of four successively smaller diameter casing strings is referred to as a telescoped well construction. This method is the current state of the art for monitoring wells installed in potentially contaminated areas. Each casing string was emplaced using bentonite chips to seal the borehole annulus.

In addition to aquifer monitor well ICPP-MON-A-230, four shallower monitor wells of the Tank Farm Well Set were installed nearby to various depths in the vadose zone to monitor potential perched water zones. Unlike the less costly method of installing multiple wells in a single borehole (nested wells), the five monitor wells of the Tank Farm Well Set were each installed in separate boreholes. This method, though more costly, minimizes the possibility that a borehole could serve as a conduit that could permit downward transport of contaminated water to deeper depths.

The field logbooks completed during drilling of the Tank Farm Well Set were reviewed for evidence of perched water encountered during drilling. The following information excerpted from the logbook (Garcia 2001) and confirmed by review of downhole videologs summarizes available information regarding perched water observed on downhole videologs just prior to well completion:

ICPP-MON-A-230 (Tank Farm Aquifer Well):

- Videolog of March 12, 2001, shows
    - Water entering hole at 272 ft; damp below this depth
    - More water entering hole at 338 ft; drippy below this depth
    - More water entering hole at 347 ft; cascading below this depth
- 12-in. steel casing installed to 399-ft depth to seal off upper portion of borehole
- 6-in. stainless steel well screen placed at 443 to 483 ft

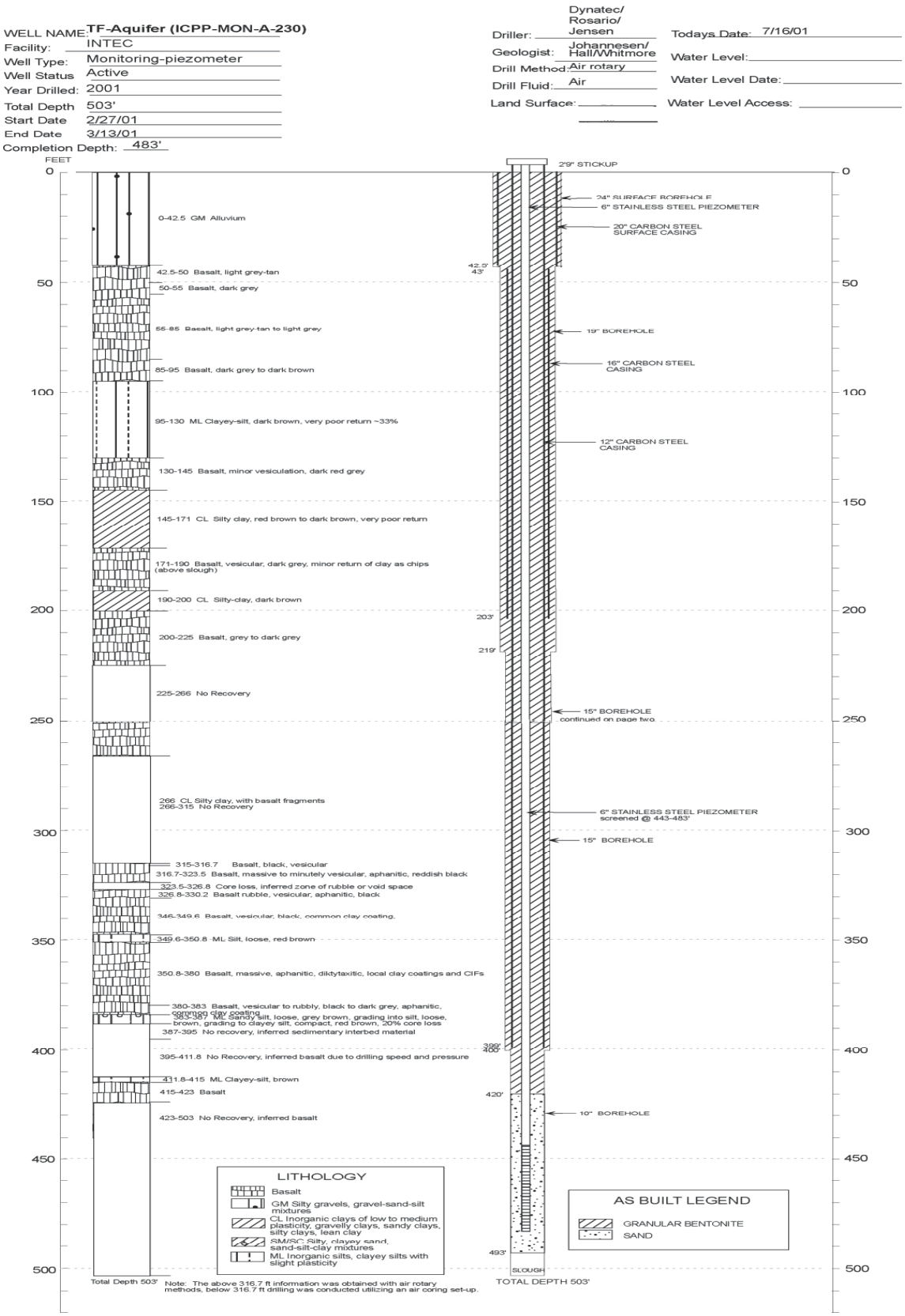

Figure 3-2. Well completion diagram for ICPP-MON-A-230.

- Monitor well sand filter pack installed from 420 to 493 ft
- Bentonite seal installed surface to 420 ft on March 20, 2001.

ICPP-SCI-P-252 (Tank Farm Core Hole):

- Videolog of February 13, 2001, shows
  - Water entering hole at 172 ft; damp below this depth
  - More water entering hole at 184 ft; drippy/cascading below this depth
- Bentonite seal installed from 152 ft to 325 ft
- 2-in. stainless steel well screen placed at 145 to 150 ft
- Monitor well sand filter pack installed from 140 to 152 ft
- Bentonite seal installed from surface to 140 ft.

In summary, there is ample evidence that perched water is present at several depths at the location of the Tank Farm Well Set. However, except for the very short time that elapsed between drilling and monitor well completion, there is no indication that the Tank Farm Well Set boreholes have allowed downward vertical transport of perched water.

Other Evidence of Perched Water at Tank Farm Well Set:

Neutron logging of ICPP-MON-A-230 was performed by the USGS on October 23, 2003, to evaluate the presence of moisture and/or perched water outside of the monitor well casing. The neutron moisture log is included in Appendix B. As expected, the neutron log was somewhat attenuated by the bentonite annular seal of the monitor well. Nevertheless, USGS interpreted the neutron log to indicate several depths where perched water may be present[c]:

- Basalt unit at 171 ft to 190 ft appears saturated (between two interbeds)
- Possibility of water moving vertically through fractures from 282 ft to 360 ft
- Possible perched water at 380 ft to 400 ft within sedimentary interbed.

The depth interval from 171 to 190 ft appeared to be the most likely zone where water could be present outside the well casing.

Additional evidence for the presence of perched water is provided by the tensiometers installed at the Tank Farm Well Set (DOE-ID 2003d). Data for April 2003 to September 2003 indicate that

- Tensiometer TF-AL at 35-ft depth indicates saturated conditions (+20 cm water potential).

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c. Twining, Brian (btwining@usgs.gov), "Neutron Logging Results for ICPP-MON-A-230," Jeff Forbes (forbjr@inel.gov), October 27, 2003.

- Tensiometer TF-SP2 at 157-ft depth indicates saturated conditions (+100 cm water potential).

- Tensiometer TF-DP2 at 388-ft depth indicates nearly saturated conditions (-10 cm water potential).

In spite of the indications of perched water, the only perched monitor well in the Tank Farm Well Set that has contained sufficient water to permit sample collection has been the shallow monitor well completed in the alluvium (TF-AL or ICPP-SCI-P-227). This well contains only very low concentrations of radionuclides of concern, in most cases at or below detection limits (DOE-ID 2003d).

In summary, both the neutron log run in October 2003 and the tensiometer data for 2003 appear to substantiate the continued presence of perched water observed previously on the 2001 videologs at the Tank Farm Well Set. One source of recharge to the perched water zones near the Tank Farm Well Set is the east-west ditch located approximately 350 ft north of the Tank Farm Well Set. This ditch receives water released during periodic testing of the INTEC fire hydrants (DOE-ID 2003e), as well as surface water runoff from natural precipitation. The magnitude of this and other recharge sources at INTEC is being evaluated.

A review of the vadose zone stratigraphy was performed to evaluate the potential for vertical and lateral water movement through the vadose zone in the vicinity of the Tank Farm Well Set. Figure 3-3 is a geologic cross section through the Tank Farm Core Hole (ICPP-SCI-P-252), which is adjacent to monitor well ICPP-MON-A-230. Figure 3-4 is a plan view map showing the location of this cross section (green line), as well as others prepared as part of the Monitoring Well and Tracer Study (MWTS) (DOE-ID 2003b). Appendix B of that study gives a detailed discussion of the stratigraphy underlying INTEC.

The cross section (Figure 3-3) illustrates the inferred relationships between the various basalt flows and sedimentary interbeds underlying the tank farm area. As shown on the cross section, the basalt is highly fractured between the 140-ft interbed and the Middle Massive Basalt Flow (shown in green). In addition, the 110-ft interbed that exists elsewhere beneath INTEC was not present at the Tank Farm Well Set. Examination of the core photos (Appendix C) confirms the presence of numerous rubble zones within the basalt at the Tank Farm Well Set. For example, a rubble zone is present at the tank farm core hole at depths of 300 to 320 ft bgs. These rubble zones may constitute high-permeability pathways for vertical or lateral flow of perched water, where present. Rapid lateral flow of water along similar rubble zones has been observed during tracer tests performed elsewhere at the INEEL (Nimmo et al. 2002).

3.5 ICPP-MON-A-230 Pumping Test

A 5-hour step-drawdown pumping test was planned at monitor well ICPP-MON-A-230 to (1) estimate the transmissivity of the upper portion of the SRPA at this location and (2) determine whether the Tc-99 detected in the well is limited to the immediate vicinity of the borehole or, instead, is more widespread in the aquifer. In preparation for the pumping test, a 15-hp submersible pump was installed in the well on October 27, 2003. On October 28, the well was developed by pumping for 1 hour at 84-86 gpm. A groundwater sample was collected at the start of the well development period, and another was collected at the end for laboratory analysis. The samples were analyzed for Tc-99 and other selected radionuclides, and the results are included in Appendix A. A total of approximately 5,000 gal of water was pumped from the monitor well during the well development period, and the water was observed to be clear at the end of the development period. All of the water was contained in two double-walled Baker tanks for subsequent disposal at the INEEL CERCLA Disposal Facility (ICDF) evaporation ponds, in accordance with the Work Plan (ICP 2003).

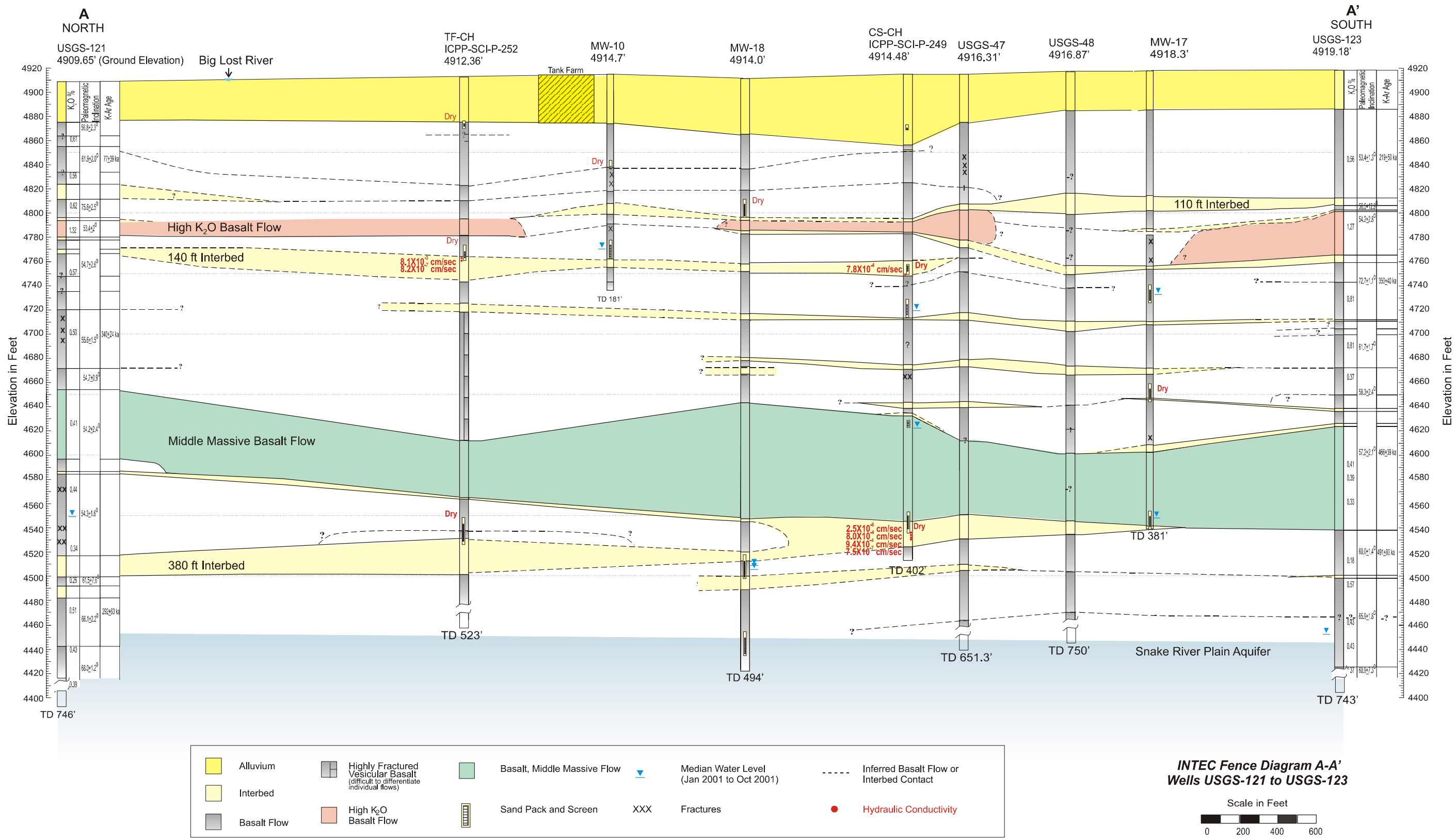

Figure 3-3. Geologic cross section through Tank Farm Well Set and tank farm area.

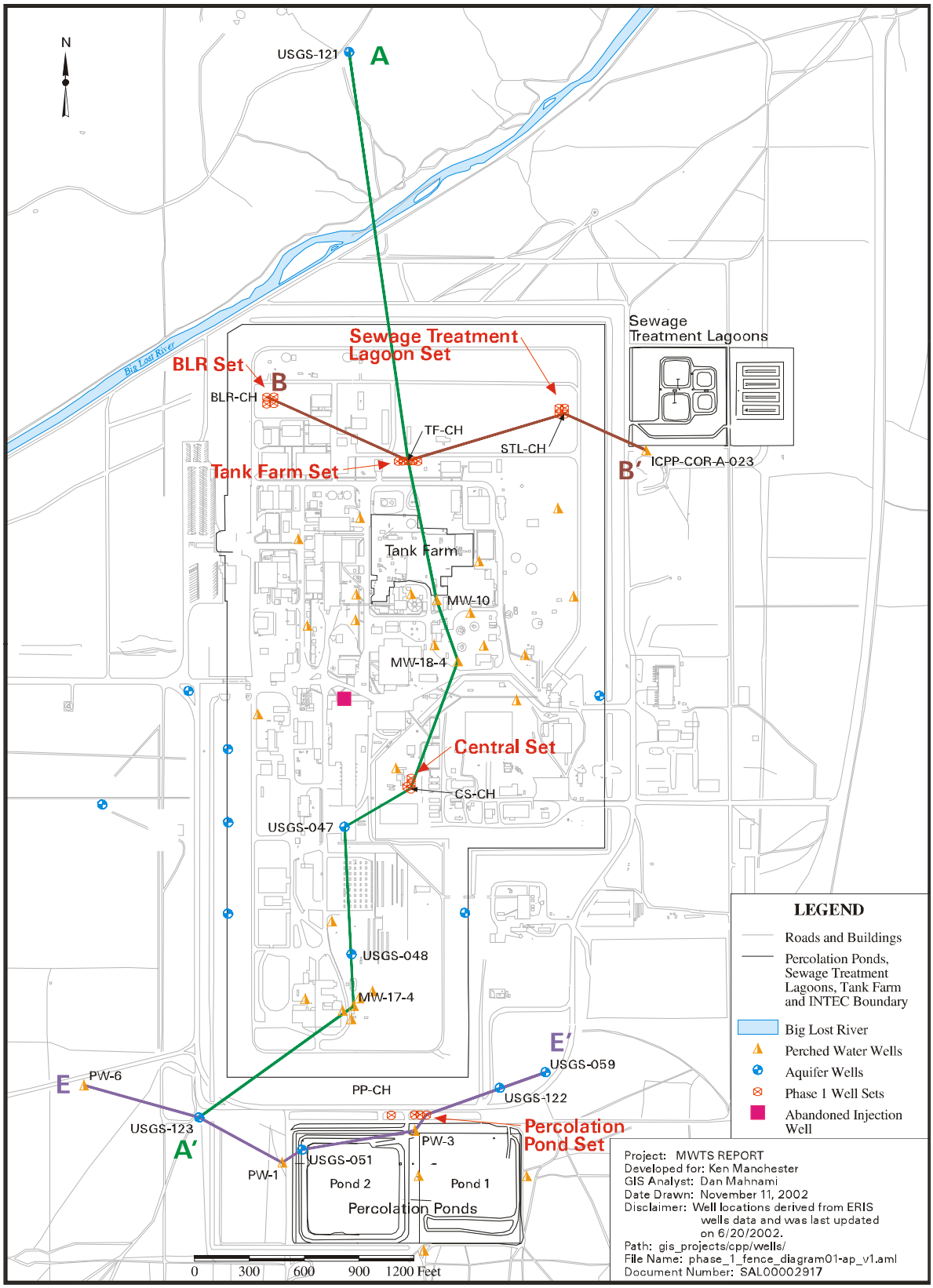

Figure 3-4. Cross section location map.

On October 30, 2003, a step-drawdown pumping test was conducted by pumping groundwater from ICPP-MON-A-230 at progressively higher pumping rates. Each pumping rate was sustained for 1 hour before proceeding to the next higher step. The five pumping rates were 20, 35, 50, 65, and 86 gpm. The highest pumping rate was the highest flow achievable with the available pump. Water levels in the well were measured using a Solinst electric water level indicator. Approximately 16,000 gal of water were pumped from the monitor well during the 5-hour-long pumping test. All of the water was contained in two double-walled Baker tanks for subsequent disposal at the ICDF, in accordance with the Work Plan (ICP 2003).

During the pumping test, a groundwater sample was collected at the start of the test, and additional samples were collected at the end of each hour-long step. Field parameters were measured simultaneously with sample collection, including temperature, pH, electrical conductivity, dissolved oxygen, and oxidation-reduction potential. The water samples were submitted to the laboratory for analysis of Tc-99, Sr-90, and tritium. Groundwater quality field and laboratory results are included in Appendix A.

Figure 3-5 shows the observed drawdowns for each pumping step. At the highest pumping rate (86 gpm), the drawdown was only 1.6 ft (below static water level), and when the pump was shut off at the conclusion of the test, essentially full recovery occurred within less than 10 seconds. This indicates a very high hydraulic conductivity for the aquifer in the vicinity of the well. This observation is consistent with the high permeabilities previously measured in nearby water supply wells CPP-01 and -02 (Anderson et al. 1999) and with the fractured/rubbly nature of the basalt at the depth of the water table (≈460 ft bgs). Specific capacities calculated from the step-drawdown test ranged from 150 gpm per foot of drawdown at the lowest pumping rate (20 gpm) to 53 gpm per foot of drawdown at the maximum pumping rate of 86 gpm. These values are quite high, especially considering that the well is only screened over the upper 18 ft of the aquifer.

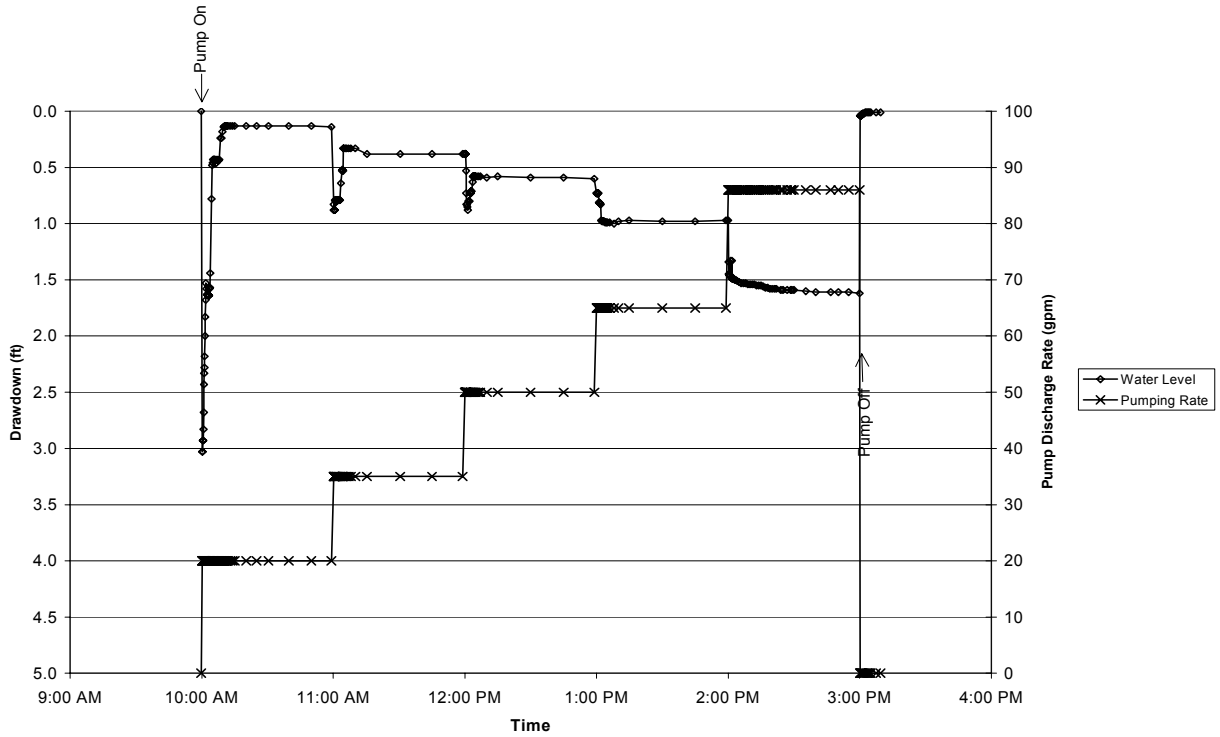

Figure 3-5. Hydrograph and pumping rate for October 30, 2003, pumping test at ICPP-MON-A-230.

In general, single-well pumping tests cannot be used to accurately calculate aquifer transmissivity and hydraulic conductivity. However, the results of short-duration single-well tests may be used to estimate these aquifer properties. Several methods were applied to estimate aquifer permeability using the step-drawdown test results. The AQTSOLV software was used to apply the Theis curve matching method to the data from the first pumping step (20 gpm). This approach yielded a hydraulic conductivity estimate of 4,100 ft/day and assumed a confined aquifer with a saturated thickness equal to the height of the water column in the well (18 ft). Using these same assumptions, application of the step-drawdown test analysis method of Driscoll (1986) to the first pumping step (20 gpm) yielded a K value of 2,300 ft/day. Applying the method of Logan (1964) to these same data gave an estimated K of 2,000 ft/day. Using data from the subsequent pumping steps yielded slightly lower hydraulic conductivity values, but the data from the first pumping step are deemed more reliable because well loss effects would be less than for subsequent steps. In summary, the pumping test results indicate that the SRPA is quite permeable at the location of monitor well ICPP-MON-A-230, with estimated hydraulic conductivities in the range of 2,000 to 4,000 ft/day. These values would fall near the upper end of hydraulic conductivities reported in the SRPA (Anderson et al. 1999).

Figures 3-6 through 3-8 show the concentrations of Tc-99, Sr-90, and tritium observed during the step-drawdown test. The concentrations of Sr-90 and tritium (±1 standard deviation) remained nearly constant over the course of the test, but the concentration of Tc-99 in groundwater decreased slightly with each increasing pumping rate (Figure 3-6).

Given the high permeability of the aquifer at this location and the maximum-size submersible pump that would fit in the 6-in. monitor well, it was not possible to thoroughly "stress" the aquifer during the pumping test. In addition, the duration of the pumping test was limited by the quantity of water that could be contained in the Baker tanks at the well site for subsequent disposal in the ICDF. Nevertheless, the pumping test was successful in achieving its two primary objectives, which were to (1) determine if Tc-99 concentrations persisted in the groundwater during a period of hours of pumping and (2) estimate the hydraulic properties of the aquifer.

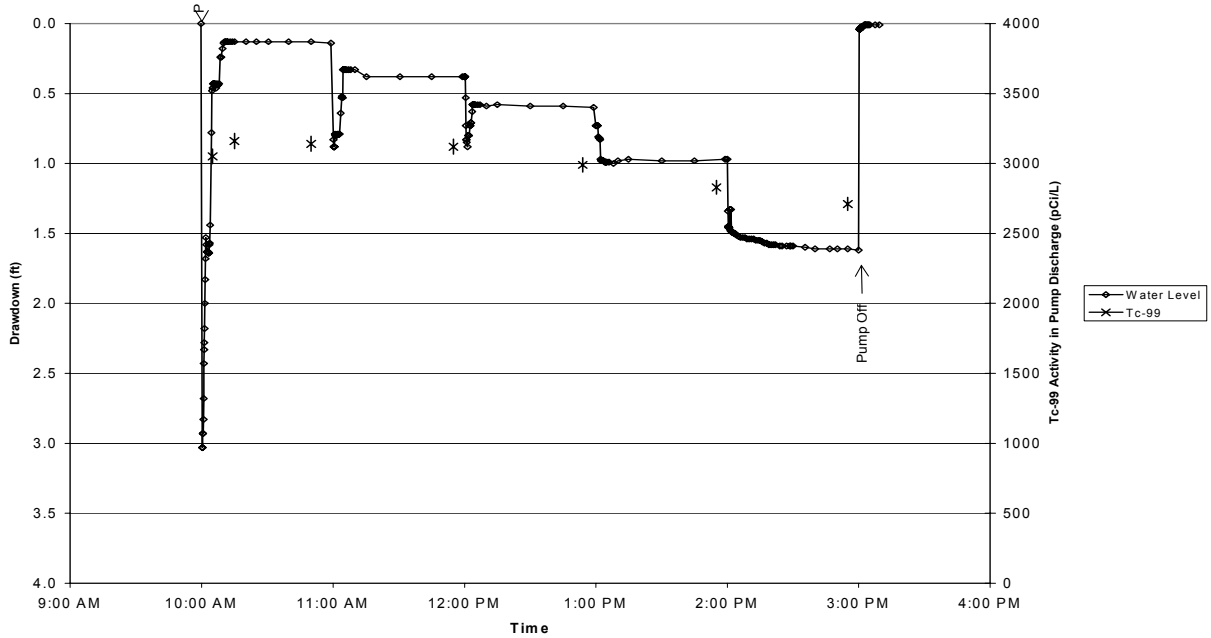

Figure 3-6. Tc-99 concentrations in groundwater during step-drawdown test at ICPP-MON-A-230.

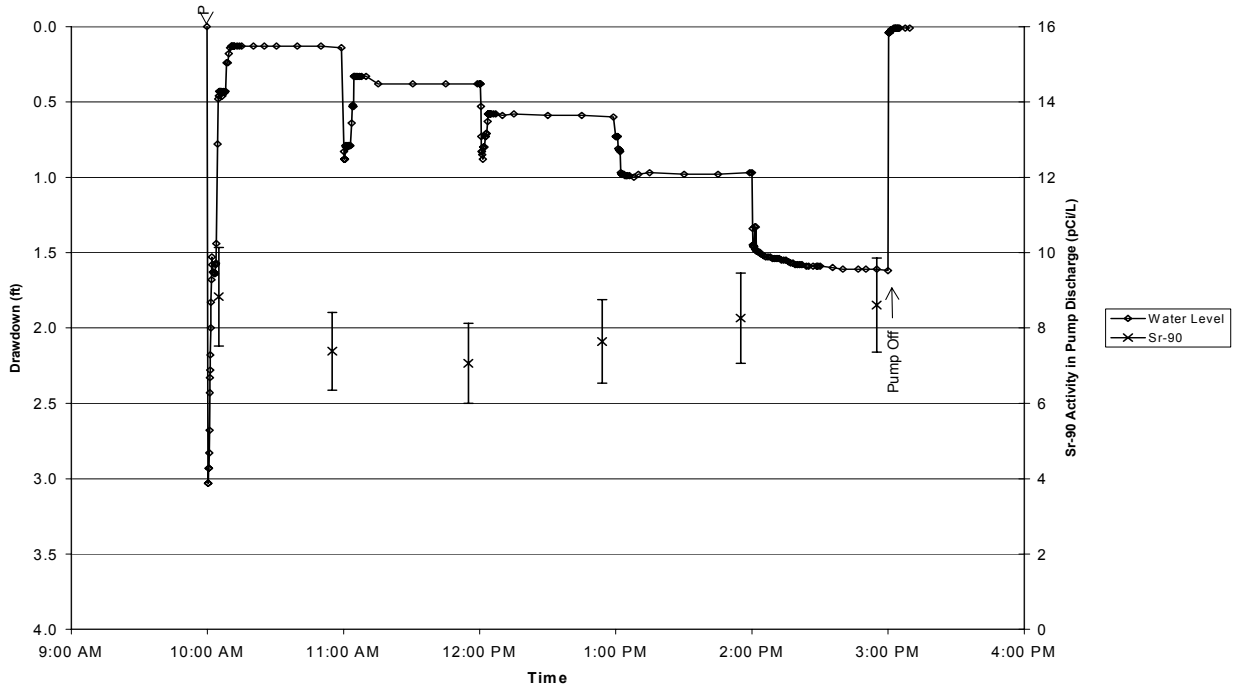

Figure 3-7. Sr-90 concentrations in groundwater during step-drawdown test at ICPP-MON-A-230.

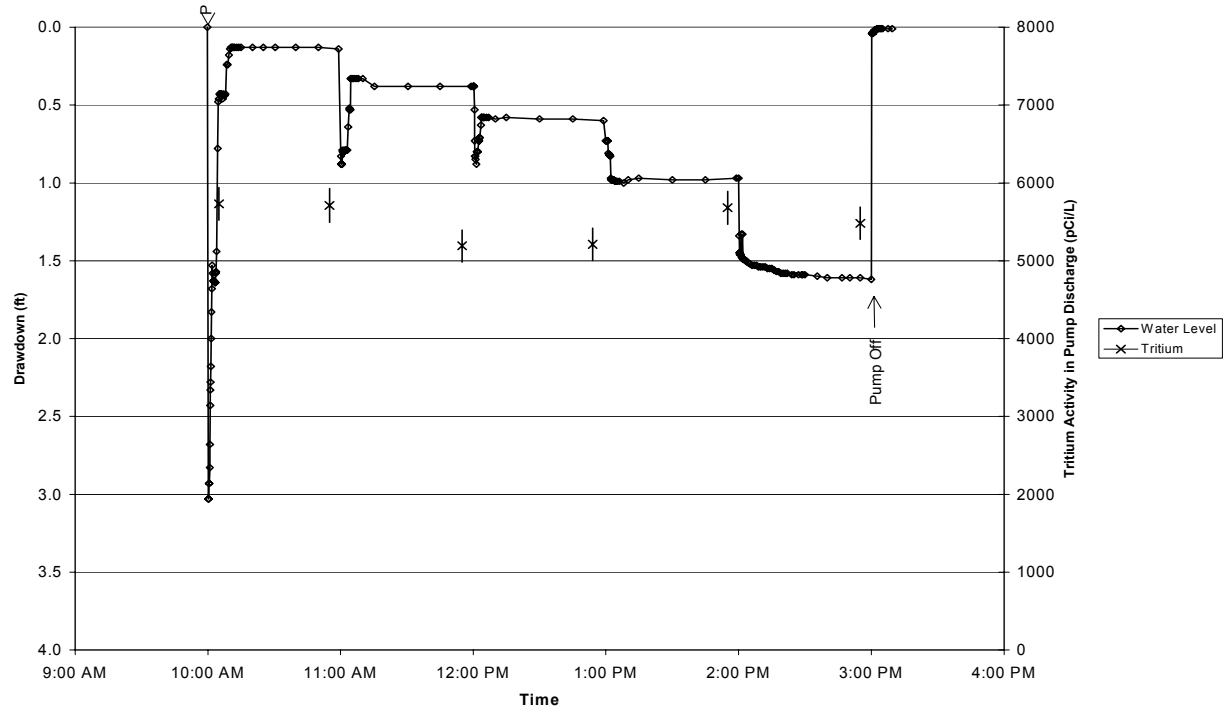

Figure 3-8. Tritium concentrations in groundwater during step-drawdown test at ICPP-MON-A-230.

Approximately 16,000 gal of groundwater were pumped from ICPP-MON-A-230 during the step drawdown test, which is equivalent to 2,100 ft^3. Dividing this volume by the assumed effective porosity of 0.03 for the aquifer gives an aquifer volume of 71,000 ft^3. The height of the water column (saturated thickness) in the well under nonpumping conditions was 18 ft. Assuming horizontal radial flow to the well in a homogeneous aquifer (cylindrical volume of influence), the area of circle affected by pumping is

$A = V/h = 71{,}000/18 = 3{,}940\ ft^2$

where: V = volume of aquifer

h = static water column height in well.

The radius of the circle around the well is then calculated as

$$R = (A/\pi)^{1/2} = (3{,}940/\pi)^{1/2} = 35\ ft.$$

This indicates that the water pumped from the well at the end of the pumping test was drawn from at least 35 ft from the monitor well, and the actual flow distance could have been greater through fractures that act as preferential pathways. The tank farm boundary is approximately 300 ft south of the monitor well, so it is unlikely that the pumping test drew water from directly beneath the tank farm. However, the test results demonstrate that the Tc-99 was present over an area of the aquifer that extends at least 35 ft away from the monitor well.

3.6 Radionuclide Results for Core Samples

Core samples obtained during drilling of the Tank Farm Well Set have been kept in storage at the INEEL Core Storage Facility. During drilling in 2001, core samples were collected from two boreholes of the Tank Farm Well Set. At the tank farm core hole (ICPP-SCI-P-252), core samples were retrieved from depths of 37 to 325 ft bgs, and detailed core logs and core photos were presented in the MWTS (DOE-ID 2003b). This boring is located approximately 50 ft west of monitor well ICPP-MON-A-230. At monitor well ICPP-MON-A-230, core samples were collected from 316 to 387 ft bgs. Because they were not included in the MWTS report, photographs of the core from ICPP-MON-A-230 are included in Appendix C.

Radiological screening performed during drilling in 2001 did not identify any core material with radiation levels above background (DOE-ID 2003b). However, as part of this study, the core samples were again screened for radioactivity to aid in selection of samples for laboratory testing. Radiological screening of the core was performed at the INEEL Core Storage Facility on November 5, 2003. The radiological control technician used a Ludlum 3 beta-gamma meter and a NEC Electra alpha meter to systematically screen the exterior surface of the entire length of cores from both borings (ICPP-MON-A-230 and ICPP-SCI-P-252). No beta-gamma activity above background levels was detected anywhere on the cores (all readings <100 dpm). For the majority of the core, alpha radiation was also at or below background levels (<20 dpm). The exception was an interval of slightly elevated alpha activity observed on the surface of the core from boring ICPP-SCI-P-252 at depths of 288 to 319 ft bgs. A peak alpha activity of 150 dpm was observed at the 293-ft depth. The alpha activity was determined to be “fixed,” as a smear sample showed no detectable alpha activity.

Ten samples of the core material were collected for laboratory testing of selected radionuclides. Samples for laboratory analysis were selected from the following zones: (1) basalt from depths where perched water was potentially present, (2) sedimentary interbed material that could have adsorbed radionuclides,

and (3) depths with elevated alpha field screening results. Table 3-5 summarizes the sample depths, lithologies, and laboratory results. The complete laboratory results are included in Appendix D.

The lab results indicate that Tc-99, Sr-90, and gamma-emitting radionuclides were not present at detectable concentrations in the samples of core material. Gross alpha and gross beta activities ranged from 2.03 ±0.877 to 16.7 ±1.65 pCi/g and from 3.61 ±1.10 to 33.0 ±1.76 pCi/g, respectively. These values are similar to the background screening criteria of 20 pCi/g for alpha radiation and 30 pCi/g for beta radiation for INTEC alluvium used in the OU 3-13 Comprehensive Remedial Investigation/ Feasibility Study Work Plan (INEL 1995). The laboratory results did not confirm the field alpha screening, which had indicated a slightly elevated fixed gross alpha activity within the depth interval of 288 to 319 ft bgs. The elevated screening results are believed to be attributable to naturally occurring uranium and/or thorium in the basalt. Chemical analysis of core samples indicates that concentrations of uranium and thorium of up to 2 ppm each are common in the basalts underlying INTEC (DOE-ID 2003b). Moreover, the lab results do not indicate the presence of Tc-99 in the basalt or interbed material within the vadose zone at monitor well ICPP-MON-A-230.

3.7 Colloidal Borescope Logging Results for ICPP-MON-A-230

To assess groundwater flow directions and velocities in the aquifer, an innovative tool, the colloidal borescope, was used for logging of monitor well ICPP-MON-A-230. The colloidal borescope was developed by Oak Ridge National Laboratory and tracks the movement of colloidal particles in groundwater as they are carried across the screened or perforated interval of a well. The colloidal borescope provides a direct measurement of the groundwater flow velocity in a well by directly observing the movement of naturally occurring particles (colloids) that are ubiquitous in groundwater. The colloidal borescope consists of a charged-couple device camera, an electronic compass for orientation, optical magnification lens, illumination source, and stainless steel housing (measuring 24 in. long with a diameter of 1.7 in.). Particles are magnified 140 times and observed at the surface on a video monitor. Colloidal movement in the groundwater is monitored using a video frame grabber that is capable of analyzing video images from the colloidal borescope several times per second. A software program analyzes the digitized video images, calculates the particle number, size, flow direction, and flow rate, and records the data to a computer (Kearl 1997).

The colloidal borescope was deployed at monitor well ICPP-MON-A-230 on October 22-23, 2003. Contractor Aquavision, Inc., operated the borescope under the supervision of a Bechtel BWXT Idaho hydrogeologist. The borescope was employed at several depths within the screened interval. Because placement of the tool in the well disturbs the natural groundwater flow, up to 30 minutes is required following tool placement before reliable data may be collected. Following return to normal groundwater flow, data collection typically requires 60 or more minutes at each depth to ensure that the natural fluctuations in groundwater flow velocity and direction are recorded (Shanklin 1996).

Figure 3-9 shows the results of the colloidal borescope logging of ICPP-MON-A-230, and additional details are included in Appendix E. As shown on the well completion diagram (Figure 3-2), the monitor well is screened from 443 to 483 ft bgs. At the start of the test, the depth to water in the well was 461.8 ft bgs. The borescope indicated significant lateral flow at two depths near the bottom of the well screen, at 477 ft and at 482 ft bgs. Southeasterly groundwater flow was observed at both depths (Figure 3-9), at estimated groundwater flow velocities in the range of 3 to 5 ft/day. These velocities were obtained by dividing the measured in-well velocities by four to account for the acceleration of groundwater near the well bore and to account for flow velocities outside of and away from the well bore, which are typically up to a factor of four lower than those measured with the borescope.

Table 3-5. Summary of radionuclide results for core samples.

Boring ID	Depth (ft bgs)	Lithology	Tc-99 (pCi/g)	Sr-90 (pCi/g)	Gross Alpha (pCi/g)	Gross Beta (pCi/g)	Gamma Emitters[a] (pCi/g)
ICPP-SCI-P-252	43	Basalt, rubbly, weathered	U[b]	U	2.03 ±0.877	3.61 ±1.10	U
ICPP-SCI-P-252	105	Basalt, fractured, w/ clay infill	U	U	4.61 ±1.22	9.67 ±1.38	U
ICPP-SCI-P-252	155	Interbed, clay, brown	U	U	16.2 ±1.68	24.6 ±1.63	U
ICPP-SCI-P-252	195	Interbed, silty sand, red-brn	U	U	15.5 ±1.50	33.0 ±1.76	U
ICPP-SCI-P-252	274	Basalt, fractured	U	U	5.55 ±1.19	7.42 ±1.26	U
ICPP-SCI-P-252	293[c]	Basalt, fractured	U	U	5.86 ±1.40	8.20 ±1.33	U
ICPP-SCI-P-252	305-306	Basalt, rubbly, weathered	U	U	5.01 ±1.44	7.33 ±1.41	U
ICPP-MON-A-230	350	Interbed, sandy silt, red-brn, loose	U	U	16.7 ±1.65	28.2 ±1.78	U
ICPP-MON-A-230	377	Basalt, rubbly, w/ interbed clay	U	U	10.9 ±1.58	16.4 ±1.80	U
ICPP-MON-A-230	385-387	Interbed, silt, gray-brn	U	U	11.5 ±1.47	20.8 ±1.89	U

a. Gamma-emitting radionuclides include Ag-108m, Ag-110m, Ce-144, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155, Mn-54, Nb-95, Ru-106, Sb-125, U-235, and Zn-65.
b. U = below detection limit.
c. Radiological screening indicates maximum fixed alpha activity at this depth (150 dpm).

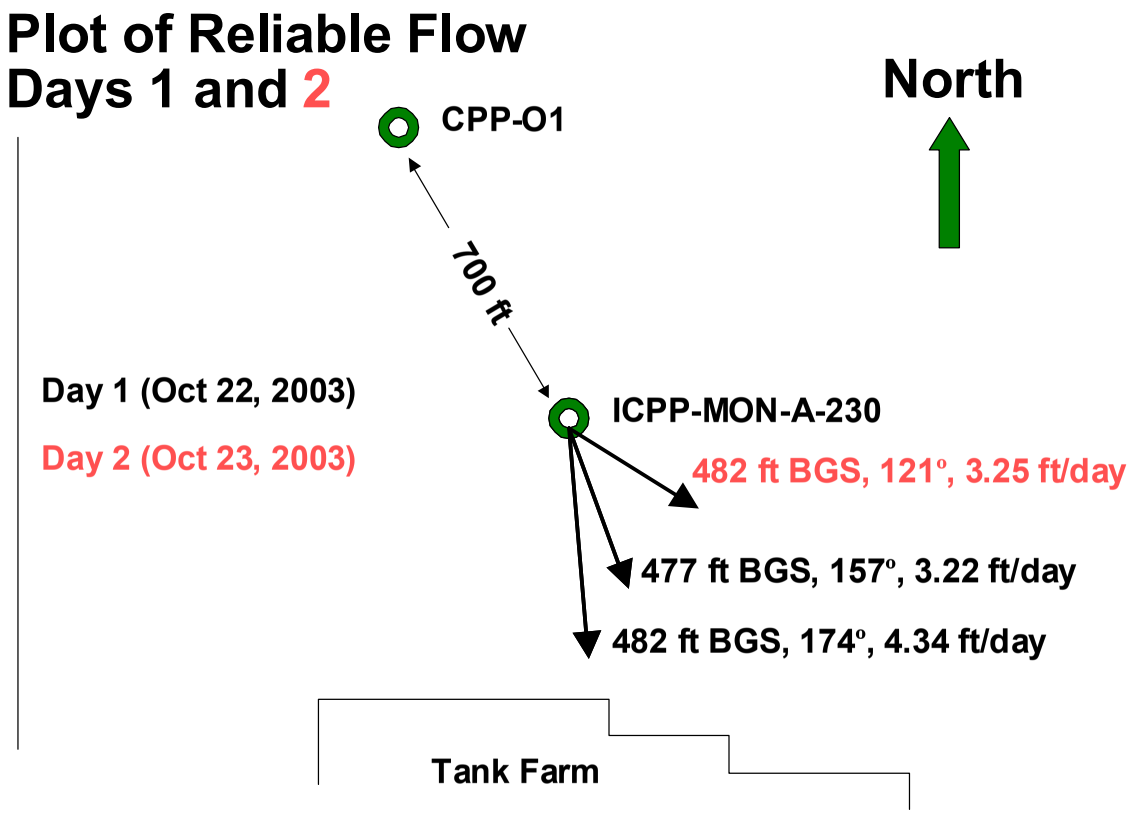

Figure 3-9. Summary of groundwater flow directions inferred using colloidal borescope.

On October 23, 2003, a test was performed to determine if pumping at INTEC raw water production well CPP-01 had a significant influence on groundwater flow at monitor well ICPP-MON-A-230. Colloidal borescope data collection began at ICPP-MON-A-230 at 9:22 a.m., and groundwater flow direction and velocity were monitored at the 482-ft depth (see Appendix E, page E-21). At 9:50 a.m., the groundwater flow azimuth was 128°, and flow velocity was 67 µm/sec. At 10:00 a.m., raw water production well CPP-01 was turned on and began pumping at 2,906 gpm. No immediate response at ICPP-MON-A-230 was observed. Instead, a gradual 10° eastward shift in groundwater flow direction occurred over the following hour, with flow velocities in the well remaining relatively constant. The gradual change in flow direction was similar to the slowly changing flow directions observed under normal conditions prior to startup of the pumping well. Therefore, it does not appear that cycling of the pump at CPP-1 had any immediate or obvious effect on groundwater flow at ICPP-MON-A-230.

3.8 Capture Zone Analysis of INTEC Well Field

Capture zone analysis of the INTEC raw water production wells (CPP-1 and CPP-2) and potable water wells (CPP-4 and CPP-5) was performed to determine if these wells could potentially capture groundwater at ICPP-MON-A-230 and/or beneath the tank farm. The analysis was performed using the MODFLOW and MODPATH computer software. MODFLOW is a three-dimensional groundwater flow simulator and MODPATH is particle tracking companion software for MODFLOW. The software was used to simulate groundwater flow paths near the tank farm and the INTEC production wells. Appendix F contains a detailed report summarizing the approach and results of the capture zone analysis.

The flow path analysis included simulations of both transient and steady-state pumping rates for the CPP-1, -2, -4, and -5 production wells. Pumping rates at the production wells were estimated from 2003 INTEC well operation logs. The capture zone modeling used a simplified lithology based on the Group 5 aquifer model, which only included the upper and lower basalt layers.

The steady-state pumping simulation with INTEC and Big Lost River recharge sources indicates the raw water well capture zone will extend approximately midway between the CPP-1 production well and ICPP-MON-A-230. The steady-state simulations with and without surface recharge indicated well capture zones are not significantly changed by the Big Lost River or INTEC facility recharge sources. Removing the Big Lost River and/or INTEC facility surface recharge did not have a dramatic effect on aquifer potentiometric surface because the volume of recharge water is relatively small and distributed over a large area compared to the volume of water pumped from the raw water production wells.

The transient simulations provide the most realistic evaluation of the INTEC production well capture zones because they include the effects of pumping cycles at the production wells. Figure 3-10 shows the transient simulation well field capture zone for 784 days of pumping with bimonthly alternation between well CPP-1 and well CPP-2. This simulation indicates the CPP-1 well capture zone extends to within approximately 40 m of the tank farm aquifer well. Transient simulations were only performed for a relatively short period of time compared to INTEC operational history because of computational restraints. The twice-daily cycle and large production volume of the raw water wells CPP-1 and CPP-2 require a large number of simulation time steps even for a short simulation period. The transient analysis was performed to determine sensitivity to the semi-daily cycling on and off of the well, and the bimonthly alternation between the CPP-1 and CPP-2 raw water wells.

The twice daily cycling on and off of the CPP-1 well did not have a significant impact on the size and shape of the simulated well field capture zone. This is because the short pumping cycle and recovery period did not allow the aquifer to completely recover between cycles. The only difference between the steady-state and transient simulation flow paths was a slight zigzag pattern within the transient flow paths.

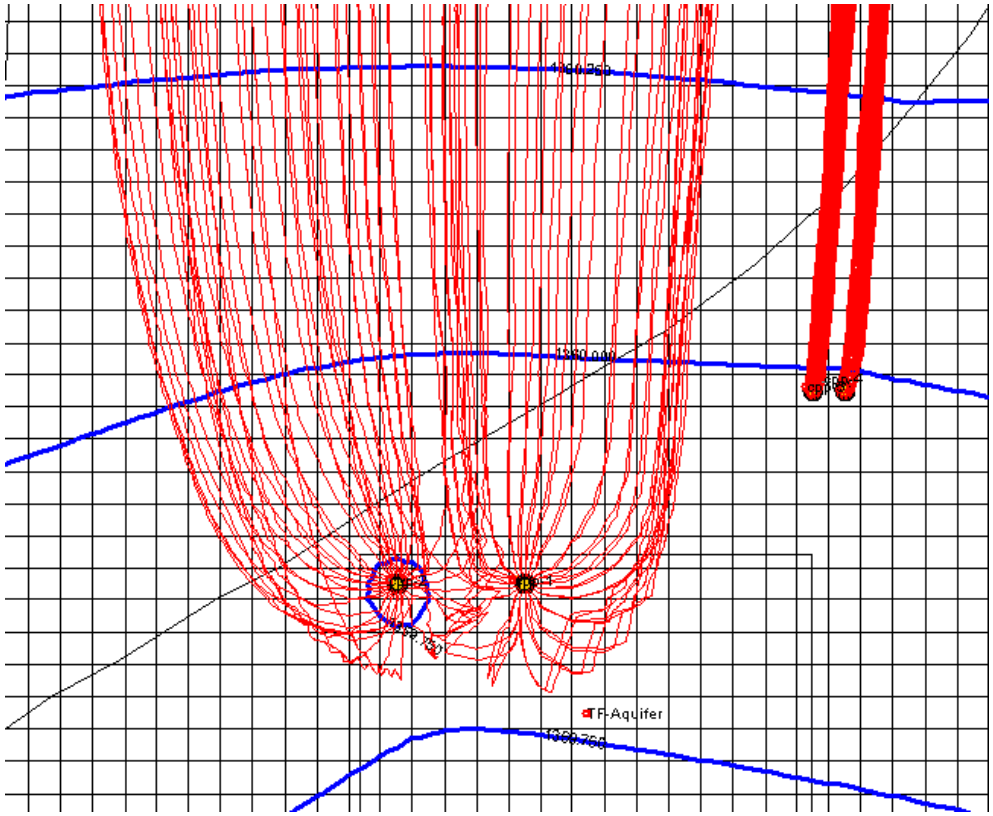

Figure 3-10. Simulated well field capture zone for 784 days of bimonthly alternating pumping between well CPP-1 and well CPP-2.

The bimonthly alternation between CPP-1 and CPP-2 has a large impact on size of the capture zone because the 2-week operation period and the 2-week inactive period allows the aquifer drawdown to reach steady state during pumping and fully recover during the shutdown period.

The results of the capture zone analysis show that the relatively small pumping rate of potable water wells CPP-4 and CPP-5 and large aquifer permeability result in the capture zones extending less than 20 m south of the potable water wells. Conversely, the large pumping rates for raw water wells CPP-1 and CPP-2 result in a very large capture zone extending approximately 150 m south or 3/4 of the distance to the tank farm aquifer well. The steady-state drawdown at CPP-1 is approximately 0.22 m and transient drawdown is approximately 0.37 m. The groundwater mounding resulting from the Big Lost River and other surface recharge sources is only a small fraction of this value and small compared to the large-scale gradient. The steady-state simulations with and without surface recharge indicated well capture zones are not significantly changed by the Big Lost River or INTEC facility recharge sources.

It is important to note that the simulations presented in this report assume the fractured basalt aquifer beneath the INTEC behaves as an equivalent isotropic porous medium and can be simulated as such. Flow is only considered in the basalt fractures and is assumed to behave as a low-porosity and high-permeability equivalent porous medium. The actual capture zones may be influenced by preferential flow paths due to rubble zones that occur near individual flow top and bottoms. When the injection well was operational prior to 1984, the capture zone of CPP-01 and -02 extended further south than at present as a result of the increased hydraulic gradient. Moreover, CPP-01 captured some service waste sent to the injection well in 1959 (Rhodes 1960), which indicates that the capture zone extended at least to the injection well at that time.

3.9 Evaluation of Tc-99 Sources at INTEC

When the elevated concentration of Tc-99 was detected in the May 2003 groundwater sample from ICPP-MON-A-230, the source of the Tc-99 had not been identified. Therefore, an evaluation of potential Tc-99 sources at INTEC was performed. Because of its low activity compared to other fission products present in SNF, relatively few Tc-99 data are available as compared to other radionuclides.

To assess potential Tc-99 sources at INTEC, an inventory of the amounts of Tc-99 historically present at the facility (as of July 1999) are summarized below (Swenson 2003):

3,450 Ci in stored calcine waste
224 Ci in remaining liquid and solid wastes in the INTEC tank farm
6 Ci shipped off-Site
3,680 Ci total Tc-99 in SNF reprocessed at INTEC

The total above does not include the Tc-99 that may have been released to the environment. The quantity that was released is unknown, but is estimated to be a fraction of 1% of the total quantity of Tc-99 in the SNF reprocessed at INTEC.[d] To address this data gap, an evaluation of the source or sources of elevated Tc-99 activity in ICPP-MON-A-230 was performed. A report documenting the approach and results of this evaluation is included in Appendix G. Below is a summary of available information regarding the magnitude of Tc-99 releases to soil and groundwater.

The RI/BRA estimated that the CPP-31 liquid release that occurred in November 1972 contained between 0.95 and 4.0 Ci Tc-99, with the average value being 2.58 Ci (DOE-ID 1997). That report further estimated that the CPP-31 release accounted for 95.9% of the Tc-99 mass released to the aquifer. The CPP-31 release site is located near the underground tanks at the INTEC tank farm (Figure 3-11). More recent assessments of the quantities of radionuclides present in historical releases at the tank farm confirm previous estimates of 2 to 3 Ci Tc-99 that have been released to tank farm soils. Additional information regarding the nature and extent of radionuclides beneath the INTEC tank farm will be generated during the OU 3-14 Remedial Investigation/ Feasibility Study (DOE-ID 2004b).

No records exist to document Tc-99 concentrations in the service waste that was previously disposed of in the former INTEC injection well, but the existence of a dilute plume of Tc-99 in the aquifer downgradient of INTEC strongly suggests that the former injection well could have been a source of Tc-99 to groundwater. Based on summation of the observed amounts of Tc-99 in the groundwater plume that existed in 1991-92, Beasley et al. (1998) estimated that a total of approximately 15 Ci of Tc-99 were present in the SRPA. The authors attributed the Tc-99 in the SRPA to waste disposal at the former INTEC injection well, which was used from 1953 until 1986 for disposal of service waste. Their estimate of 15 Ci Tc-99 in the aquifer was based on assumptions that the active flow zone of the SRPA has a thickness of 50 m and an effective porosity for the basalt aquifer of 23%. Based on more recent data, the current WAG 3 aquifer model assumes an effective porosity of 3% (Appendix F). The use of the higher-porosity value by Beasley et al. (1998) could result in their calculations significantly overestimating the total Tc-99 in the aquifer. Applying the 3% porosity value to their analysis would result in revising their estimate of the total Tc-99 in groundwater from 15 Ci down to 2 Ci.

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d. Swenson, M. C., 2003, personal communication with J. Forbes, December 2, 2003.

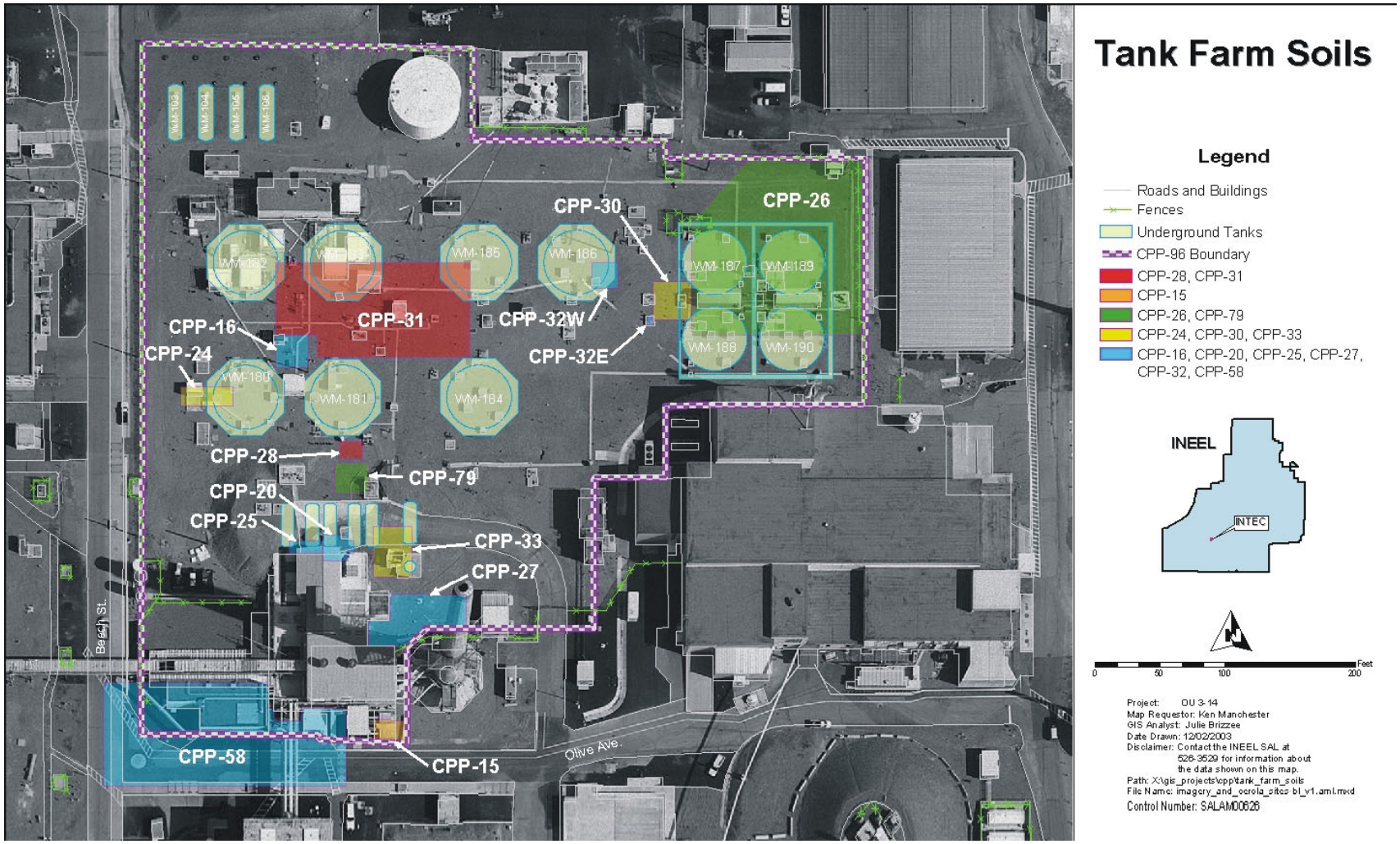

Figure 3-11. CERCLA sites at INTEC tank farm.

There are two basic ways that Tc-99 could have entered the service waste stream that was sent to the former injection well, either as a volatile species that passed across the process equipment waste (PEW) evaporator or as an aqueous species. Volatile radionuclides, such as tritium and I-129, are not effectively removed during waste distillation in the PEW evaporator. Semivolatile nuclides, such as Ru-106, may be only partially removed. Therefore, an appreciable fraction of these volatile and semivolatile constituents can pass to the PEW condensate (overheads) that was sent to the injection well. The extent to which Tc-99 could have passed into the PEW condensate is unknown, because Tc-99 testing of the condensate or service waste was never performed. However, Thomas[e] has performed calculations of the volatility of Tc-99 under the conditions that would have existed in the PEW evaporator and in the Waste Calcining Facility. The results of these calculations show that the vapor pressure of dissolved technetium species in the PEW evaporator would be too low for a large amount of Tc-99 to pass over to the condensate. Nevertheless, there is evidence that Tc-99 is intermediate in terms of its volatility between volatile solutes, such as tritium and I-129, and essentially nonvolatile radionuclides, such as Sr-90 and Cs-137.

Even if the volatility of Tc-99 is too low to permit vapor-phase transport in the PEW evaporator, there still remains the possibility that some aqueous-phase Tc-99 could have entered the service waste sent to the injection well. Sr-90 is considered an essentially nonvolatile radionuclide, yet it has been estimated that 24.3 Ci of Sr-90 were disposed of to the injection well over its operational lifetime (DOE-ID 1997, Appendix F). The Sr-90 most likely entered the service waste in the aqueous phase, either as aerosol mists or in relatively small volumes of liquid decontamination wastes, and a much smaller amount of Tc-99 would likely have been present in the waste also. Another approach proposed by Swenson in Appendix G is based on the observation that the tritium:Tc-99 ratio in groundwater downgradient of the former injection well is approximately 100:1 in 2001 (Table 3-6). Because of the relatively short half-life of tritium, this ratio decreases with time and would have been larger in the past, perhaps in the range of 1,000:1 to 1,500:1 during the period when the injection well was in operation (1953–1986).[a] Assuming these ratios would have existed in the PEW condensate, the amount of Tc-99 sent to the disposal well can then be estimated. Based on the 21,300 Ci of tritium thought to have been disposed of to the injection well (DOE-ID 1997), this would suggest that perhaps 14 to 21 Ci of Tc-99 may have been sent to the injection well with the service waste.

Appendix G contains an evaluation by Swenson of the ratios of Tc-99, tritium, I-129, and nitrate observed in the groundwater at ICPP-MON-A-230 with these same ratios in the tank farm liquid wastes and in service waste sent to the former injection well. For relatively mobile constituents such as these, concentration ratios should remain fairly constant during subsurface transport (assuming the tritium activity has been adjusted for natural radioactive decay). The results of this analysis show that the contaminant ratios at ICPP-MON-A-230 resemble those in past releases at the tank farm (i.e., CPP-31, CPP-28 release sites).

Table 3-6 summarizes the calculated concentration ratios for the groundwater at ICPP-MON-A-230 and compares them with similar ratios calculated for average tank farm liquid waste and an average for groundwater from monitor wells located downgradient of the former injection well. As shown on this table, groundwater at ICPP-MON-A-230 has concentration ratios very similar to ratios in an average tank farm liquid waste. In contrast, contaminant ratios for other monitor wells downgradient of INTEC are very different than those in either the tank farm liquid waste or groundwater at ICPP-MON-A-230. The other downgradient wells have chemical signatures representative of the service waste that was previously sent to the former injection well. This analysis provides strong geochemical evidence that the elevated

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e. Thomas, T. R., INEEL, to M. C. Swenson, INEEL, October 20, 2003, "Volatility of technetium from process evaporator and calciner operations."

Table 3-6. Comparison of contaminants in groundwater and tank farm waste.

Ratio	ICPP-MON-A-230	Average Tank Farm Release[a]	Groundwater Downgradient of INTEC[b]
H-3/Tc-99	1.7	2.2	100
NO_3/H-3 (g/µCi)	8.1	4.7	0.1
NO_3/Tc-99 (g/µCi)	14	10	100

a. Average composition of CPP-28 and CPP-31 releases.
b. Rounded average value based on 2001 and 2003 results for monitor wells USGS-42, -48, -57, -67, and -123.

Tc 99 concentration currently present at ICPP-MON-A-230 is derived from past liquid releases at the tank farm, not from service waste discharges to the former injection well.

3.10 Tc-99 Results for Archived Groundwater Samples

Groundwater samples from the INTEC area were not analyzed for Tc-99 prior to the first sampling for this radionuclide performed by the USGS in 1991-92 (Beasley et al. 1998). However, each year beginning in 1968, the USGS has set aside an extra 1-L groundwater sample from each of the USGS monitor wells and water supply wells that are sampled during their spring sampling event. The extra water samples are stored (archived) indefinitely at CFA in order to permit future testing of groundwater using improved laboratory methods or in case unanticipated questions should arise regarding past concentrations of chemical constituents in groundwater. After the May 2003 sample from monitor well ICPP-MON-A-230 was found to exceed the Tc-99 MCL, questions arose regarding past concentrations of Tc-99 in the aquifer. A discussion with USGS staff indicated that some of their archived groundwater samples could be made available for analysis of Tc-99. Clearly, laboratory results for water samples that have been stored for 20+ years should be used with caution, as standard holding times and other quality assurance/quality control requirements have not been met. In addition, some of the archived water samples had been preserved with hydrochloric acid, while others had not. In spite of these variables, the consensus of the project team was that Tc-99 results for archived water samples ought to be valid because the pertechnetate anion remains stable in groundwater, with little or no tendency to precipitate, adsorb, or volatilize. Therefore, the decision was made to proceed with Tc-99 testing of the archived water samples, with the caveat that the results should be used for information and screening purposes only and are not intended for making decisions under CERCLA.

Groundwater samples collected by the USGS from selected wells between 1970 and 1990 were analyzed for Tc-99 by the Radiological and Environmental Sciences Laboratory located at CFA. Four wells were selected and, for each well, groundwater samples collected in 1970, 1975, 1980, 1985, and 1990 were tested. Samples tested were those from wells located closest to the INTEC tank farm and/or former injection well.

Table 3-7 summarizes the Tc-99 results for the archived water samples, along with the available Tc-99 results for these same wells reported for routine (nonarchived) groundwater samples collected after 1990. Figure 3-12 shows the results as time-series trend plots. The highest Tc-99 concentration reported for any of the archived water samples was 121 ±9 pCi/L for the sample collected from deep perched monitor well USGS-50 on April 18, 1975. Water quality in USGS-50 was significantly impacted by the failure of the INTEC injection well during 1968-71, which allowed service waste to be temporarily discharged into the deep vadose zone (DOE-ID 2004a), as well as direct injection of service waste into USGS-50 during September-October 1971 (Amberson 1971).

Table 3-7. Summary of Tc-99 results for selected wells.

Well	Sample Date	Tc-99 (pCi/L)	Total Uncertainty (pCi/L)	Preservative	Sample Type
CPP-1	01/29/70	35	6	Raw	Pump
CPP-1	07/30/75	7	5	2% HCl	Pump
CPP-1	04/15/80	-3	5	2% HCl	Unknown
CPP-1	07/11/85	3	5	Raw	Pump
CPP-1	04/17/90	-10	5	Raw	Pump
CPP-1	06/05/95	31	1		Pump
CPP-1	10/22/02	23.6	2.35		Pump
CPP-1	10/02/03	44.7	3.09	HNO3	Pump
CPP-1	10/13/03	26.3	2.1	HNO3	Pump
USGS-47	04/21/70	-7	5	2% HCl	Thief
USGS-47	07/29/75	-8	5	2% HCl	Thief
USGS-47	04/15/80	-6	5	2% HCl	Unknown
USGS-47	04/23/85	4	5	Raw	Thief
USGS-47	04/17/90	7	5	Raw	Unknown
USGS-47	06/26/95	174	2		
USGS-47	10/20/99	1.63	0.283		
USGS-47	04/25/01	38.3	2.78	HNO3	Pump
USGS-47	04/10/03	42.5	2.52	HNO3	Pump
USGS-50	04/21/70	7	5	2% HCl	Thief
USGS-50	04/18/75	121	9	2% HCl	Thief
USGS-50	02/20/81	57	7	2% HCl	Unknown
USGS-50	04/23/85	-2	5	Raw	Bailer
USGS-50	04/23/90	43	6	Raw	Unknown
USGS-50	01/01/92	55.6	0.43		
USGS-50	12/14/1993	71	1		
USGS-50	12/16/1994	77	1		
USGS-50	5/30/1995	75	1		
USGS-50	2/26/2001	50.2	3.19		
USGS-52	10/17/70	61	7	Raw	Thief
USGS-52	04/15/75	33	6	2% HCl	Thief
USGS-52	04/22/80	85	8	2% HCl	Unknown
USGS-52	04/23/85	65	7	Raw	Thief
USGS-52	04/03/90	91	8	Raw	Unknown
USGS-52	05/12/95	235	3		
USGS-52	04/25/01	322	6.6	HNO3	Pump
USGS-52	04/14/03	313	6.77	HNO3	Pump

Note: Gray shaded cells are for archived water samples; all others are conventional groundwater samples.

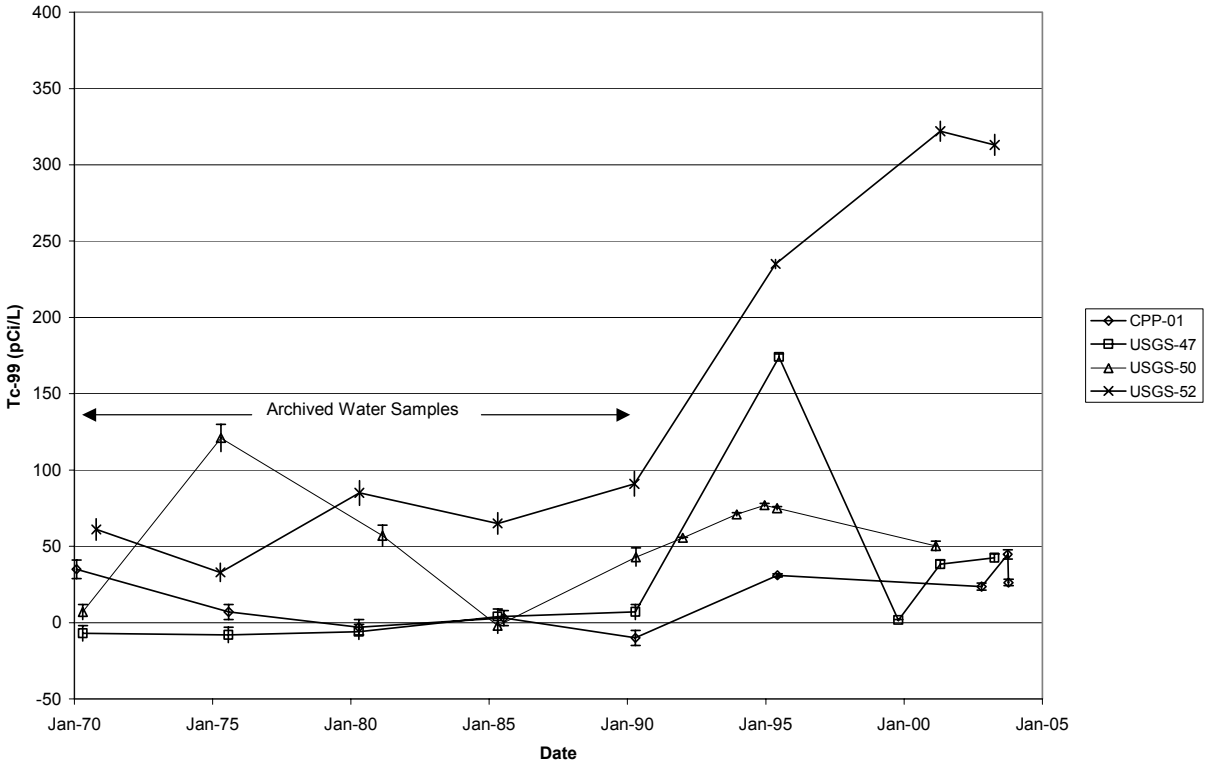

Figure 3-12. Tc-99 results for groundwater samples from selected wells.

Another significant observation is that the results for the archived water testing indicate that Tc-99 was present in 1970 in INTEC water supply well CPP-01 at a concentration of 35 ±6 pCi/L. This coincides with the time period when groundwater quality at CPP-01 was impacted by the injection well failure (Amberson 1972a, b).

The results for monitor well USGS-52 show a significant increase in Tc-99 concentrations beginning in about 1990 (Figure 3-12). A similar rising trend for Tc-99 has been observed in USGS-112 located roughly halfway between INTEC and CFA, but the increase in that well appears to begin in about 2000 (DOE-ID 2003a). The increasing concentrations of Tc-99 observed in these wells contrasts with the declining concentrations of tritium, Sr-90, and I-129 in the aquifer (DOE-ID 2004a).

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4. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are based on the results of the Phase 1 investigation of Tc-99 at INTEC:

- Groundwater at ICPP-MON-A-230 contains Tc-99 at concentrations between 2,000 and 3,000 pCi/L. This is the only location at INTEC where the observed Tc-99 concentration has exceeded the derived MCL of 900 pCi/L (including perched monitor wells and vadose zone water from suction lysimeters in and around the tank farm).

- Monitoring results for raw water well CPP-01 show that low concentrations of Tc-99 were present in the aquifer at this location by 1995, 6 years before installation of the Tank Farm Well Set. Results for archived groundwater samples suggest that Tc-99 may have been present in CPP-01 even earlier, perhaps as early as 1970.

- ICPP-MON-A-230 is constructed in a manner that minimizes the possibility of downhole migration of contaminated water, and it is concluded that the occurrence of Tc-99 in the aquifer cannot be attributed to installation of this well or other monitor wells at the Tank Farm Well Set.

- The pumping test confirms that the aquifer is very permeable at the location of ICPP-MON-A-230, with hydraulic conductivities in the range of 2,000 to 4,000 ft/day.

- The persistence of Tc-99 concentrations exceeding 2,000 pCi/L during the 5-hour pumping test indicates that the Tc-99 is present over a volume of the aquifer that extends at least 35 ft radially from monitor well ICPP-MON-A-230.

- At several times in the past when the injection well was in operation, the capture zone of the INTEC raw water wells CPP-01 and –02 extended at least as far south as the injection well and almost certainly included some portion of the aquifer underlying the tank farm.

- The evidence strongly suggests that the source of the elevated Tc-99 activity in the groundwater near ICPP-MON-A-230 is historical liquid waste releases at the tank farm, in particular the Site CPP-31 and CPP-28 releases. This observation represents possible evidence of groundwater quality impact from releases associated with the tank farm (OU 3-14).

- The most likely mechanism for transport of Tc-99 from contaminated soils at the tank farm to the aquifer is downward movement of contaminated water through the vadose zone to the water table.

- Alternating layers of basalt and sedimentary interbeds present beneath the tank farm area may result in significant horizontal flow of water percolating downward towards the aquifer.

- The former INTEC injection well likely constituted an earlier source of Tc-99 to the aquifer, but the resulting groundwater concentrations did not exceed the MCL. The dilute Tc-99 plume that extends south and downgradient of INTEC is most likely primarily the result of service waste discharges to the former injection well, not contaminated soils at the tank farm.

Based on discussions with the Agencies and the project team, it is recommended that a work plan be developed for a Phase 2 investigation of Tc-99 to further delineate the nature and extent of Tc-99 in the perched water and aquifer beneath the northern portion of INTEC. The Phase 2 investigation should be performed as a continuation of the OU 3-13 Group 4 Phase 1 well installation activities. The primary

task recommended for Phase 2 is the installation of two new well sets along the southern boundary of the tank farm. Figure 4-1 shows the proposed locations of the two well sets. These are the same locations where additional monitor wells were previously proposed for installation in the MWTS (DOE-ID 2003b), but the decision to install the wells had been deferred. Each well set should include a shallow perched monitor well, a deep perched well, and an aquifer skimmer well. The new well sets should be incorporated into the existing Group 4 annual monitoring program.

The proposed schedule for the Phase 2 investigation of Tc-99 at INTEC is to prepare the drilling bid package during FY-04, then perform drilling and monitor well installation during FY-05. This schedule will then permit revision of the WAG 3 vadose zone transport model during FY 2006–2007, and submission of the Group 4 Monitoring Report/Decision Summary in February 2008, as currently scheduled.

The observed Tc-99 concentration at ICPP-MON-A-230 significantly exceeded the predicted concentration from both the original OU 3-13 RI/BRA contaminant transport model (DOE-ID 1997) and the more recent updated WAG 3, Group 5 model (DOE-ID 2003b). The INTEC vadose zone model will be revised to reflect the new Tc-99 information. The model revision is currently being performed as part of the OU 3-14 Preliminary Baseline Risk Assessment.

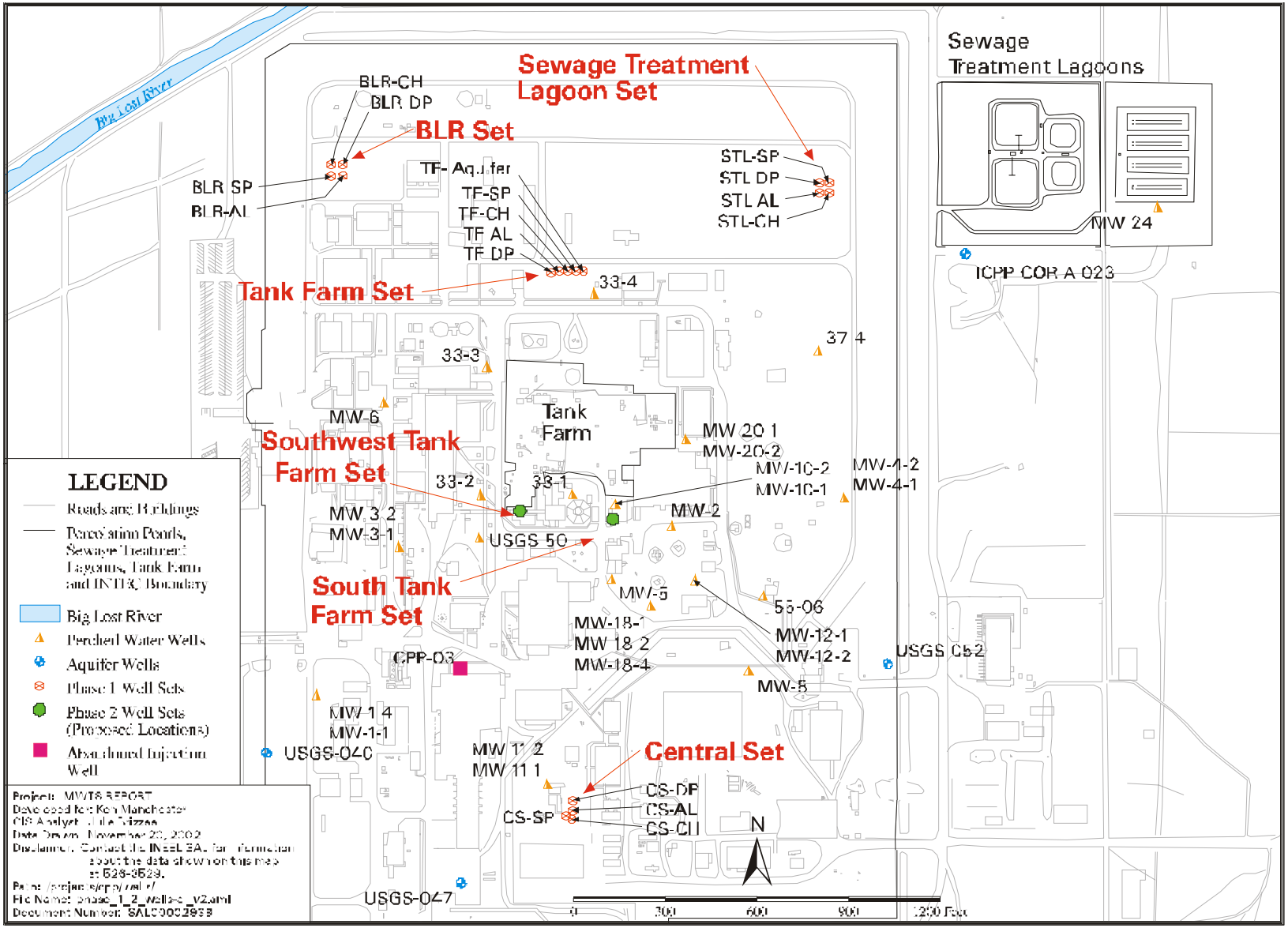


Figure 4-1. Proposed Phase 2 monitor well locations.

5. REFERENCES

Amberson, C. B., 1971, ICP Production Monthly Report No. 138, August 27 through September 27, 1971, AMB-175-71, Oct. 1, 1971.

Amberson, C. B., 1972a, ICP Production Monthly Report No. 144, Feb. 27 through March 26, 1972, AMB-41-72, April 3, 1972.

Amberson, C. B., 1972b, ICP Production Monthly Report No. 151, Sept. 27 through Oct. 26, 1972, AMB-123-72, November 3, 1972.

Anderson, S. R., M. A. Kuntz, L. C. Davis, 1999, *Geologic Controls of Hydraulic Conductivity in the Snake River Plain Aquifer at and near the Idaho National Engineering and Environmental Laboratory, Idaho*, USGS WRIR 99-4033, DOE/ID-22155, United States Geological Survey, February 1999.

Beasley, T. M., P. R. Dixon, and L. J. Mann, 1998, "^{99}Tc, ^{236}U, and ^{237}Np in the Snake River Plain Aquifer at the Idaho National Engineering and Environmental Laboratory," *Environmental Science & Technology*, *32*:3875-3881, 1998.

Cahn, Lorie S., and Shannon L. Ansley, 2003, "Analysis of Perched Water Data from ICDF Monitoring Wells," INEEL/EXT-03-00250, Rev. 0, Draft, Idaho National Engineering and Environmental Laboratory, May 2003.

Chen, Fanronga, P. C. Burns, R. C. Ewing, 2000, "Near-field behavior of ^{99}Tc during the oxidative alteration of spent nuclear fuel," *Journal of Nuclear Materials*, *Vol. 278*, No. 2-3, April 2000, pp. 225-232.

Darab, John G., and Peter A. Smith, 1996, "Chemistry of Technitium and Rhenium Species during Low-Level Radioactive Waste Vitrification," *Chem. Mater. 1996*, *8*, pp. 1004-1021.

Del Debbio, John, and T. Thomas, 1989, *Transport Properties of Radionuclides and Hazardous Chemical Species in Soils at the Idaho Chemical Processing Plant*, WINCO-1068, Westinghouse Idaho Nuclear Company, October 1989.

DOE-ID, 1997, *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEEL-Part A, RI/BRA Report (Final)*, DOE/ID-10534, U.S. Department of Energy Idaho Operations Office, November 1997.

DOE-ID, 1999, *Final Record of Decision Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13*, DOE/ID-10660, Rev. 0, U. S. Department of Energy Idaho Operations Office, October 1999.

DOE-ID, 2000, *CERCLA Waste Inventory Database Report for the Operable Unit 3-13 Waste Disposal Complex*, DOE/ID-10803, Rev. 0, U. S. Department of Energy Idaho Operations Office, December 2000.

DOE-ID, 2002, *Annual INTEC Groundwater Monitoring Report for Group 5-Snake River Plain Aquifer (2001),* DOE/ID-10930, Rev. 0, U.S. Department of Energy Idaho Operations Office, February 2002.

DOE-ID, 2003a, *Annual INTEC Groundwater Monitoring Report for Group 5-Snake River Plain Aquifer (2003)*, DOE/ID-11118, Rev. 0, U.S. Department of Energy Idaho Operations Office, December 2003.

DOE-ID, 2003b, *Phase I Monitoring Well and Tracer Study Report for Operable Unit 3-13, Group 4, Perched Water,* DOE/ID-10967, Rev. 1, U.S. Department of Energy Idaho Operations Office, June 2003. (Revision 1 is the public version; Revision 2 is the Official Use Only version.)

DOE-ID, 2003c, *Monitoring System and Installation Plan for Operable Unit 3-13, Group 4, Perched Water Well Installation*, DOE/ID-10774, Rev. 2, , U.S. Department of Energy Idaho Operations Office, November 2003.

DOE-ID, 2003d, *Annual INTEC Groundwater Monitoring Report for Group 4 - Perched Water (2003)*, DOE/ID-11117, Rev. 0, U.S. Department of Energy Idaho Operations Office, December 2003.

DOE-ID, 2003e, *INTEC Water System Engineering Study*, DOE/ID-11115, Rev. 0, U.S. Department of Energy Idaho Operations Office, December 2003.

DOE-ID, 2004a, *Monitoring Report/Decision Summary for Operable Unit 3-13, Group 5, Snake River Plain Aquifer*, DOE/ID-11098, Rev. 0, U.S. Department of Energy Idaho Operations Office, January 2004.

DOE-ID, 2004b, *Operable Unit 3-14 Tank Farm Soil and Groundwater Remedial Investigation/ Feasibility Study Work Plan*, DOE/ID-10676, Rev. 1, U.S. Department of Energy Idaho Operations Office, June 2004.

Driscoll, F.G., 1986, *Groundwater and Wells*, 2nd edition, Johnson Division, 1089p.

EPA, 2000, *Radionuclides Notice of Data Availability, Technical Support Document*, EPA/815/R-00/007, U.S. EPA Office of Ground Water and Drinking Water, March 2000.

Ehrhardt, K. C., and M. Attrep Jr., 1978, "Technetium-99 in the atmosphere," *Environmental Science & Technology*, *Vol. 12*, No. 1, January 1978, pp. 55-57.

Garcia, Russ, 2001, "Environmental Restoration Sample and Core Description Logbook, Tank Farm Set," ER-05-01, Idaho National Engineering and Environmental Laboratory, February 1 to March 21, 2001.

ICP, 2003, *Supplemental Work Plan for Tc-99 Evaluation in Groundwater, Waste Area Group 3, Group 4, Perched Water*, ICP/EXT-03-00029, Rev. 0, Idaho Completion Project, Idaho National Engineering and Environmental Laboratory, October 2003.

IDAPA 58.01.11, 1997, "Ground Water Quality Rule," Idaho Administrative Procedures Act, Department of Environmental Quality, March 1997.

INEL, 1995, *Waste Area Group 3 Comprehensive Remedial Investigation/Feasibility Study Work Plan (Final)*, *Vol. 2*, Attachment 6, "Sampling and Analysis Plan," INEL-95/0056, Idaho National Engineering Laboratory, August 1995.

Kearl, Peter M., 1997, "Observations of particle movement in a monitoring well using the colloidal borescope," *Journal of Hydrology*, *Vol. 200*, March 1997, pp 323–344.

Krupka, K. M., and R. J. Serne, 2002, *Geochemical Factors Affecting the Behavior of Antimony, Cobalt, Europium, Technetium, and Uranium in Vadose Sediments*, PNNL-14126, Pacific Northwest Laboratory, December 2002.

Logan, J., 1964, "Estimating Transmissibility from Routine Production Tests of Water Wells," *Ground Water*, Vol. 2, No. 1, p. 35-37.

Nimmo, J. R., K. S. Perkins, P. E. Rose, J. P. Rousseau, B. R. Orr, B. V. Twining, and S. R. Anderson, 2002, "Kilometer-scale rapid transport of naphthalene sulfonate tracer in the unsaturated zone at the Idaho National Engineering and Environmental Laboratory," *Vadose Zone Journal*, *Vol. 1*, August 2002, pp. 89-101.

Rard, J. A., M. H. Rand, G. Anderegg, and H. Wanner, 1999, *Chemical Thermodynamics 3*, "Chemical Thermodynamics of Technetium," Elsevier Science, 544 p.

Rhodes, D. W., Phillips Petroleum Company, to C. M. Slansky, Phillips Petroleum Company, May 24, 1960, "Low-Activity Waste Disposal at the ICPP," Rhod-5-60A.

Shanklin, Dean E., 1996, *Colloidal Borescope Groundwater Flow Measurements Along the Southern Boundary of the Fernald Environmental Management Project*, Prepared by the Fernald Environmental Management Corporation, Cincinnati, Ohio, for the U.S. Department of Energy under contract DE-AC05-860R21600, August 1996.

Swenson, M. C., 2003, "Validation of the radionuclide inventory and mass balance used in the INTEC SBW and Tank Farm Residuals WIR Determination Report," EDF-1920, Rev. 5, Idaho National Engineering and Environmental Laboratory, November 2003.

Turcotte, Marie-Daniele S., 1982, *Environmental behavior of technetium-99*, Technical Publication DP-1644, DuPont, December 1982.

Wenzel, D. R., 2002, "Relative Inventories of Reactor-Produced Species in INTEC Waste Types," EDF-CRPD-001, Rev. 1, Idaho National Engineering and Environmental Laboratory, November 2002.

Appendix A

Water Quality Results for Monitor Well ICPP-MON-A-230

Water Quality Field Parameters for Pumping Test at ICPP-MON-A-230 October 30, 2003

Time	Temperature (°C)	pH	Electrical Conductivity (µmhos/cm)	D.O. (mg/L)	D.O. (% SAT.)	Oxidation Reduction Potential (mV)
1045	0.31	7.61	671	10.28	77.3	+95
1046	2.77	7.59	631	5.18	46.4	+97
1047	5.26	7.61	614	4.95	47.2	+98
1151	7.36	7.63	665	7.57	79.1	+111
1152	9.57	7.71	666	7.31	78.5	+113
1153	10.50	7.71	665	7.35	79.6	+114
1248	10.92	7.63	663	7.63	83.1	+139
1249	11.22	7.67	661	7.33	80.8	+139
1250	11.39	7.66	661	7.20	79.9	+139
1346	10.51	7.66	667	7.70	84.1	+142
1347	11.23	7.69	665	7.50	82.9	+142
1348	11.30	7.69	664	7.36	81.5	+142
1446	10.24	7.63	668	7.96	86.5	+86
1447	10.95	7.70	666	7.73	85	+85
1448	11.24	7.69	665	7.65	84.7	+84

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
									Radionuclides								
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Americium-241	-0.006	0.004		U	PCI/L	05/13/2003	7.28E-02	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Americium-241	0.006	0.013		U	PCI/L	10/13/2003	7.59E-02	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Americium-241	0.019	0.019		U	PCI/L	10/13/2003	7.92E-02	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Antimony-125	0.219	2.62		U	PCI/L	05/13/2003	9.13E+00	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Antimony-125	2.94	3.28		U	PCI/L	10/13/2003	1.26E+01	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Antimony-125	-3.79	3.93		U	PCI/L	10/13/2003	1.28E+01	SOS-TL260-03
50M12502CW	80829002	50M12501CW	19649	ER-TOS-A2023	GEL	MONITRING WELL	ICPP-MON-A-230	443-483	Carbon-14	0.686	0.899		U	PCI/L	05/13/2003	2.00E+00	SOS-TL141-03
50M12501CW	80829001	50M12501CW	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Carbon-14	1.27	1.12		U	PCI/L	05/13/2003	2.48E+00	SOS-TL141-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cerium-144	-4.75	7.07		U	PCI/L	05/13/2003	2.32E+01	SOS-TL136-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cerium-144	-0.373	7.38		U	PCI/L	10/13/2003	2.67E+01	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cerium-144	8.41	9.76		U	PCI/L	10/13/2003	3.40E+01	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cesium-134	-1.48	1.13		U	PCI/L	05/13/2003	3.27E+00	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cesium-134	-1.69	1.49		U	PCI/L	10/13/2003	4.92E+00	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cesium-134	-0.453	1.71		U	PCI/L	10/13/2003	6.12E+00	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cesium-137	0.531	0.955		U	PCI/L	05/13/2003	3.54E+00	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cesium-137	-0.538	1.40		U	PCI/L	10/13/2003	4.95E+00	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cesium-137	8.20	5.94		U	PCI/L	10/13/2003	5.34E+00	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cobalt-60	-2.61	1.22		U	PCI/L	05/13/2003	2.97E+00	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cobalt-60	0.826	1.19		U	PCI/L	10/13/2003	4.66E+00	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cobalt-60	-0.288	1.49		U	PCI/L	10/13/2003	5.69E+00	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Europium-152	-0.324	2.79		U	PCI/L	05/13/2003	9.68E+00	SOS-TL136-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Europium-152	7.70	3.89		U	PCI/L	10/13/2003	1.49E+01	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Europium-152	0.715	4.00		U	PCI/L	10/13/2003	1.46E+01	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Europium-154	3.19	2.50		U	PCI/L	05/13/2003	1.03E+01	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Europium-154	9.07	3.64		UJ	PCI/L	10/13/2003	1.65E+01	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Europium-154	-3.41	3.70		U	PCI/L	10/13/2003	1.32E+01	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Europium-155	-3.12	4.07		U	PCI/L	05/13/2003	1.34E+01	SOS-TL136-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Europium-155	-4.99	4.41		U	PCI/L	10/13/2003	1.38E+01	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Europium-155	-0.982	5.46		U	PCI/L	10/13/2003	1.85E+01	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Gross Alpha	32.7	2.72		J	PCI/L	05/13/2003	1.67E+00	SOS-TL136-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Gross Alpha	61.5	3.95		R	PCI/L	10/13/2003	7.01E-01	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Gross Alpha	92	5.66		R	PCI/L	10/13/2003	8.97E-01	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Gross Beta	931	19.1		J	PCI/L	05/13/2003	3.09E+00	SOS-TL136-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Gross Beta	1120	7.46		J	PCI/L	10/13/2003	8.87E-01	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Gross Beta	1220	9.30		J	PCI/L	10/13/2003	9.36E-01	SOS-TL260-03
50M11001UD	80759001	50M11001UD	19643	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iodine-129	0.117	0.026			PCI/L	05/13/2003	7.39E-02	SOS-TL136-03
5OM13801RN	100528001	5OM13801RN	22393	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iodine-129	0.076	0.042		U	PCI/L	10/13/2003	1.43E-01	SOS-033-03
5OM13802RN	100528002	5OM13801RN	22394	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iodine-129	0.030	0.051		U	PCI/L	10/13/2003	1.35E-01	SOS-033-03
5OM32301RN	101829002	5OM32401RN	23653	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iodine-129	0.047	0.027		U	PCI/L	11/12/2003	1.38E-01	SOS-TL023-04
5OM32302RN	101829003	5OM32401RN	23653	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iodine-129	0.156	0.061		J	PCI/L	11/12/2003	1.33E-01	SOS-TL023-04
5OM19502RN	104226003	5OM19601RN	24301	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iodine-129	0.132	0.039			PCI/L	12/16/2003	1.28E-01	SOS-TL039-04
5OM19501RN	104226002	5OM19601RN	24301	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iodine-129	0.153	0.061		UJ	PCI/L	12/16/2003	1.49E-01	SOS-TL039-04
5OM28201RN	105049002	5OM28202RN	24302	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iodine-129	0.209	0.076		UJ	PCI/L	01/07/2004	1.47E-01	
5OM28202RN	105049001	5OM28202RN	24302	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iodine-129	0.234	0.094		J	PCI/L	01/07/2004	1.81E-01	
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Manganese-54	-0.165	0.935		U	PCI/L	05/13/2003	3.33E+00	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Manganese-54	1.55	1.13		U	PCI/L	10/13/2003	4.65E+00	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Manganese-54	-0.084	1.48		U	PCI/L	10/13/2003	5.39E+00	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Neptunium-237	0.015	0.038		U	PCI/L	05/13/2003	1.42E-01	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Neptunium-237	0.008	0.010		U	PCI/L	10/13/2003	4.53E-02	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Neptunium-237	-0.033	0.016		U	PCI/L	10/13/2003	9.85E-02	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Plutonium-238	-0.009	0.005		U	PCI/L	05/13/2003	7.08E-02	SOS-TL136-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Plutonium-238	-0.015	0.007		U	PCI/L	10/13/2003	1.00E-01	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Plutonium-238	0.003	0.012		U	PCI/L	10/13/2003	7.83E-02	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Plutonium-239/240	0.000	0.010		U	PCI/L	05/13/2003	7.08E-02	SOS-TL136-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Plutonium-239/240	-0.024	0.009		U	PCI/L	10/13/2003	1.17E-01	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Plutonium-239/240	0.078	0.037		UJ	PCI/L	10/13/2003	1.26E-01	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Plutonium-241	-0.279	1.68		U	PCI/L	05/13/2003	5.67E+00	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Plutonium-241	-2.27	2.77		U	PCI/L	10/13/2003	9.48E+00	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Plutonium-241	-2.69	3.02		U	PCI/L	10/13/2003	1.04E+01	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Radium-226	0.342	0.171		U	PCI/L	10/13/2003	5.36E-01	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Radium-226	0.88	0.244			PCI/L	10/13/2003	6.20E-01	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Radium-228	-0.258	0.202		U	PCI/L	10/13/2003	6.91E-01	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Radium-228	-0.095	0.232		U	PCI/L	10/13/2003	7.88E-01	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Ruthenium-106	-7.58	8.02		U	PCI/L	05/13/2003	2.78E+01	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Ruthenium-106	-17.80	11.2		U	PCI/L	10/13/2003	3.58E+01	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Ruthenium-106	9.75	13.5		U	PCI/L	10/13/2003	5.16E+01	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Silver-108m	-0.882	0.985		U	PCI/L	05/13/2003	3.27E+00	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Silver-108m	-1.39	1.22		U	PCI/L	10/13/2003	4.13E+00	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Silver-108m	-1.08	1.39		U	PCI/L	10/13/2003	4.60E+00	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Silver-110m	-0.404	0.873		U	PCI/L	05/13/2003	3.10E+00	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Silver-110m	-0.109	1.34		U	PCI/L	10/13/2003	4.81E+00	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Silver-110m	1.33	1.44		U	PCI/L	10/13/2003	5.59E+00	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	7.61	1.05			PCI/L	05/13/2003	7.55E-01	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	8.06	1.06			PCI/L	10/13/2003	6.83E-01	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	8.76	1.09			PCI/L	10/13/2003	7.85E-01	SOS-TL260-03
5OM16101RH	101184008	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	7.16	1.14			PCI/L	10/28/2003	1.07E+00	SOS-TL006-04
5OM16301RH	101184004	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	8.31	1.37			PCI/L	10/28/2003	1.17E+00	SOS-TL006-04
5OM17401RH	101184009	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	7.38	1.03			PCI/L	10/30/2003	1.08E+00	SOS-TL006-04
5OM17501RH	101184010	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	7.06	1.06			PCI/L	10/30/2003	1.13E+00	SOS-TL006-04
5OM17601RH	101184011	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	7.64	1.11			PCI/L	10/30/2003	1.07E+00	SOS-TL006-04
5OM17702RH	101184012	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	8.26	1.20			PCI/L	10/30/2003	1.05E+00	SOS-TL006-04
5OM17801RH	101184013	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	8.61	1.25			PCI/L	10/30/2003	1.35E+00	SOS-TL006-04
5OM17301RH	101184001	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	8.83	1.31			PCI/L	10/30/2003	1.31E+00	SOS-TL006-04
5OM17701RH	101184005	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	9.50	1.36			PCI/L	10/30/2003	1.25E+00	SOS-TL006-04
5OM32302RH	101821002	5OM32301RH	19731	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	6.32	0.825			PCI/L	11/12/2003	5.41E-01	BAM-008-04
5OM32301RH	101821001	5OM32301RH	19731	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	6.30	0.851			PCI/L	11/12/2003	5.96E-01	BAM-008-04
5OM19501RB	104226016	5OM19601RN	23693	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	6.57	0.879			PCI/L	12/16/2003	5.88E-01	SOS-TL039-04
5OM19502RB	104226017	5OM19601RN	23693	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	7.69	1.05			PCI/L	12/16/2003	5.53E-01	SOS-TL039-04
5OM28202RH	105049007	5OM28202RN	24303	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	6.53	0.909			PCI/L	01/07/2004	5.91E-01	
5OM28201RH	105049006	5OM28202RN	24303	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Strontium-90	7.84	1.03			PCI/L	01/07/2004	6.64E-01	
50M11001RH(RE)	85255001	50M11001RH	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2110	32.4			PCI/L	05/13/2003	6.75E+00	BAM-84-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2220	37.7			PCI/L	05/13/2003	1.60E+01	SOS-TL136-03
50M12702EA	85882004	50M12601EA	16469	ER-TOS-A2155	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2770	42.2			PCI/L	08/11/2003	7.94E+00	BAM-87-03
50M12701EA	85882003	50M12601EA	16469	ER-TOS-A2155	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2840	43.4			PCI/L	08/11/2003	8.18E+00	BAM-87-03
50M13102EA	F3H120241-004	50M13001EA	20239	ER-TOS-A2157	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2000	200			PCI/L	08/11/2003	1E+00	BAM-88-03
50M13101EA	F3H120241-003	50M13001EA	20239	ER-TOS-A2157	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2630	260			PCI/L	08/11/2003	3E+00	BAM-88-03
50M13602EA	88930002	50M13601EA	22324	ER-TOS-A2188	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2140	31.7			PCI/L	09/24/2003	1.38E+01	SOS-TL243-03
50M13601EA	88930001	50M13601EA	22324	ER-TOS-A2188	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2580	40.0			PCI/L	09/24/2003	1.91E+01	SOS-TL243-03
5OM13801EA	100514001	5OM13801EA	22391	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2810	48.9			PCI/L	10/13/2003	1.56E+01	SOS-032-03
5OM13802EA	100514002	5OM13801EA	22391	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2860	49.8			PCI/L	10/13/2003	1.57E+01	SOS-032-03
5OM16301RH	101184004	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2890	50.1		J[a]	PCI/L	10/28/2003	1.55E+01	SOS-TL006-04
5OM16202RH	101184006	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2920	50.6		J[a]	PCI/L	10/28/2003	1.61E+01	SOS-TL006-04
5OM16201RH	101184002	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	3050	52.5		J[a]	PCI/L	10/28/2003	1.74E+01	SOS-TL006-04
5OM16101RH	101184008	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	3160	54.9		J[a]	PCI/L	10/28/2003	1.99E+01	SOS-TL006-04
5OM17801RH	101184013	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2710	46.7		J[a]	PCI/L	10/30/2003	1.43E+01	SOS-TL006-04
5OM17702RH	101184012	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2830	48.8		J[a]	PCI/L	10/30/2003	1.48E+01	SOS-TL006-04
5OM17601RH	101184011	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2990	51.5		J[a]	PCI/L	10/30/2003	1.54E+01	SOS-TL006-04
5OM17701RH	101184005	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	3000	52.0		J[a]	PCI/L	10/30/2003	1.58E+01	SOS-TL006-04
5OM17301RH	101184001	5OM17301RH	23621	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	3050	52.7		J[a]	PCI/L	10/30/2003	2.01E+01	SOS-TL006-04
5OM17501RH	101184010	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	3120	53.8		J[a]	PCI/L	10/30/2003	1.66E+01	SOS-TL006-04
5OM17401RH	101184009	5OM17301RH	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	3140	54.3		J[a]	PCI/L	10/30/2003	1.71E+01	SOS-TL006-04

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM32302RH	101821002	5OM32301RH	19731	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2120	36.9			PCI/L	11/12/2003	1.62E+01	BAM-008-04
5OM32301RH	101821001	5OM32301RH	19731	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2420	42.0			PCI/L	11/12/2003	1.68E+01	BAM-008-04
5OM19501EA	104226010	5OM19601RN	23693	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2640	46.0			PCI/L	12/16/2003	1.58E+01	SOS-TL039-04
5OM19502EA	104226011	5OM19601RN	23693	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2720	47.5			PCI/L	12/16/2003	1.65E+01	SOS-TL039-04
5OM28202RH	105049007	5OM28202RN	24303	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2790	41.6			PCI/L	01/07/2004	7.56E+00	
5OM28201RH	105049006	5OM28202RN	24303	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Technetium-99	2780	41.9			PCI/L	01/07/2004	7.30E+00	
5OM13802RN	100528002	5OM13801RN	22394	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5140	172			PCI/L	10/13/2003	3.54E+02	SOS-033-03
5OM13801RN	100528001	5OM13801RN	22393	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5540	182			PCI/L	10/13/2003	3.71E+02	SOS-033-03
5OM16201R8	101193003	5OM17101R8	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5180	205			PCI/L	10/28/2003	2.51E+02	SOS-TL009-04
5OM16202R8	101193004	5OM17101R8	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5490	210			PCI/L	10/28/2003	2.50E+02	SOS-TL009-04
5OM16301R8	101193005	5OM17101R8	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5530	214			PCI/L	10/28/2003	2.56E+02	SOS-TL009-04
5OM16101R8	101193002	5OM17101R8	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5520	218			PCI/L	10/28/2003	2.66E+02	SOS-TL009-04
5OM17501R8	101193009	5OM17101R8	23623	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5190	206			PCI/L	10/30/2003	2.53E+02	SOS-TL009-04
5OM17702R8	101193012	5OM17101R8	23623	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5280	207			PCI/L	10/30/2003	2.52E+02	SOS-TL009-04
5OM17801R8	101193013	5OM17101R8	23623	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5480	207			PCI/L	10/30/2003	2.44E+02	SOS-TL009-04
5OM17601R8	101193010	5OM17101R8	23623	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5210	208			PCI/L	10/30/2003	2.56E+02	SOS-TL009-04
5OM17301R8	101193007	5OM17101R8	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-448	Tritium	5730	212			PCI/L	10/30/2003	2.45E+02	SOS-TL009-04
5OM17701R8	101193011	5OM17101R8	23623	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	5680	212			PCI/L	10/30/2003	2.46E+02	SOS-TL009-04
5OM17401R8	101193008	5OM17101R8	23622	ER-TOS-A2210	GEL	MONITORING WELL	ICPP-MON-A-230	443-448	Tritium	5710	217			PCI/L	10/30/2003	2.56E+02	SOS-TL009-04
5OM32302RN	101829003	5OM32401RN	23653	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	4940	213			PCI/L	11/12/2003	3.05E+02	SOS-TL023-04
5OM32301RN	101829002	5OM32401RN	23653	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	4870	215			PCI/L	11/12/2003	3.12E+02	SOS-TL023-04
5OM19502RN	104226003	5OM19601RN	24301	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	4640	253			PCI/L	12/16/2003	4.37E+02	SOS-TL039-04
5OM19501RN	104226002	5OM19601RN	24301	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	4780	260			PCI/L	12/16/2003	4.47E+02	SOS-TL039-04
5OM28202RN	105049001	5OM28202RN	24302	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	4760	236			PCI/L	01/07/2004	3.41E+02	
5OM28201RN	105049002	5OM28202RN	24302	ER-TOS-A2229	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	4860	242			PCI/L	01/07/2004	3.49E+02	
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Uranium-233/234	1.91	0.218			PCI/L	05/13/2003	8.72E-02	SOS-TL136-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Uranium-233/234	1.88	0.205			PCI/L	10/13/2003	6.04E-02	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Uranium-233/234	1.83	0.206			PCI/L	10/13/2003	7.95E-02	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Uranium-235	0.189	0.051			PCI/L	05/13/2003	3.78E-02	SOS-TL136-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Uranium-235	0.037	0.020		U	PCI/L	10/13/2003	5.14E-02	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Uranium-235	0.206	0.050			PCI/L	10/13/2003	6.56E-02	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Uranium-238	1.0	0.138			PCI/L	05/13/2003	3.76E-02	SOS-TL136-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Uranium-238	1.33	0.157			PCI/L	10/13/2003	2.91E-02	SOS-TL260-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Uranium-238	1.32	0.161			PCI/L	10/13/2003	5.55E-02	SOS-TL260-03
50M11001RH	80759002	50M11001UD	19645	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Zinc-65	-2.98	2.19		U	PCI/L	05/13/2003	7.47E+00	SOS-TL136-03
5OM13802RH	100014004	5OM15501RH	22366	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Zinc-65	-3.33	2.45		U	PCI/L	10/13/2003	8.37E+00	SOS-TL260-03
5OM13801RH	100014005	5OM15501RH	22367	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Zinc-65	6.53	3.06		UJ	PCI/L	10/13/2003	1.36E+01	SOS-TL260-03
Inorganics																	
50M12501A1	80579003	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Alkalinity, Total as CaCO3	135				mg/L	05/13/2003		DNT-155-03
50M12502A1	80579004	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Alkalinity, Total as CaCO3	136				mg/L	05/13/2003		DNT-155-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Aluminum	118		B	U	UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Aluminum	171		B	U	UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Antimony	3.46		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Antimony	3.46		U		UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Arsenic	3.31		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Arsenic	3.31		U		UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Barium	123		B		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Barium	125		B		UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Beryllium	0.210		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Beryllium	0.210		U		UG/L	05/13/2003		DNT-135-03
50M12501AN	80579001	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Bromide	0.000		U		mg/L	05/13/2003		DNT-155-03
50M12502AN	80579002	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Bromide	0.000		U		mg/L	05/13/2003		DNT-155-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cadmium	0.66		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cadmium	0.66		U		UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Calcium	63000				UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Calcium	63800				UG/L	05/13/2003		DNT-135-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
50M12501AN	80579001	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Chloride	64.4				mg/L	05/13/2003		DNT-155-03
50M12502AN	80579002	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Chloride	65.6				mg/L	05/13/2003		DNT-155-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Chromium	11.3				UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Chromium	12.7				UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cobalt	1.01		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Cobalt	1.01		U		UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Copper	18.0		B		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Copper	18.4		B		UG/L	05/13/2003		DNT-135-03
50M12501AN	80579001	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Fluoride	0.296		J		mg/L	05/13/2003		DNT-155-03
50M12502AN	80579002	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Fluoride	0.293		J		mg/L	05/13/2003		DNT-155-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iron	351				UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Iron	391				UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Lead	2.40		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Lead	2.40		U		UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Magnesium	20100				UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Magnesium	20300				UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Manganese	19.8				UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Manganese	19.6				UG/L	05/13/2003		DNT-135-03
50M11001HG	80854002	50M09001HG	19650	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Mercury	0.095		U		UG/L	05/13/2003		DNT-150-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Mercury	0.095		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Mercury	0.095		U		UG/L	05/13/2003		DNT-135-03
5OM13802HZ	100526002	5OM13801HZ	22391	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Mercury	0.033		U		UG/L	10/13/2003		DNT-272-03
5OM13801HZ	100526001	5OM13801HZ	22391	ER-TOS-A2205	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Mercury	0.033		U		UG/L	10/13/2003		DNT-272-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Nickel	28.1		B		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Nickel	27.6		B		UG/L	05/13/2003		DNT-135-03
50M12701N2	85881002	50M12601N2	16469	ER-TOS-A2155	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Nitrogen, Nitrate/Nitrite	9.10				MG/L	08/11/2003		DNT-183-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Potassium	4420				UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Potassium	4480				UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Selenium	3.39		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Selenium	3.39		U		UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Silver	1.70		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Silver	1.70		U		UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Sodium	28900				UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Sodium	29600				UG/L	05/13/2003		DNT-135-03
50M12501AN	80579001	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Sulfate	46.6			J	mg/L	05/13/2003		DNT-155-03
50M12502AN	80579002	50M12501AN	19640	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Sulfate	47.2			J	mg/L	05/13/2003		DNT-155-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Thallium	3.64		U		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Thallium	3.64		U		UG/L	05/13/2003		DNT-135-03
50M11001R8	80759005	50M11001UD	19650	ER-TOS-A2075	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Tritium	3700	178			PCI/L	05/13/2003	3.26E+02	SOS-TL136-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Vanadium	3.61		B		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Vanadium	3.49		B		UG/L	05/13/2003		DNT-135-03
50M12501LM	80830001	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Zinc	7.90		B		UG/L	05/13/2003		DNT-135-03
50M12502LM	80830002	50M12501LM	19649	ER-TOS-A2023	GEL	MONITORING WELL	ICPP-MON-A-230	443-483	Zinc	9.90		B		UG/L	05/13/2003		DNT-135-03
Volatile Organic Compounds																	
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,1,2-Tetrachloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,1,2-Tetrachloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,1,2-Tetrachloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,1-Trichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,1-Trichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,1-Trichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,2,2-Tetrachloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,2,2-Tetrachloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,2,2-Tetrachloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,2-Trichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,2-Trichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1,2-Trichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1-Dichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1-Dichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1-Dichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1-Dichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1-Dichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,1-Dichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2,3-Trichloropropane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2,3-Trichloropropane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2,3-Trichloropropane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dibromo-3-chloropropane	1.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dibromo-3-chloropropane	1.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dibromo-3-chloropropane	1.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dibromoethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dibromoethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dibromoethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichlorobenzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichloroethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichloroethene (total)	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichloropropane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichloropropane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichloropropane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3-Dichlorobenzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Dichlorobenzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Dioxane	80		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Dioxane	80		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Dioxane	80		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Butanone	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Butanone	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Butanone	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Hexanone	5.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Hexanone	5.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Hexanone	5.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acetone	10		J	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acetone	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acetone	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acetonitrile	20		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acetonitrile	20		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acetonitrile	20		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acrolein	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acrolein	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acrolein	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acrylonitrile	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acrylonitrile	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acrylonitrile	10		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Allyl chloride	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Allyl chloride	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Allyl chloride	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Bromodichloromethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Bromodichloromethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Bromodichloromethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Bromoform	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Bromoform	1.0		U		UG/L	10/13/2003		JGJ-099-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Bromoform	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Bromomethane	2.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Bromomethane	2.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Bromomethane	2.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Carbon disulfide	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Carbon disulfide	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Carbon disulfide	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Carbon tetrachloride	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Carbon tetrachloride	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Carbon tetrachloride	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chlorobenzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chlorobenzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chlorobenzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloroethane	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloroethane	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloroethane	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloroform	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloroform	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloroform	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloromethane	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloromethane	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloromethane	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloroprene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloroprene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chloroprene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	cis-1,2-Dichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	cis-1,2-Dichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	cis-1,2-Dichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	cis-1,3-Dichloropropene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	cis-1,3-Dichloropropene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	cis-1,3-Dichloropropene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibromochloromethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibromochloromethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibromochloromethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibromomethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibromomethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibromomethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dichlorodifluoromethane	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dichlorodifluoromethane	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dichlorodifluoromethane	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Ethylbenzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Ethylbenzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Ethylbenzene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isobutyl alcohol	80		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isobutyl alcohol	80		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isobutyl alcohol	80		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methacrylonitrile	5.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methacrylonitrile	5.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methacrylonitrile	5.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl iodide	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl iodide	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl iodide	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl isobutyl ketone	5.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl isobutyl ketone	5.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl isobutyl ketone	5.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methylene Chloride	1.0		U	UJ	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methylene Chloride	1.0		U	UJ	UG/L	10/13/2003		JGJ-099-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methylene Chloride	1.0		U	UJ	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methylmethacrylate	1.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methylmethacrylate	1.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methylmethacrylate	1.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	m-Xylene & p-Xylene	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	o-Xylene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Propionitrile	5.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Propionitrile	5.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Propionitrile	5.0		U	R	UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Styrene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Styrene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Styrene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Tetrachloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Tetrachloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Tetrachloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Toluene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Toluene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Toluene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	trans-1,2-Dichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	trans-1,2-Dichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	trans-1,2-Dichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	trans-1,3-Dichloropropene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	trans-1,3-Dichloropropene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	trans-1,3-Dichloropropene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	trans-1,4-Dichloro-2-butene	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	trans-1,4-Dichloro-2-butene	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	trans-1,4-Dichloro-2-butene	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Trichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Trichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Trichloroethene	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Trichlorofluoromethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Trichlorofluoromethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Trichlorofluoromethane	1.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Vinyl Acetate	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Vinyl Acetate	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Vinyl Acetate	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Vinyl Chloride	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Vinyl Chloride	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Vinyl Chloride	2.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AV	F3J160351002	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Xylene (Total)	3.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13801AZ	F3J160351001	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Xylene (Total)	3.0		U		UG/L	10/13/2003		JGJ-099-03
5OM13802AV	F3J160351003	5OM13801AZ	22381	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Xylene (Total)	3.0		U		UG/L	10/13/2003		JGJ-099-03
Semivolatile Organic Compounds																	
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2,4,5-Tetrachlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2,4,5-Tetrachlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2,4,5-Tetrachlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2,4-Trichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2,4-Trichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2,4-Trichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,2-Dichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3,5-Trinitrobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3,5-Trinitrobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3,5-Trinitrobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3-Dichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3-Dichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3-Dichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3-Dinitrobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3-Dinitrobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,3-Dinitrobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Dichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Dichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Dichlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Naphthoquinone	10		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Naphthoquinone	10		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1,4-Naphthoquinone	10		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1-Naphthylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1-Naphthylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	1-Naphthylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,3,4,6-Tetrachlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,3,4,6-Tetrachlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,3,4,6-Tetrachlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4,5-Trichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4,5-Trichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4,5-Trichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4,6-Trichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4,6-Trichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4,6-Trichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dimethylphenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dimethylphenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dimethylphenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dinitrophenol	50		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dinitrophenol	50		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dinitrophenol	50		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dinitrotoluene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dinitrotoluene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,4-Dinitrotoluene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,6-Dichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,6-Dichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,6-Dichlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,6-Dinitrotoluene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,6-Dinitrotoluene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2,6-Dinitrotoluene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Acetylaminofluorene	20		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Acetylaminofluorene	20		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Acetylaminofluorene	20		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Chloronaphthalene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Chloronaphthalene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Chloronaphthalene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Chlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Chlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Chlorophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Methylnaphthalene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Methylnaphthalene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Methylnaphthalene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Methylphenol (o-Cresol)	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Methylphenol (o-Cresol)	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Methylphenol (o-Cresol)	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Naphthylamine	10		U		UG/L	10/13/2003		DMG-147-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Naphthylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Naphthylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Nitroaniline	50		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Nitroaniline	50		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Nitroaniline	50		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Nitrophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Nitrophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Nitrophenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Picoline	20		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Picoline	20		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	2-Picoline	20		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3,3'-Dichlorobenzidine	20		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3,3'-Dichlorobenzidine	20		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3,3'-Dichlorobenzidine	20		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3,3'-Dimethylbenzidine	10		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3,3'-Dimethylbenzidine	10		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3,3'-Dimethylbenzidine	10		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3-Methylcholanthrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3-Methylcholanthrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3-Methylcholanthrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3-Methylphenol & 4-Methylphenol	20		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3-Methylphenol & 4-Methylphenol	20		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3-Methylphenol & 4-Methylphenol	20		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3-Nitroaniline	50		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3-Nitroaniline	50		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	3-Nitroaniline	50		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4,6-Dinitro-2-methylphenol	50		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4,6-Dinitro-2-methylphenol	50		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4,6-Dinitro-2-methylphenol	50		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Aminobiphenyl	20		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Aminobiphenyl	20		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Aminobiphenyl	20		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Bromophenyl phenyl ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Bromophenyl phenyl ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Bromophenyl phenyl ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Chloro-3-methylphenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Chloro-3-methylphenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Chloro-3-methylphenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Chloroaniline	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Chloroaniline	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Chloroaniline	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Chlorophenyl phenyl ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Chlorophenyl phenyl ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Chlorophenyl phenyl ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Nitroaniline	50		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Nitroaniline	50		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Nitroaniline	50		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Nitrophenol	50		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Nitrophenol	50		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Nitrophenol	50		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Nitroquinoline 1-oxide	40		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Nitroquinoline 1-oxide	40		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	4-Nitroquinoline 1-oxide	40		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	5-Nitro-o-toluidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	5-Nitro-o-toluidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	5-Nitro-o-toluidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	7,12-Dimethylbenz(a)anthracene	10		U		UG/L	10/13/2003		DMG-147-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	7,12-Dimethylbenz(a)anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	7,12-Dimethylbenz(a)anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	a,a,-Dimethylphenethylamine	40		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	a,a,-Dimethylphenethylamine	40		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	a,a,-Dimethylphenethylamine	40		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acenaphthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acenaphthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acenaphthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acenaphthylene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acenaphthylene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acenaphthylene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acetophenone	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acetophenone	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Acetophenone	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Aniline	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Aniline	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Aniline	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Aramite	20		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Aramite	20		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Aramite	20		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Azobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Azobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Azobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(a)anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(a)anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(a)anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(a)pyrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(a)pyrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(a)pyrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(b)fluoranthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(b)fluoranthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(b)fluoranthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(g,h,i)perylene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(g,h,i)perylene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(g,h,i)perylene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(k)fluoranthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(k)fluoranthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzo(k)fluoranthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzyl alcohol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzyl alcohol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Benzyl alcohol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis-(2-chloroethoxy)methane	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis-(2-chloroethoxy)methane	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis-(2-chloroethoxy)methane	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis-(2-Chloroethyl)ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis-(2-Chloroethyl)ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis-(2-Chloroethyl)ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis(2-Chloroisopropyl)ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis(2-Chloroisopropyl)ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis(2-Chloroisopropyl)ether	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis-(2-ethylhexyl)phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis-(2-ethylhexyl)phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	bis-(2-ethylhexyl)phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Butyl benzyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Butyl benzyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Butyl benzyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Carbazole	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chlorobenzilate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chlorobenzilate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chlorobenzilate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chrysene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chrysene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Chrysene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibenzo(a,h)anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibenzo(a,h)anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibenzo(a,h)anthracene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibenzofuran	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibenzofuran	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dibenzofuran	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Diethyl Phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Diethyl Phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Diethyl Phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dimethoate	20		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dimethoate	20		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dimethoate	20		U	UJ	UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dimethyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dimethyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dimethyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Di-n-butyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Di-n-butyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Di-n-butyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Di-n-octyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Di-n-octyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Di-n-octyl phthalate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dinoseb	20		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dinoseb	20		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Dinoseb	20		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Disulfoton	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Disulfoton	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Disulfoton	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Ethyl methacrylate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Ethyl methacrylate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Ethyl methacrylate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Ethyl methanesulfonate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Ethyl methanesulfonate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Ethyl methanesulfonate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Famphur	10		U	R	UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Famphur	10		U	R	UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Famphur	10		U	R	UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Fluoranthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Fluoranthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Fluoranthene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Fluorene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Fluorene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Fluorene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorobutadiene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorobutadiene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorobutadiene	10		U		UG/L	10/13/2003		DMG-147-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorocyclopentadiene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorocyclopentadiene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorocyclopentadiene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachloroethane	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachloroethane	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachloroethane	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorophene	50		U	R	UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorophene	50		U	R	UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachlorophene	50		U	R	UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachloropropene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachloropropene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Hexachloropropene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Indeno(1,2,3-cd)pyrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Indeno(1,2,3-cd)pyrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Indeno(1,2,3-cd)pyrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isodrin	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isodrin	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isodrin	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isophorone	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isophorone	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isophorone	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isosafrole	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isosafrole	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Isosafrole	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Kepone	20		U	R	UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Kepone	20		U	R	UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Kepone	20		U	R	UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methapyrilene	50		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methapyrilene	50		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methapyrilene	50		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl methanesulfonate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl methanesulfonate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl methanesulfonate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl parathion	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl parathion	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methyl parathion	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methylmethacrylate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methylmethacrylate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Methylmethacrylate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Naphthalene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Naphthalene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Naphthalene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Nitrobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Nitrobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Nitrobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodiethylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodiethylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodiethylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodimethylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodimethylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodimethylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitroso-di-n-butylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitroso-di-n-butylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitroso-di-n-butylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodi-n-propylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodi-n-propylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodi-n-propylamine	10		U		UG/L	10/13/2003		DMG-147-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodiphenylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodiphenylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosodiphenylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosomethylethylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosomethylethylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosomethylethylamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosomorpholine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosomorpholine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosomorpholine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosopiperidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosopiperidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosopiperidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosopyrrolidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosopyrrolidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	n-Nitrosopyrrolidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	O,O,O-Triethyl phosphorothioate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	O,O,O-Triethyl phosphorothioate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	O,O,O-Triethyl phosphorothioate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	o,o-Diethyl-o-(2-pyrazinyl)	50		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	o,o-Diethyl-o-(2-pyrazinyl)	50		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	o,o-Diethyl-o-(2-pyrazinyl)	50		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	o-Toluidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	o-Toluidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	o-Toluidine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Parathion	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Parathion	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Parathion	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	p-Dimethylaminoazobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	p-Dimethylaminoazobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	p-Dimethylaminoazobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachlorobenzene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachloroethane	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachloroethane	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachloroethane	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachloronitrobenzene	20		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachloronitrobenzene	20		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachloronitrobenzene	20		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachlorophenol	50		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachlorophenol	50		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pentachlorophenol	50		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phenacetin	20		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phenacetin	20		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phenacetin	20		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phenanthrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phenanthrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phenanthrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phenol	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phorate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phorate	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Phorate	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	p-Phenylenediamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	p-Phenylenediamine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	p-Phenylenediamine	10		U		UG/L	10/13/2003		DMG-147-03

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pronamide	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pronamide	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pronamide	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pyrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pyrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pyrene	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pyridine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pyridine	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Pyridine	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Safrole	10		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Safrole	10		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Safrole	10		U		UG/L	10/13/2003		DMG-147-03
5OM138011X	F3J160346001	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Sulfotep	40		U		UG/L	10/13/2003		DMG-147-03
5OM13801HN	F3J160346002	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Sulfotep	40		U		UG/L	10/13/2003		DMG-147-03
5OM13802HN	F3J160346003	5OM138011X	22382	ER-TOS-A2206	STL-STLOUIS	MONITORING WELL	ICPP-MON-A-230	443-483	Sulfotep	40		U		UG/L	10/13/2003		DMG-147-03

a. "J" flags (estimated value) were assigned because Laboratory Control Standard (LCS) was outside control limits due to high percent recovery.

Validation Flags:

J = estimated value.

U = nondetect.

R = rejected.

Appendix B

Hydrograph and Neutron Log for Monitor Well ICPP-MON-A-230

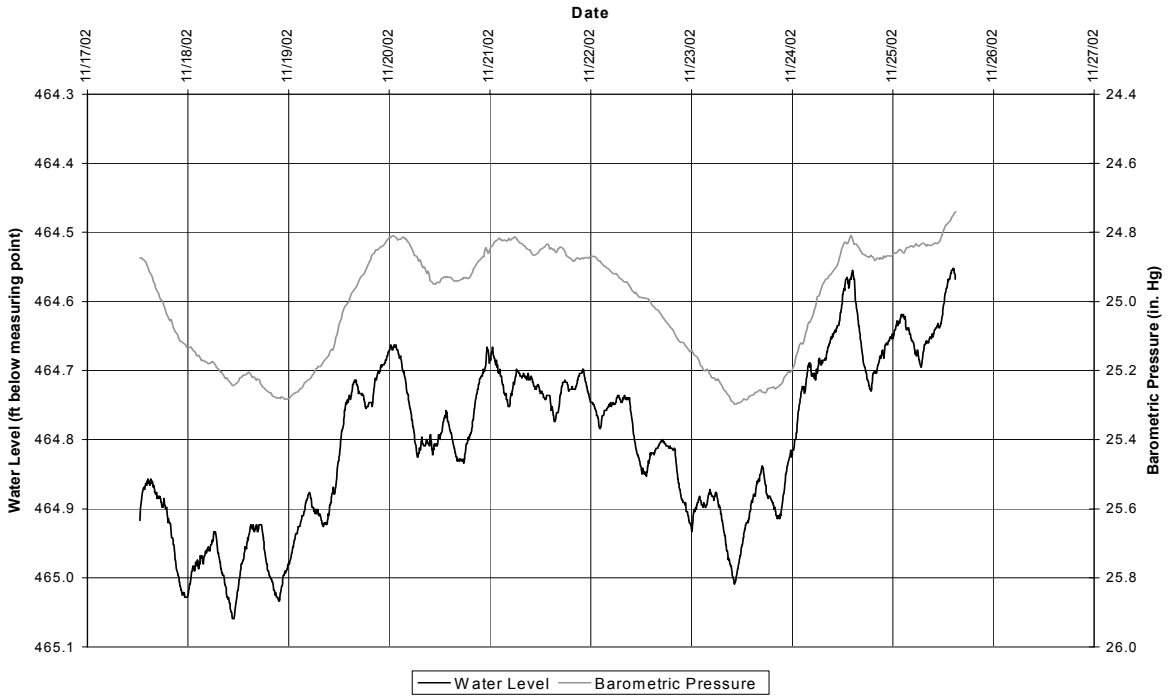


Figure B-1. Hydrograph for ICPP-MON-A-230.

Neutron log interpretation by Brian Twining - USGS

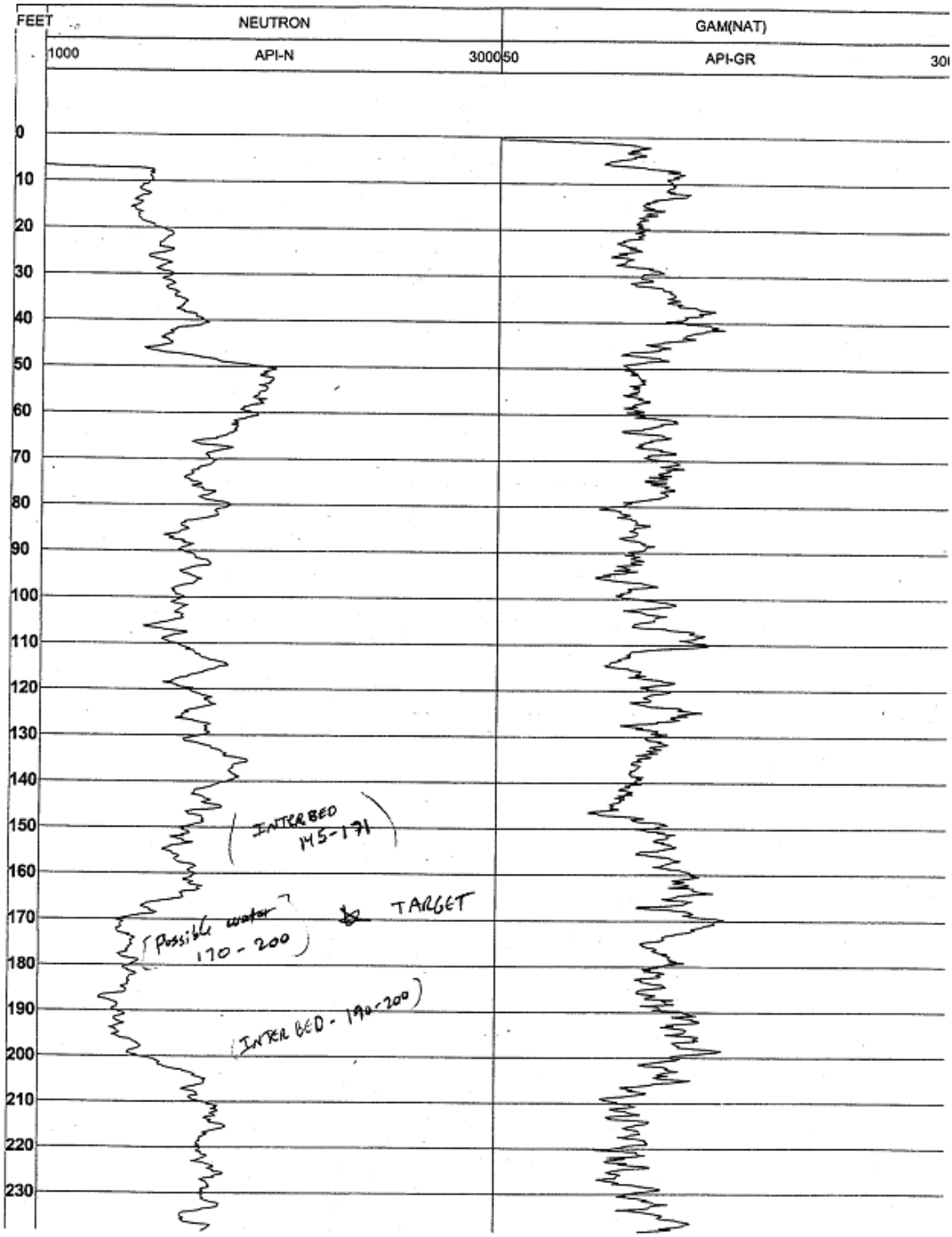
Century GEOPHYSICAL CORP.

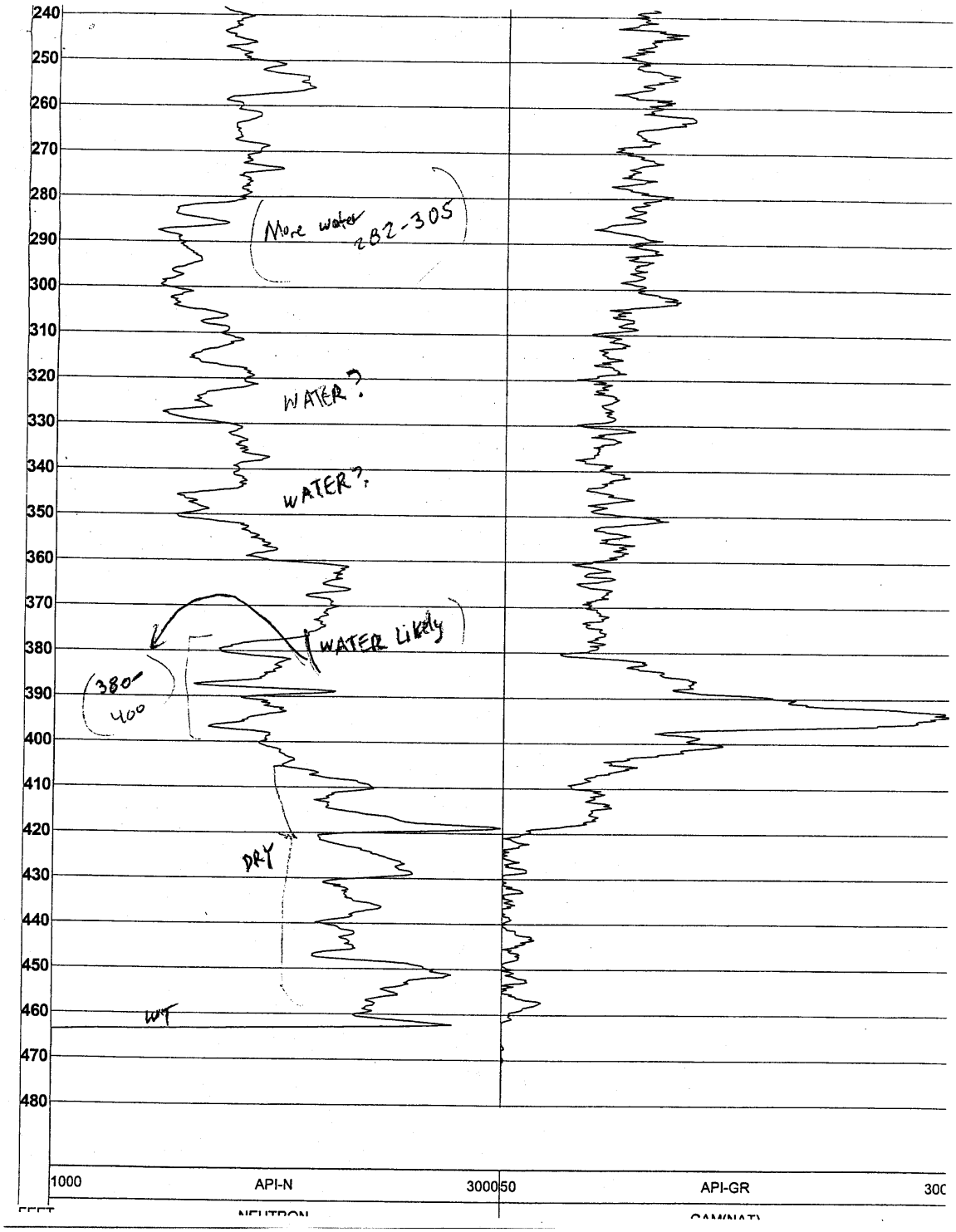
ICPP-MON-A-230 ← Tank Farm Aquifer Well

COMPANY	: USGS		OTHER SERVICES: none		
WELL	: ICPP-MON-A-230				
LOCATION/FIELD	: INTEC				
COUNTY	: Butte		None		
STATE	: ID				
SECTION	: None	TOWNSHIP	: None	RANGE	: None
DATE	: 10/23/03	PERMANENT DATUM	: None		
DEPTH DRILLER	: 493			KB	: None
LOG BOTTOM	: 478.75	LOG MEASURED FROM:	LS	DF	: None
LOG TOP	: 0.50	DRL MEASURED FROM:	LS	GL	: None
CASING DIAMETER	: 6	LOGGING UNIT	: USGS		
CASING TYPE	: Steel	FIELD OFFICE	: None		
CASING THICKNESS:	.25	RECORDED BY	: MJG,MSV		
BIT SIZE	: 6	BOREHOLE FLUID	: 0	FILE	: ORIGINAL
MAGNETIC DECL.	: 0	RM	: 0	TYPE	: 9057A
MATRIX DENSITY	: 2.71	RM TEMPERATURE	: 0		
NEUTRON MATRIX	: Dolomite	MATRIX DELTA T	: 54		
				THRESH:	2500

source lo

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS


FEET
NEUTRON
1000
API-N
3000
GAM(NAT)
50
API-GR
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
INTERBED 145-171
TARGET
Possible water 170 - 200
INTERBED - 190-200


240
250
260
270
280
290
300
310
320
330
340
350
360
370
380
390
400
410
420
430
440
450
460
470
480
More water 282-305
WATER?
WATER?
WATER likely
380-400
DRY
WT
1000
API-N
3000
50
API-GR
300

Appendix C

Core Photographs for ICPP-SCI-P-252 and ICPP-MON-A-230

53.7
ICPP-SCI-P-252
37.7-53.7

64.6
ICPP-SCI-P-252
53.7-64.6 ft

76.1
ICPP-SCIF-252
64.6-76.1

87.6
ICPP-SCIF-252
76.1-87.6

102.3
ICPP-SCIP-252
87.6-102.3

119.7
ICPP-SCIP-252
102.3-119.7 ft

130.7
ICPP-SCI-P-252
119.7-130.7ft

141.8
ICPP-SCI-P-252
130.7-141.8ft

161.2
ICPP-SCIP-252
141.8-161.2

177.8
ICPP-SCIP-252
161.2-177.8

186.6
ICPP-SCI-P-252
177.8-186.6

205.1
ICPP-SCI-P-252
186.6 -205.1

214.5
ICPP-SCI-P-252
205.1-214.5

223.8
ICPP-SCI-P-252
214.5-223.8

232.9
ICPP-SCI-P-252
223.8-232.9ft

242
ICPP-SCI-P-252
232.9-242

252.9
ICPP-SCI-P-252
242-252.9

260.2
ICPP-SCI-P-252
252.9-260.2

260.2
270
ICPP-SCI-P-252
260.2-270 ft.

270
278.7
ICPP-SCI-P-252
270-278.7

287
ICPP-SCI-P-252
278.7-287

297.7
ICPP-SCI-P-252
287-297.7ft

317.5
ICPP-SCI-P-252
297.7-317.5 ft

325
ICPP-SCI-P-252
317.5-325 ft.

USGS
INEEL Lithologic Core Storage Library
Idaho National Engineering
and Environmental Laboratory
Building CFA-663
Operated by the US Geological Survey
for the Department of Energy
Borehole
ICPP-MON-A-230
Depth Range
316.7 – 328.5
DEEPER
UP
1ft 0.3m
KODAK Gray Scale
KODAK Color Control Patches
1F
2F

USGS
INEEL Lithologic Core Storage Library
Idaho National Engineering
and Environmental Laboratory
Building CFA-663
Operated by the US Geological Survey
for the Department of Energy
Borehole
ICPP-MON-A-230
Depth Range
3285 - 3370
DEEPER
UP
1ft 0.3m
KODAK Gray Scale
KODAK Color Control Patches

USGS
INEEL Lithologic Core Storage Library
Idaho National Engineering
and Environmental Laboratory
Building CFA-663
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for the Department of Energy
Borehole
ICPP-MON-A-230
Depth Range
337.0 - 344.3
DEEPER
UP
1ft 0.3m
KODAK Gray Scale
KODAK Color Control Patches
top 340.6
bottom 344.3

USGS
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Idaho National Engineering
and Environmental Laboratory
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for the Department of Energy
Borehole
ICPP-MON-A-230
Depth Range
344.3 - 351.0
DEEPER
UP
1ft 0.3m
KODAK Gray Scale
KODAK Color Control Patches

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for the Department of Energy
Borehole
ICPP-MON-A-230
Depth Range
351.0 - 358.0
DEEPER
UP
1ft 0.3m
KODAK Gray Scale
KODAK Color Control Patches

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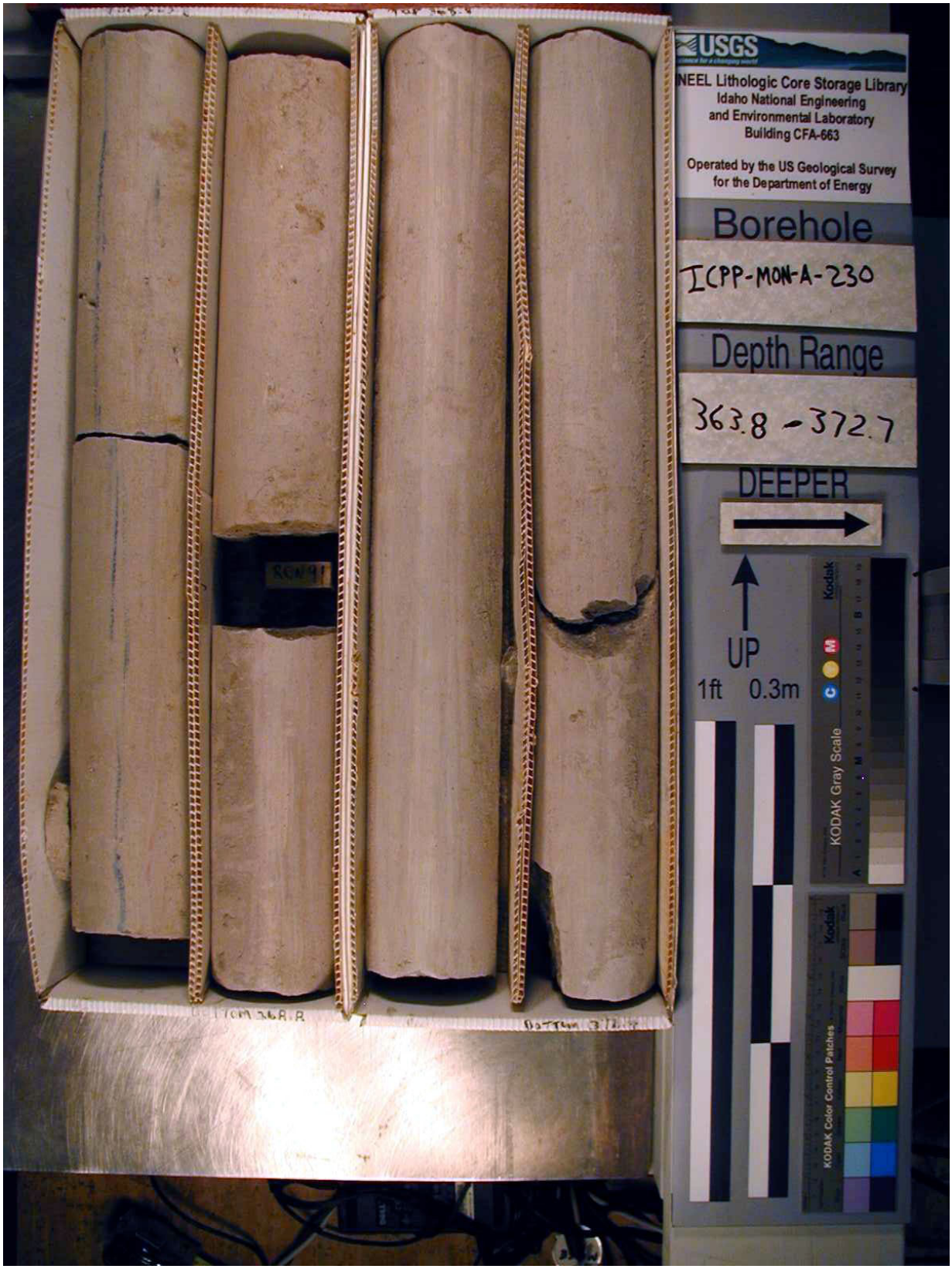
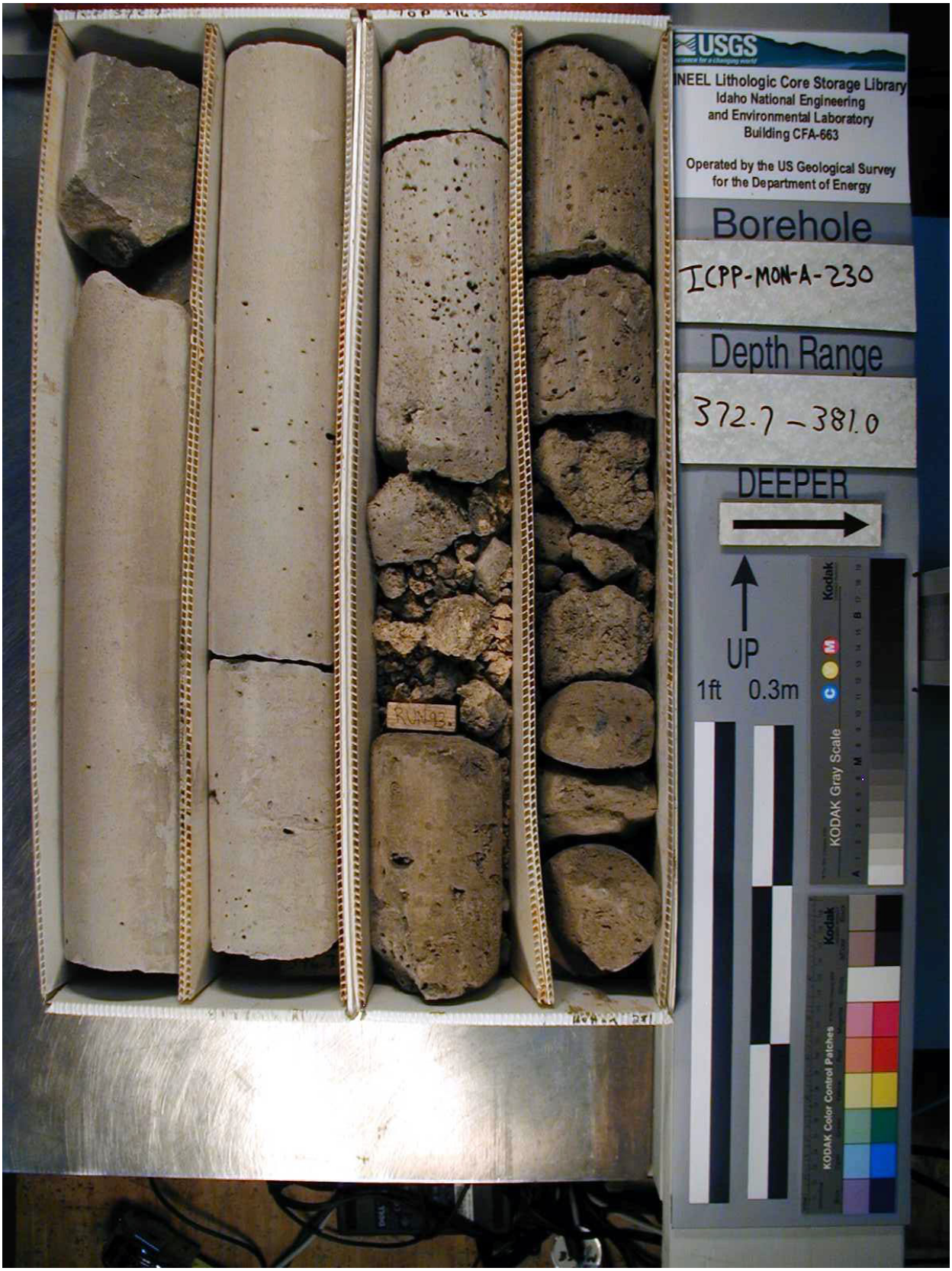
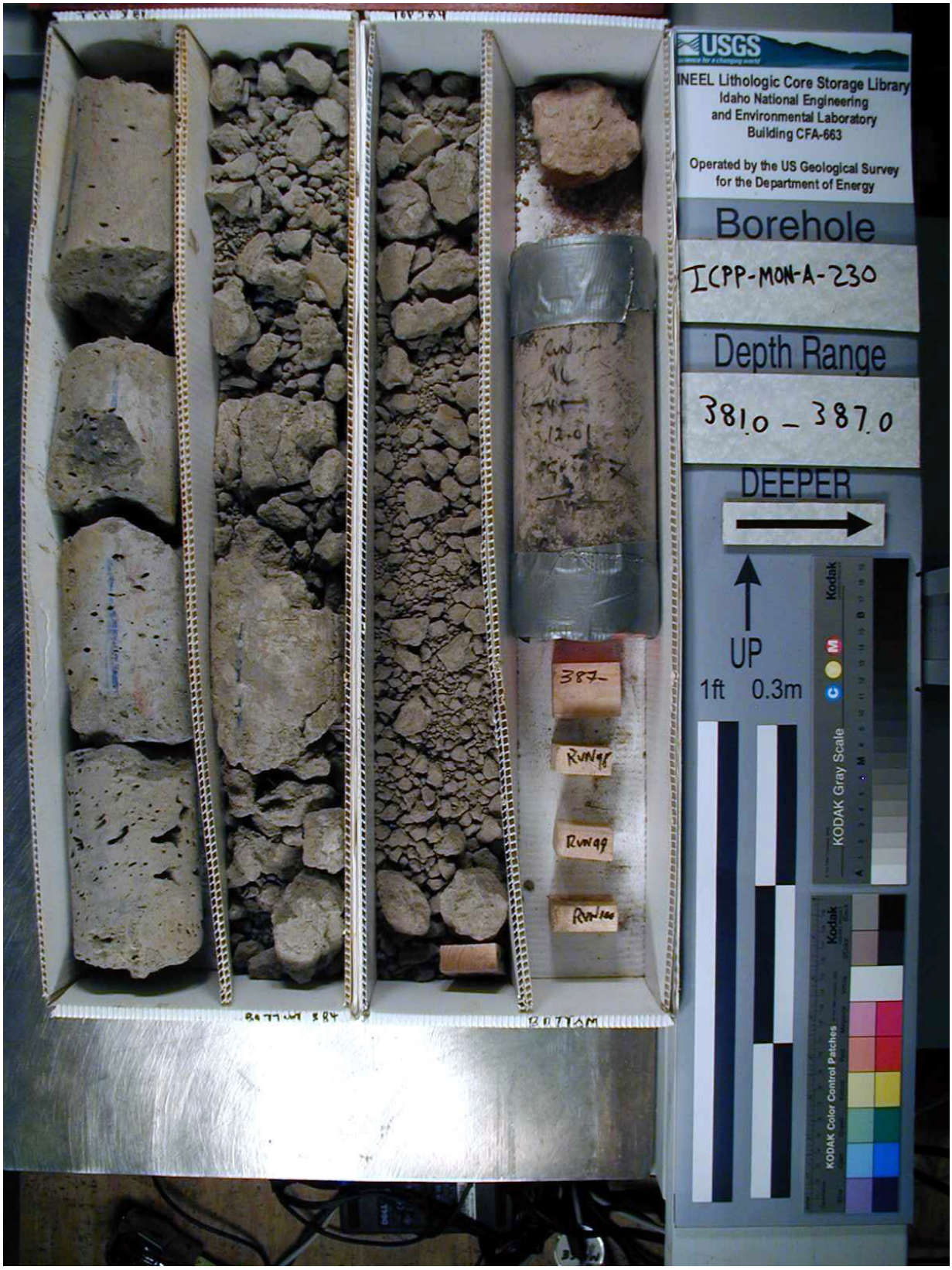
for the Department of Energy
Borehole
ICPP-MON-A-230
Depth Range
358.0 – 363.8
DEEPER
UP
1ft 0.3m
KODAK Gray Scale
KODAK Color Control Patches


USGS
NEEL Lithologic Core Storage Library
Idaho National Engineering
and Environmental Laboratory
Building CFA-663
Operated by the US Geological Survey
for the Department of Energy
Borehole
ICPP-MON-A-230
Depth Range
363.8 - 372.7
DEEPER
UP
1ft 0.3m
KODAK Gray Scale
KODAK Color Control Patches


USGS
INEEL Lithologic Core Storage Library
Idaho National Engineering
and Environmental Laboratory
Building CFA-663
Operated by the US Geological Survey
for the Department of Energy
Borehole
ICPP-MON-A-230
Depth Range
372.7 – 381.0
DEEPER
UP
1ft 0.3m
KODAK Gray Scale
KODAK Color Control Patches


USGS
INEEL Lithologic Core Storage Library
Idaho National Engineering
and Environmental Laboratory
Building CFA-663
Operated by the US Geological Survey
for the Department of Energy
Borehole
ICPP-MON-A-230
Depth Range
381.0 – 387.0
DEEPER
UP
1ft 0.3m
KODAK Gray Scale
KODAK Color Control Patches

Appendix D

Radionuclide Results for Core Samples

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Antimony-125	-0.0084	0.0181		U	PCI/G	11/05/2003	6.30E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Antimony-125	-0.0162	0.0170		U	PCI/G	11/05/2003	5.68E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Antimony-125	0.0092	0.0261		U	PCI/G	11/05/2003	9.51E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Antimony-125	-0.0183	0.0221		U	PCI/G	11/05/2003	8.05E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Antimony-125	0.0323	0.0157		UJ	PCI/G	11/05/2003	6.20E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Antimony-125	0.0052	0.0150		U	PCI/G	11/05/2003	5.60E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Antimony-125	-0.0314	0.0159		U	PCI/G	11/05/2003	4.97E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Antimony-125	0.0351	0.0182		U	PCI/G	11/05/2003	7.11E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Antimony-125	-0.0092	0.0196		U	PCI/G	11/05/2003	7.10E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Antimony-125	0.0125	0.0168		U	PCI/G	11/05/2003	6.03E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Antimony-125	0.0121	0.0186		U	PCI/G	11/05/2003	6.58E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Cerium-144	0.0542	0.0402		U	PCI/G	11/05/2003	1.45E-01	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Cerium-144	-0.0235	0.0359		U	PCI/G	11/05/2003	1.30E-01	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Cerium-144	-0.0093	0.0591		U	PCI/G	11/05/2003	2.10E-01	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Cerium-144	-0.0927	0.0522		U	PCI/G	11/05/2003	1.88E-01	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Cerium-144	0.0175	0.0334		U	PCI/G	11/05/2003	1.23E-01	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Cerium-144	0.0192	0.0294		U	PCI/G	11/05/2003	1.10E-01	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Cerium-144	0.0001	0.0333		U	PCI/G	11/05/2003	1.10E-01	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Cerium-144	-0.0533	0.0448		U	PCI/G	11/05/2003	1.65E-01	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Cerium-144	0.0725	0.0481		U	PCI/G	11/05/2003	1.77E-01	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Cerium-144	-0.0188	0.0285		U	PCI/G	11/05/2003	1.05E-01	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Cerium-144	0.0346	0.0465		U	PCI/G	11/05/2003	1.66E-01	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Cesium-134	0.0180	0.0081		UJ	PCI/G	11/05/2003	3.20E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Cesium-134	0.0106	0.0072		U	PCI/G	11/05/2003	2.86E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Cesium-134	0.0658	0.0214		UJ	PCI/G	11/05/2003	5.47E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Cesium-134	0.0772	0.0172		UJ	PCI/G	11/05/2003	4.64E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Cesium-134	0.0262	0.0071		UJ	PCI/G	11/05/2003	2.87E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Cesium-134	0.0015	0.0084		U	PCI/G	11/05/2003	2.77E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Cesium-134	0.0041	0.0073		U	PCI/G	11/05/2003	2.76E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Cesium-134	0.0071	0.0070		U	PCI/G	11/05/2003	2.77E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Cesium-134	0.0403	0.0182		UJ	PCI/G	11/05/2003	3.99E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Cesium-134	0.0131	0.0078		U	PCI/G	11/05/2003	3.03E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Cesium-134	0.0449	0.0142		UJ	PCI/G	11/05/2003	3.67E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Cesium-137	-0.0043	0.0070		U	PCI/G	11/05/2003	2.51E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Cesium-137	-0.0003	0.0069		U	PCI/G	11/05/2003	2.55E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Cesium-137	0.0103	0.0119		U	PCI/G	11/05/2003	4.28E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Cesium-137	-0.0173	0.0093		U	PCI/G	11/05/2003	3.14E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Cesium-137	-0.0044	0.0062		U	PCI/G	11/05/2003	2.17E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Cesium-137	0.0027	0.0067		U	PCI/G	11/05/2003	2.46E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Cesium-137	0.0009	0.0067		U	PCI/G	11/05/2003	2.50E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Cesium-137	0.0010	0.0067		U	PCI/G	11/05/2003	2.56E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Cesium-137	0.0120	0.0087		U	PCI/G	11/05/2003	3.31E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Cesium-137	-0.0008	0.0068		U	PCI/G	11/05/2003	2.48E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Cesium-137	-0.0137	0.0086		U	PCI/G	11/05/2003	2.49E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Cobalt-60	0.0026	0.0085		U	PCI/G	11/05/2003	3.17E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Cobalt-60	0.0119	0.0073		U	PCI/G	11/05/2003	3.09E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Cobalt-60	0.0038	0.0108		U	PCI/G	11/05/2003	4.01E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Cobalt-60	-0.0111	0.0101		U	PCI/G	11/05/2003	3.47E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Cobalt-60	0.0061	0.0075		U	PCI/G	11/05/2003	2.64E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Cobalt-60	-0.0063	0.0070		U	PCI/G	11/05/2003	2.41E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Cobalt-60	0.0056	0.0070		U	PCI/G	11/05/2003	2.85E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Cobalt-60	-0.0067	0.0077		U	PCI/G	11/05/2003	2.77E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Cobalt-60	0.0075	0.0084		U	PCI/G	11/05/2003	3.19E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Cobalt-60	-0.0024	0.0082		U	PCI/G	11/05/2003	2.98E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Cobalt-60	0.0028	0.0080		U	PCI/G	11/05/2003	2.88E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Europium-152	-0.0074	0.0178		U	PCI/G	11/05/2003	6.31E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Europium-152	-0.0014	0.0205		U	PCI/G	11/05/2003	7.18E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Europium-152	0.0109	0.0290		U	PCI/G	11/05/2003	9.96E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Europium-152	-0.0570	0.0258		U	PCI/G	11/05/2003	8.48E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Europium-152	-0.0244	0.0160		U	PCI/G	11/05/2003	5.67E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Europium-152	-0.0028	0.0156		U	PCI/G	11/05/2003	5.78E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Europium-152	0.0010	0.0169		U	PCI/G	11/05/2003	6.01E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Europium-152	-0.0068	0.0200		U	PCI/G	11/05/2003	7.19E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Europium-152	-0.0317	0.0209		U	PCI/G	11/05/2003	7.44E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Europium-152	-0.0323	0.0173		U	PCI/G	11/05/2003	5.64E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Europium-152	0.0237	0.0206		U	PCI/G	11/05/2003	7.43E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Europium-154	-0.0386	0.0259		U	PCI/G	11/05/2003	7.10E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Europium-154	-0.0050	0.0211		U	PCI/G	11/05/2003	7.88E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Europium-154	0.0062	0.0384		U	PCI/G	11/05/2003	1.38E-01	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Europium-154	0.0042	0.0564		U	PCI/G	11/05/2003	1.19E-01	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Europium-154	0.0185	0.0202		U	PCI/G	11/05/2003	7.92E-02	SOS-TL002-04

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Europium-154	-0.0115	0.0209		U	PCI/G	11/05/2003	7.37E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Europium-154	0.0106	0.0184		U	PCI/G	11/05/2003	7.44E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Europium-154	-0.0004	0.0220		U	PCI/G	11/05/2003	8.06E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Europium-154	0.0203	0.0308		U	PCI/G	11/05/2003	1.00E-01	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Europium-154	0.0134	0.0222		U	PCI/G	11/05/2003	8.50E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Europium-154	-0.0190	0.0253		U	PCI/G	11/05/2003	8.71E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Europium-155	0.0060	0.0201		U	PCI/G	11/05/2003	7.23E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Europium-155	0.0320	0.0197		U	PCI/G	11/05/2003	7.61E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Europium-155	0.1460	0.0497		UJ	PCI/G	11/05/2003	1.19E-01	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Europium-155	0.0677	0.0271		UJ	PCI/G	11/05/2003	1.06E-01	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Europium-155	0.0094	0.0178		U	PCI/G	11/05/2003	6.61E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Europium-155	0.0937	0.0367		UJ	PCI/G	11/05/2003	5.85E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Europium-155	0.0069	0.0168		U	PCI/G	11/05/2003	6.32E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Europium-155	0.0411	0.0242		U	PCI/G	11/05/2003	9.62E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Europium-155	0.0332	0.0338		U	PCI/G	11/05/2003	9.54E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Europium-155	0.0139	0.0145		U	PCI/G	11/05/2003	5.10E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Europium-155	0.0484	0.0324		U	PCI/G	11/05/2003	8.34E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Gross Alpha	2.03	0.877		UJ	PCI/G	11/05/2003	3.06E+00	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Gross Alpha	4.61	1.22		J	PCI/G	11/05/2003	3.82E+00	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Gross Alpha	16.2	1.68		J	PCI/G	11/05/2003	2.03E+00	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Gross Alpha	15.5	1.50		J	PCI/G	11/05/2003	2.63E+00	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Gross Alpha	5.55	1.19		J	PCI/G	11/05/2003	3.19E+00	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Gross Alpha	5.86	1.40		J	PCI/G	11/05/2003	4.41E+00	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Gross Alpha	5.01	1.44		J	PCI/G	11/05/2003	4.77E+00	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Gross Alpha	3.52	0.99		J	PCI/G	11/05/2003	2.85E+00	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Gross Alpha	16.7	1.65		J	PCI/G	11/05/2003	1.74E+00	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Gross Alpha	10.9	1.58		J	PCI/G	11/05/2003	2.35E+00	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Gross Alpha	11.50	1.47		J	PCI/G	11/05/2003	2.38E+00	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Gross Beta	3.61	1.10		J	PCI/G	11/05/2003	4.08E+00	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Gross Beta	9.67	1.38		J	PCI/G	11/05/2003	4.49E+00	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Gross Beta	24.6	1.63		J	PCI/G	11/05/2003	3.80E+00	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Gross Beta	33.0	1.76		J	PCI/G	11/05/2003	3.82E+00	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Gross Beta	7.42	1.26		J	PCI/G	11/05/2003	4.32E+00	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Gross Beta	8.20	1.33		J	PCI/G	11/05/2003	4.59E+00	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Gross Beta	7.73	1.41		J	PCI/G	11/05/2003	4.95E+00	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Gross Beta	5.56	1.17		J	PCI/G	11/05/2003	4.09E+00	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Gross Beta	28.2	1.78		J	PCI/G	11/05/2003	3.46E+00	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Gross Beta	16.4	1.80		J	PCI/G	11/05/2003	3.65E+00	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Gross Beta	20.8	1.89		J	PCI/G	11/05/2003	3.98E+00	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Manganese-54	-0.0086	0.0070		U	PCI/G	11/05/2003	2.38E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Manganese-54	0.0099	0.0064		U	PCI/G	11/05/2003	2.55E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Manganese-54	0.0121	0.0119		U	PCI/G	11/05/2003	4.15E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Manganese-54	0.0168	0.0176		U	PCI/G	11/05/2003	3.38E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Manganese-54	0.0067	0.0064		U	PCI/G	11/05/2003	2.41E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Manganese-54	-0.0019	0.0059		U	PCI/G	11/05/2003	2.19E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Manganese-54	-0.0017	0.0065		U	PCI/G	11/05/2003	2.36E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Manganese-54	0.0027	0.0061		U	PCI/G	11/05/2003	2.33E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Manganese-54	-0.0023	0.0088		U	PCI/G	11/05/2003	3.05E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Manganese-54	-0.0030	0.0072		U	PCI/G	11/05/2003	2.53E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Manganese-54	0.0114	0.0091		U	PCI/G	11/05/2003	2.87E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Niobium-95	0.0010	0.0086		U	PCI/G	11/05/2003	3.13E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Niobium-95	0.0105	0.0088		U	PCI/G	11/05/2003	3.36E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Niobium-95	0.0166	0.0168		U	PCI/G	11/05/2003	5.32E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Niobium-95	0.0572	0.0210		UJ	PCI/G	11/05/2003	4.58E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Niobium-95	0.0079	0.0083		U	PCI/G	11/05/2003	3.09E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Niobium-95	0.0006	0.0088		U	PCI/G	11/05/2003	2.73E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Niobium-95	0.0127	0.0110		U	PCI/G	11/05/2003	2.88E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Niobium-95	0.0140	0.0081		U	PCI/G	11/05/2003	3.27E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Niobium-95	-0.0031	0.0173		U	PCI/G	11/05/2003	3.74E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Niobium-95	-0.0034	0.0092		U	PCI/G	11/05/2003	3.24E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Niobium-95	0.0308	0.0108		UJ	PCI/G	11/05/2003	3.56E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Ruthenium-106	0.0429	0.0632		U	PCI/G	11/05/2003	2.38E-01	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Ruthenium-106	-0.0109	0.0538		U	PCI/G	11/05/2003	1.98E-01	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Ruthenium-106	0.0166	0.0913		U	PCI/G	11/05/2003	3.26E-01	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Ruthenium-106	0.0921	0.0796		U	PCI/G	11/05/2003	2.97E-01	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Ruthenium-106	-0.0618	0.0635		U	PCI/G	11/05/2003	2.19E-01	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Ruthenium-106	0.0036	0.0532		U	PCI/G	11/05/2003	1.93E-01	SOS-TL002-04

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Ruthenium-106	0.0554	0.0581		U	PCI/G	11/05/2003	2.24E-01	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Ruthenium-106	-0.0568	0.0578		U	PCI/G	11/05/2003	2.08E-01	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Ruthenium-106	-0.0008	0.0675		U	PCI/G	11/05/2003	2.42E-01	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Ruthenium-106	-0.0574	0.0667		U	PCI/G	11/05/2003	2.03E-01	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Ruthenium-106	-0.0811	0.0609		U	PCI/G	11/05/2003	2.10E-01	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Silver-108m	-0.0082	0.0063		U	PCI/G	11/05/2003	2.10E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Silver-108m	-0.0109	0.0068		U	PCI/G	11/05/2003	2.21E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Silver-108m	0.0000	0.0091		U	PCI/G	11/05/2003	3.30E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Silver-108m	0.0107	0.0081		U	PCI/G	11/05/2003	3.10E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Silver-108m	0.0003	0.0055		U	PCI/G	11/05/2003	2.02E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Silver-108m	0.0049	0.0050		U	PCI/G	11/05/2003	1.91E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Silver-108m	0.0034	0.0057		U	PCI/G	11/05/2003	2.07E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Silver-108m	0.0113	0.0074		U	PCI/G	11/05/2003	2.54E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Silver-108m	-0.0123	0.0069		U	PCI/G	11/05/2003	2.41E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Silver-108m	0.0017	0.0064		U	PCI/G	11/05/2003	2.24E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Silver-108m	0.0077	0.0068		U	PCI/G	11/05/2003	2.42E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Silver-110m	0.0012	0.0063		U	PCI/G	11/05/2003	2.34E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Silver-110m	0.0020	0.0060		U	PCI/G	11/05/2003	2.27E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Silver-110m	-0.0247	0.0104		U	PCI/G	11/05/2003	3.36E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Silver-110m	0.0144	0.0085		U	PCI/G	11/05/2003	3.20E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Silver-110m	0.0013	0.0057		U	PCI/G	11/05/2003	2.11E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Silver-110m	-0.0096	0.0063		U	PCI/G	11/05/2003	2.08E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Silver-110m	0.0025	0.0060		U	PCI/G	11/05/2003	2.26E-02	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Silver-110m	0.0018	0.0067		U	PCI/G	11/05/2003	2.53E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Silver-110m	-0.0008	0.0079		U	PCI/G	11/05/2003	2.48E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Silver-110m	-0.0038	0.0061		U	PCI/G	11/05/2003	2.15E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Silver-110m	0.0099	0.0064		U	PCI/G	11/05/2003	2.28E-02	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Strontium-90	0.1550	0.0989		U	PCI/G	11/05/2003	3.97E-01	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Strontium-90	0.0586	0.1020		U	PCI/G	11/05/2003	4.40E-01	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Strontium-90	0.1690	0.1050		U	PCI/G	11/05/2003	4.20E-01	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Strontium-90	0.2150	0.1160		U	PCI/G	11/05/2003	4.55E-01	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Strontium-90	0.0382	0.1330		U	PCI/G	11/05/2003	5.73E-01	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Strontium-90	0.3160	0.1450		UJ	PCI/G	11/05/2003	5.55E-01	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Strontium-90	0.2080	0.1200		U	PCI/G	11/05/2003	4.71E-01	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Strontium-90	-0.0036	0.0957		U	PCI/G	11/05/2003	4.26E-01	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Strontium-90	0.1560	0.1180		U	PCI/G	11/05/2003	4.84E-01	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Strontium-90	0.0308	0.0984		U	PCI/G	11/05/2003	4.27E-01	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Strontium-90	0.2400	0.1100		UJ	PCI/G	11/05/2003	4.14E-01	SOS-TL002-04
5OM32601RH	101364003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Technetium-99	-0.0097	0.1590		U	PCI/G	11/05/2003	5.46E-01	SOS-TL008-04
5OM32701RH	101364004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Technetium-99	0.4920	0.2320		UJ	PCI/G	11/05/2003	7.75E-01	SOS-TL008-04
5OM32801RH	101364005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Technetium-99	0.0105	0.1380		U	PCI/G	11/05/2003	4.71E-01	SOS-TL008-04
5OM32901RH	101364006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Technetium-99	-0.0129	0.2110		U	PCI/G	11/05/2003	7.23E-01	SOS-TL008-04
5OM33001RH	101364007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Technetium-99	0.0483	0.1770		U	PCI/G	11/05/2003	6.04E-01	SOS-TL008-04
5OM33101RH	101364008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Technetium-99	-0.3230	0.1510		U	PCI/G	11/05/2003	5.30E-01	SOS-TL008-04
5OM32501RH	101364001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Technetium-99	-0.1100	0.1790		U	PCI/G	11/05/2003	6.17E-01	SOS-TL008-04
5OM32502RH	101364002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Technetium-99	-0.1430	0.1020		U	PCI/G	11/05/2003	3.56E-01	SOS-TL008-04
5OM33201RH	101364009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Technetium-99	-0.0608	0.1130		U	PCI/G	11/05/2003	3.91E-01	SOS-TL008-04
5OM33301RH	101364010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Technetium-99	-0.0628	0.1710		U	PCI/G	11/05/2003	5.89E-01	SOS-TL008-04
5OM33401RH	101364011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Technetium-99	0.0058	0.1280		U	PCI/G	11/05/2003	4.39E-01	SOS-TL008-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Uranium-235	0.0832	0.0512		U	PCI/G	11/05/2003	1.54E-01	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Uranium-235	-0.0418	0.0374		U	PCI/G	11/05/2003	1.33E-01	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Uranium-235	0.1210	0.0741		U	PCI/G	11/05/2003	2.27E-01	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Uranium-235	0.0415	0.0553		U	PCI/G	11/05/2003	2.07E-01	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Uranium-235	0.0868	0.0372		UJ	PCI/G	11/05/2003	1.39E-01	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Uranium-235	0.0396	0.0313		U	PCI/G	11/05/2003	1.17E-01	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Uranium-235	0.0319	0.0362		U	PCI/G	11/05/2003	1.35E-01	SOS-TL002-04
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Uranium-235	0.0623	0.0458		U	PCI/G	11/05/2003	1.77E-01	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Uranium-235	-0.0154	0.0542		U	PCI/G	11/05/2003	1.73E-01	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Uranium-235	0.0132	0.0311		U	PCI/G	11/05/2003	1.17E-01	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Uranium-235	0.1370	0.0768		U	PCI/G	11/05/2003	1.82E-01	SOS-TL002-04
5OM32601RH	101378003	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	43	Zinc-65	-0.0131	0.0191		U	PCI/G	11/05/2003	5.79E-02	SOS-TL002-04
5OM32701RH	101378004	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	105	Zinc-65	0.0118	0.0147		U	PCI/G	11/05/2003	5.62E-02	SOS-TL002-04
5OM32801RH	101378005	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	155	Zinc-65	0.0369	0.0297		U	PCI/G	11/05/2003	9.93E-02	SOS-TL002-04
5OM32901RH	101378006	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	195	Zinc-65	-0.0484	0.0279		U	PCI/G	11/05/2003	8.01E-02	SOS-TL002-04
5OM33001RH	101378007	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	274	Zinc-65	0.0182	0.0166		U	PCI/G	11/05/2003	5.80E-02	SOS-TL002-04
5OM33101RH	101378008	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	293	Zinc-65	0.0191	0.0137		U	PCI/G	11/05/2003	5.03E-02	SOS-TL002-04
5OM32501RH	101378001	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Zinc-65	-0.0411	0.0213		U	PCI/G	11/05/2003	5.46E-02	SOS-TL002-04

Field Sample Number	Lab Sample Number	SDG Number	COC Number	TOS/SOW Number	Lab Code	Type of Location	Location	Depth	Compound	Sample Result	Sample Error	Result Qualifier	Validation Flag	Sample Units	Date Sample Collected	MDA	L&V Report Number
5OM32502RH	101378002	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-SCI-P-252	305-306	Zinc-65	0.0188	0.0168		U	PCI/G	11/05/2003	5.93E-02	SOS-TL002-04
5OM33201RH	101378009	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	350	Zinc-65	0.0034	0.0287		U	PCI/G	11/05/2003	6.22E-02	SOS-TL002-04
5OM33301RH	101378010	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	377	Zinc-65	0.0211	0.0171		U	PCI/G	11/05/2003	6.05E-02	SOS-TL002-04
5OM33401RH	101378011	5OM32501RH	23624	ER-TOS-A2224	GEL	ARCHIVED CORE	ICPP-MON-A-230	385-387	Zinc-65	-0.0007	0.0210		U	PCI/G	11/05/2003	6.45E-02	SOS-TL002-04

Validation Flags:

J = estimated value.

U = nondetect.

Appendix E

Colloidal Borescope Logging Results for Monitor Well ICPP-MON-A-230

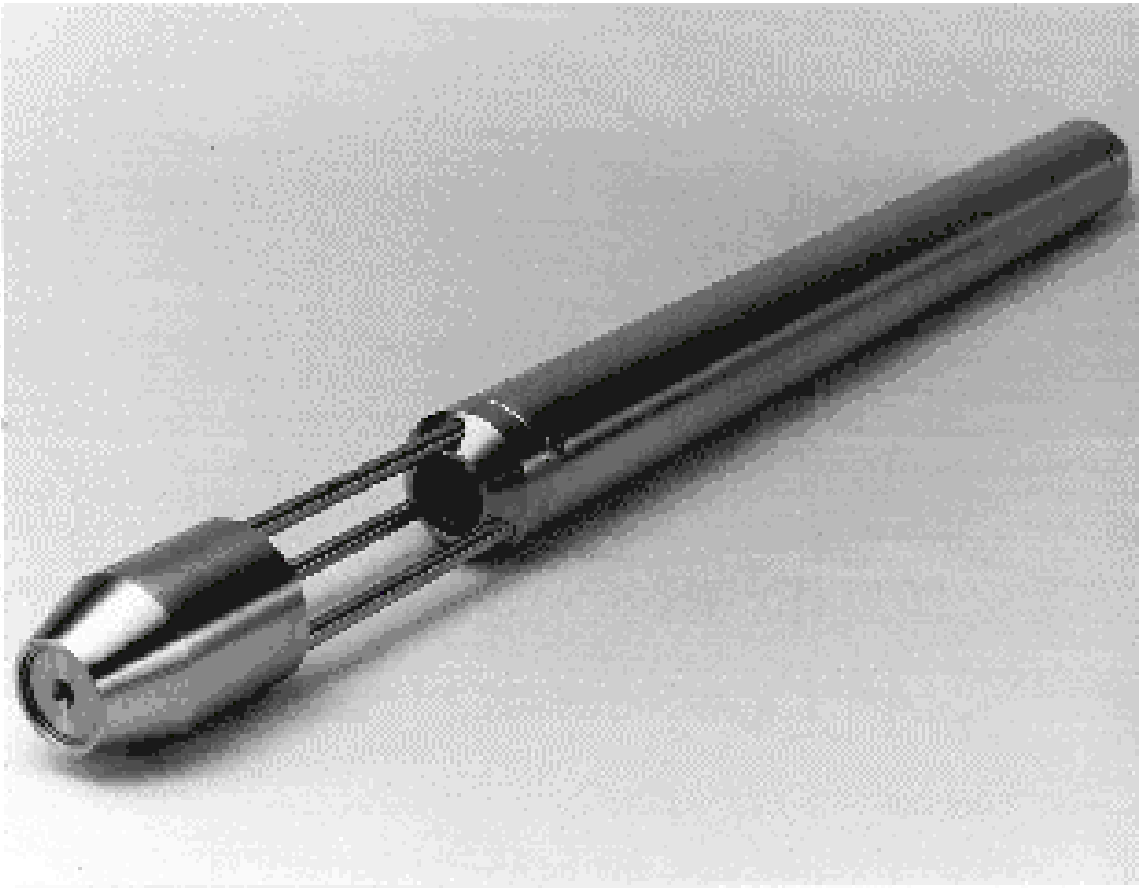
Tc-99 Groundwater Investigation

Colloidal Borescope Data Presentation

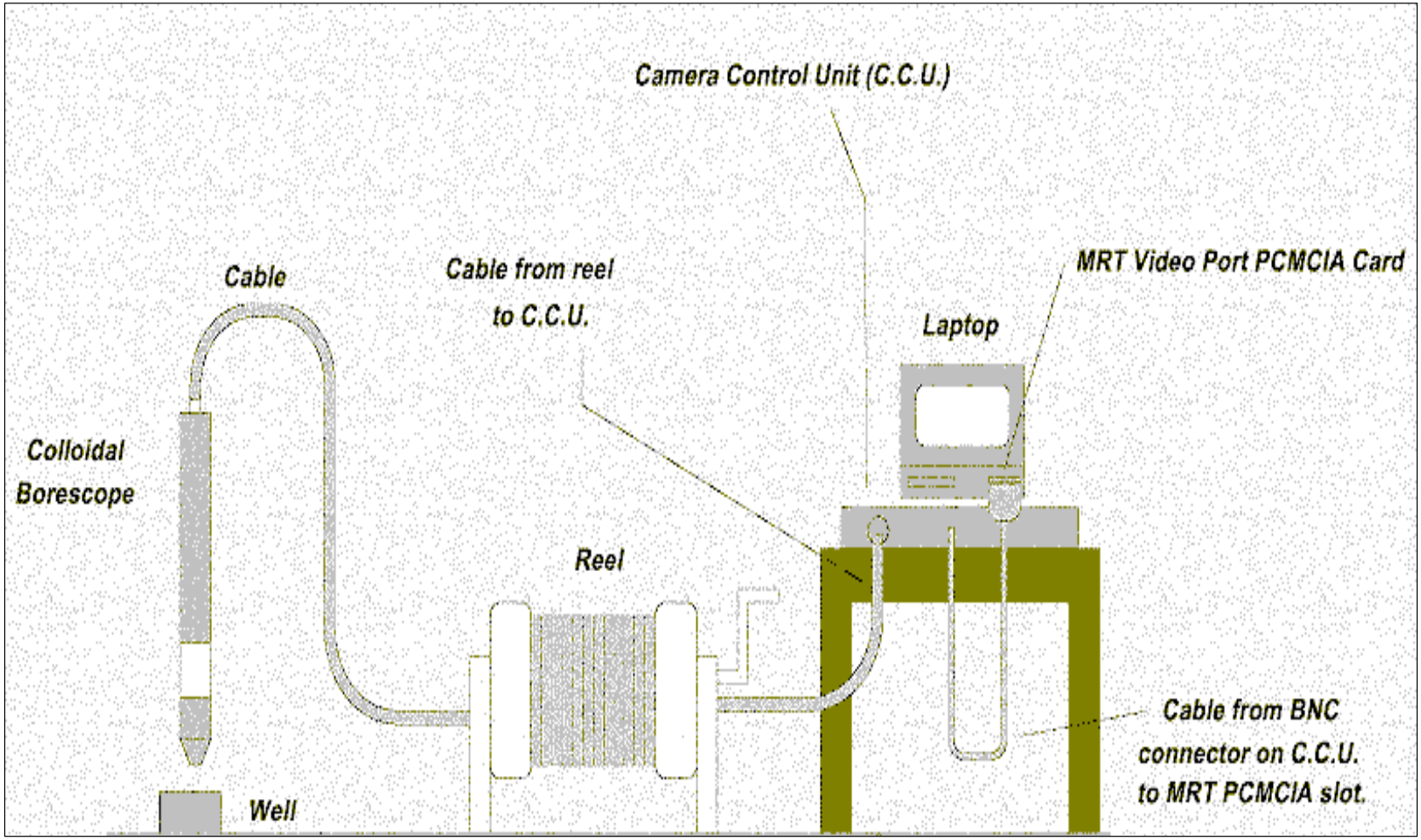
From: Monitoring Well ICCP-MON-A-230
Dates: October 22, 23, 2003

December 2003

Colloidal Borescope



Components


Camera Control Unit (C.C.U.)
Cable
Cable from reel
to C.C.U.
MRT Video Port PCMCIA Card
Laptop
Colloidal
Borescope
Reel
Cable from BNC
connector on C.C.U.
to MRT PCMCIA slot.
Well

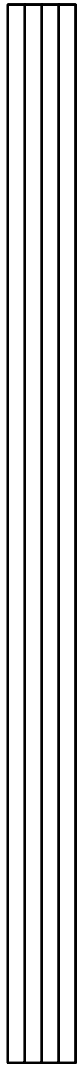
The Technology

The colloidal borescope is a down-hole device that captures visual images of colloidal particles over time and calculates groundwater flow direction based on the observed movement of these particles. In the borehole, groundwater flows past a digital camera that collects digitized images of colloidal particles in the groundwater. Images, collected every few milliseconds, are compared to determine the distance and direction of particle movement during the time interval.

Field Setup

View Inside Van

Data Collection Depths BGS



Screen Top: 443 ft

Water Table: 461.8 ft

462 ft

463 ft

465 ft

467 ft

470 ft

472 ft

475 ft

477 ft

480 ft

482 ft

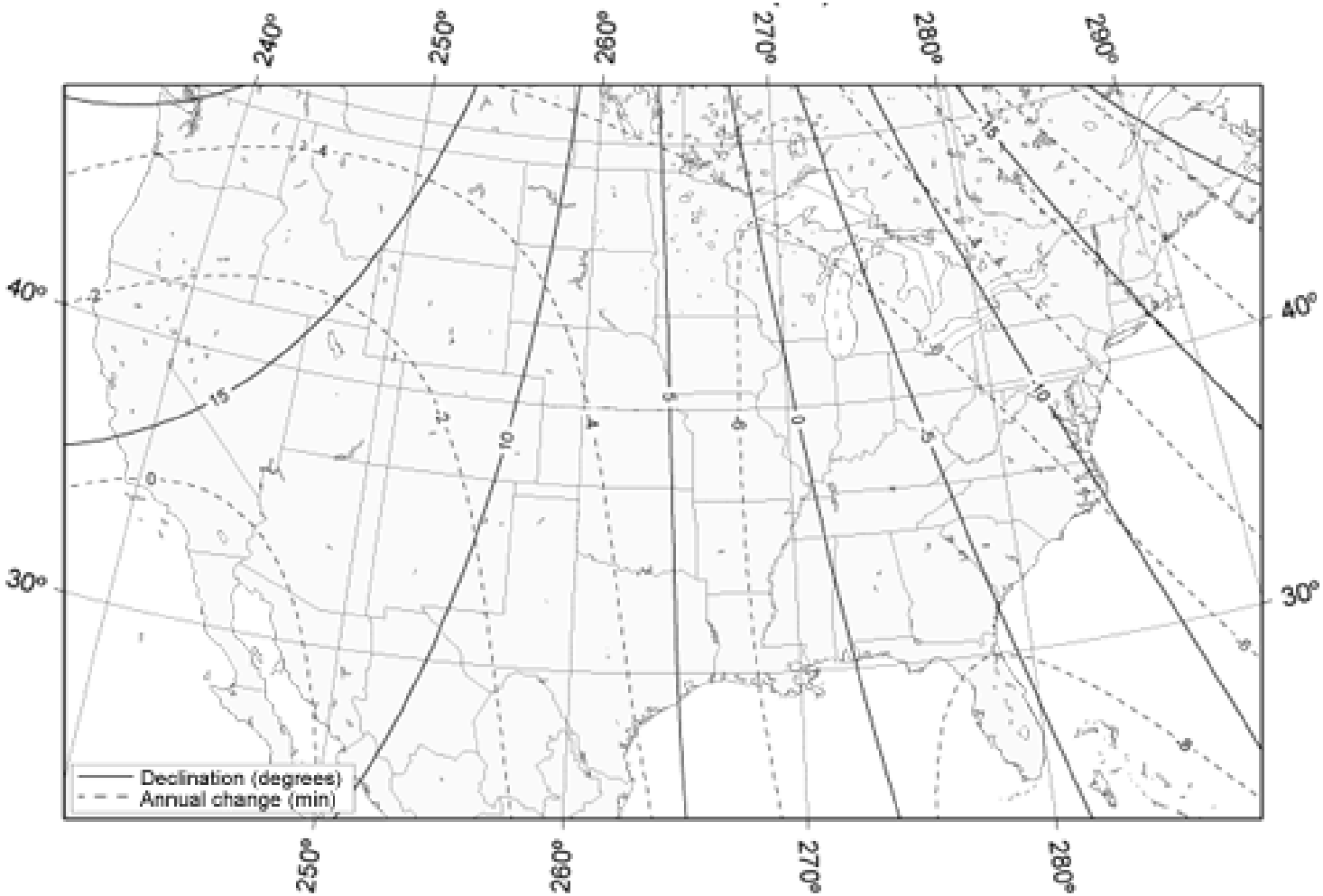
483 ft

Screen Bottom: 483 ft

Data Collection Findings BGS

	Screen Top: 443 ft
	Water Table: 461.8 ft
462 ft	Swirling Non-Directional Flow
463 ft	Swirling Non-Directional Flow
465 ft	Swirling Non-Directional Flow
467 ft	Swirling Non-Directional Flow
470 ft	Swirling Non-Directional Flow
472 ft	Swirling Non-Directional Flow
475 ft	Swirling Non-Directional Flow
477 ft	Reliable Flow Zone
480 ft	Swirling Non-Directional Flow
482 ft	Reliable Flow Zone
483 ft	Screen Bottom: 483 ft

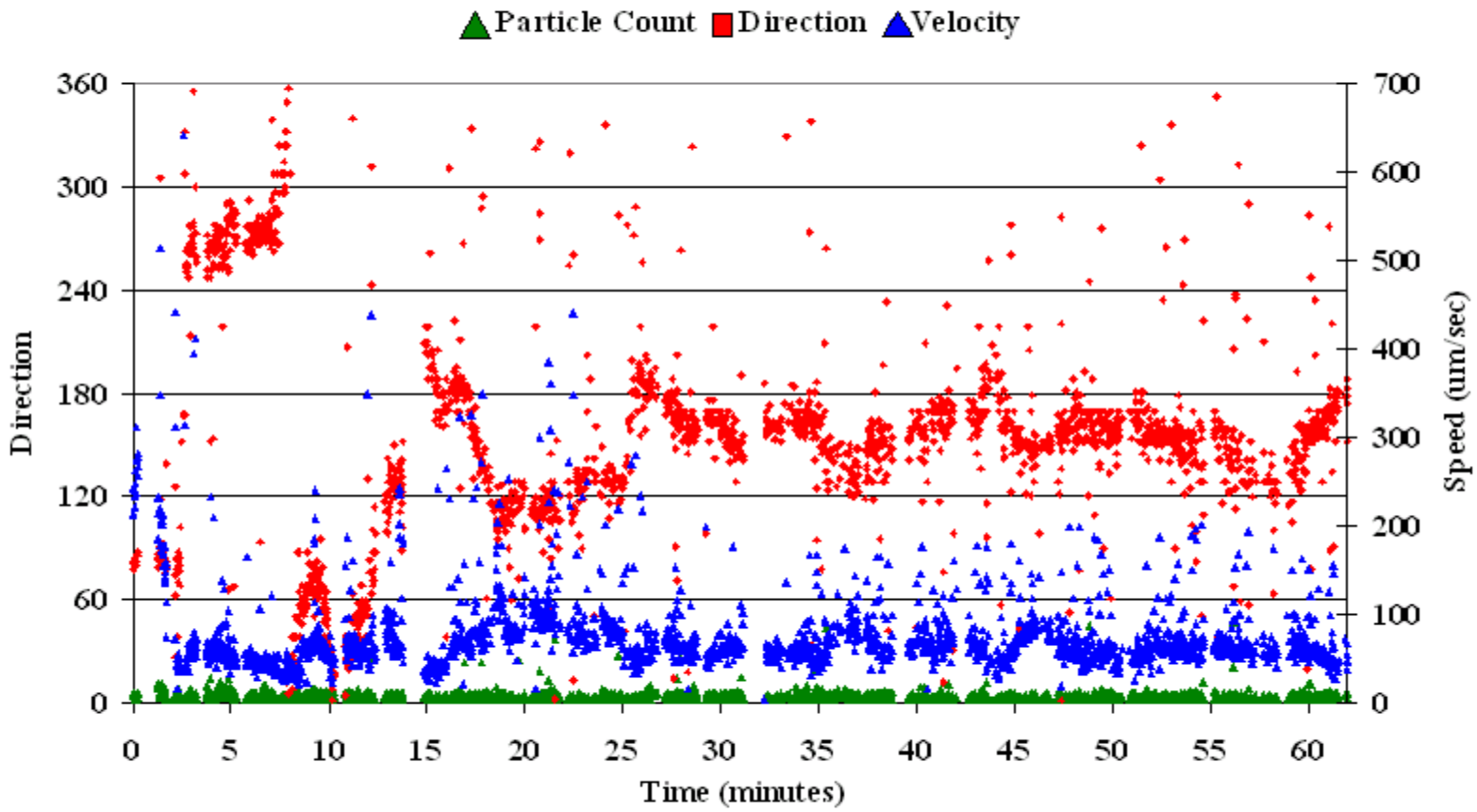
Magnetic Declination (degrees)



Magnetic Declination

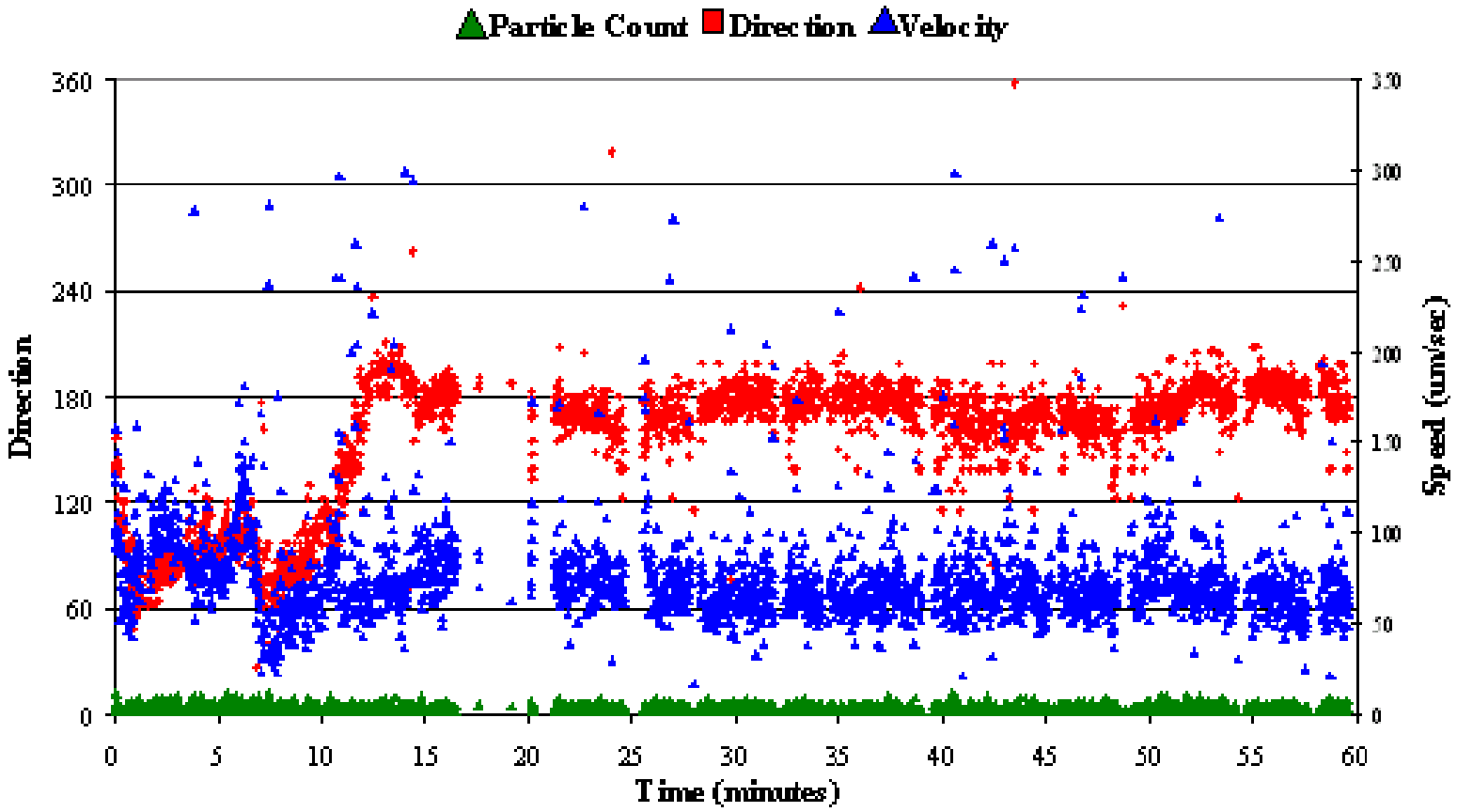
- Latitude 43.50, Longitude -113.00, Elevation 5,000 ft
- On 10/22/2003, the Magnetic Declination was 14 Degrees 25 Minutes East
- The Current Rate of Change is 5 Minutes/Year West
- Magnetic Declination is the Angle Between True North and Magnetic North

Reliable Flow at 477 Ft BGS



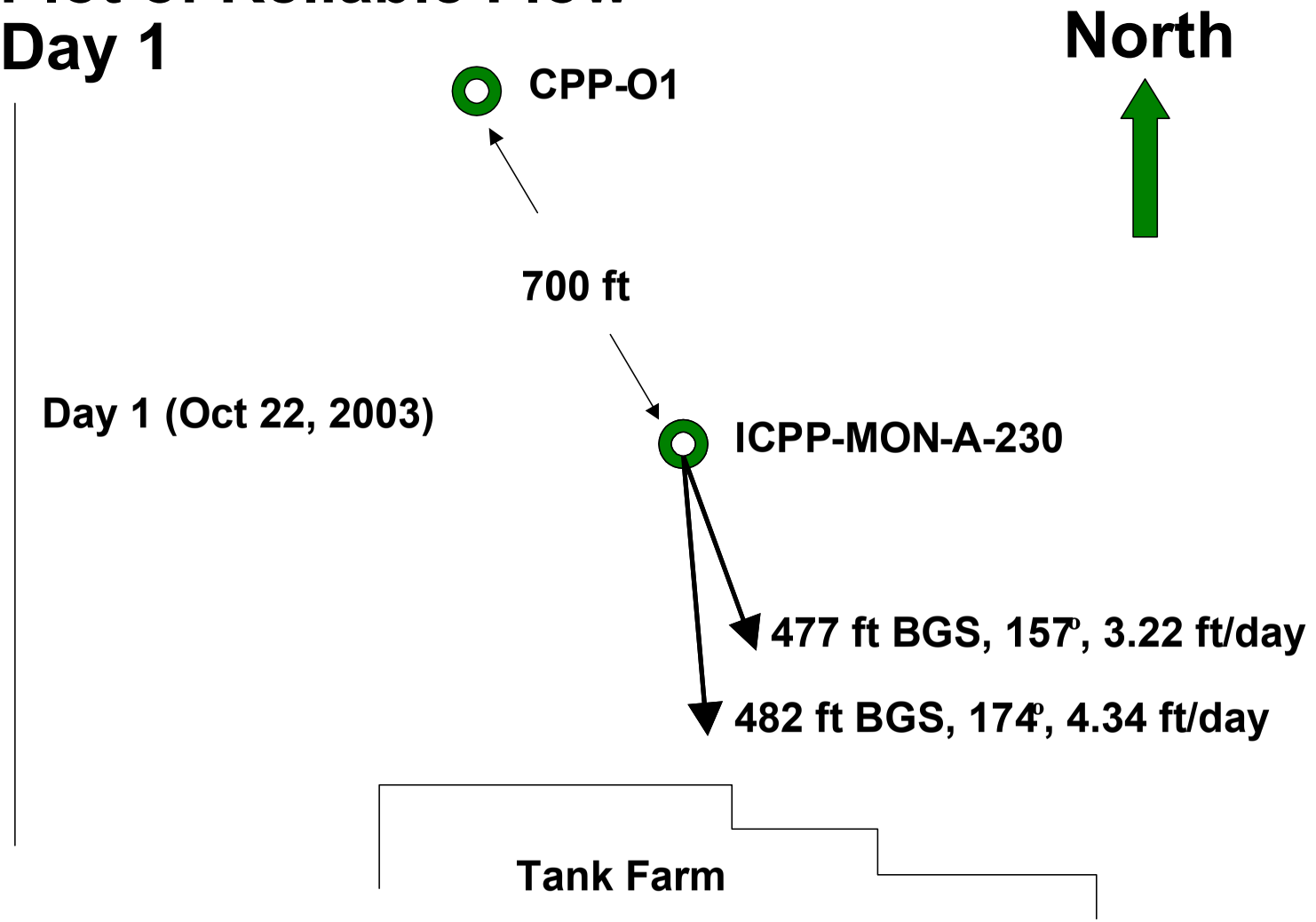
Average Direction: 157 - Average Velocity: 45 um/sec - Average Seepage Velocity: 3.22 ft/day

Reliable Flow at 482 Feet BGS

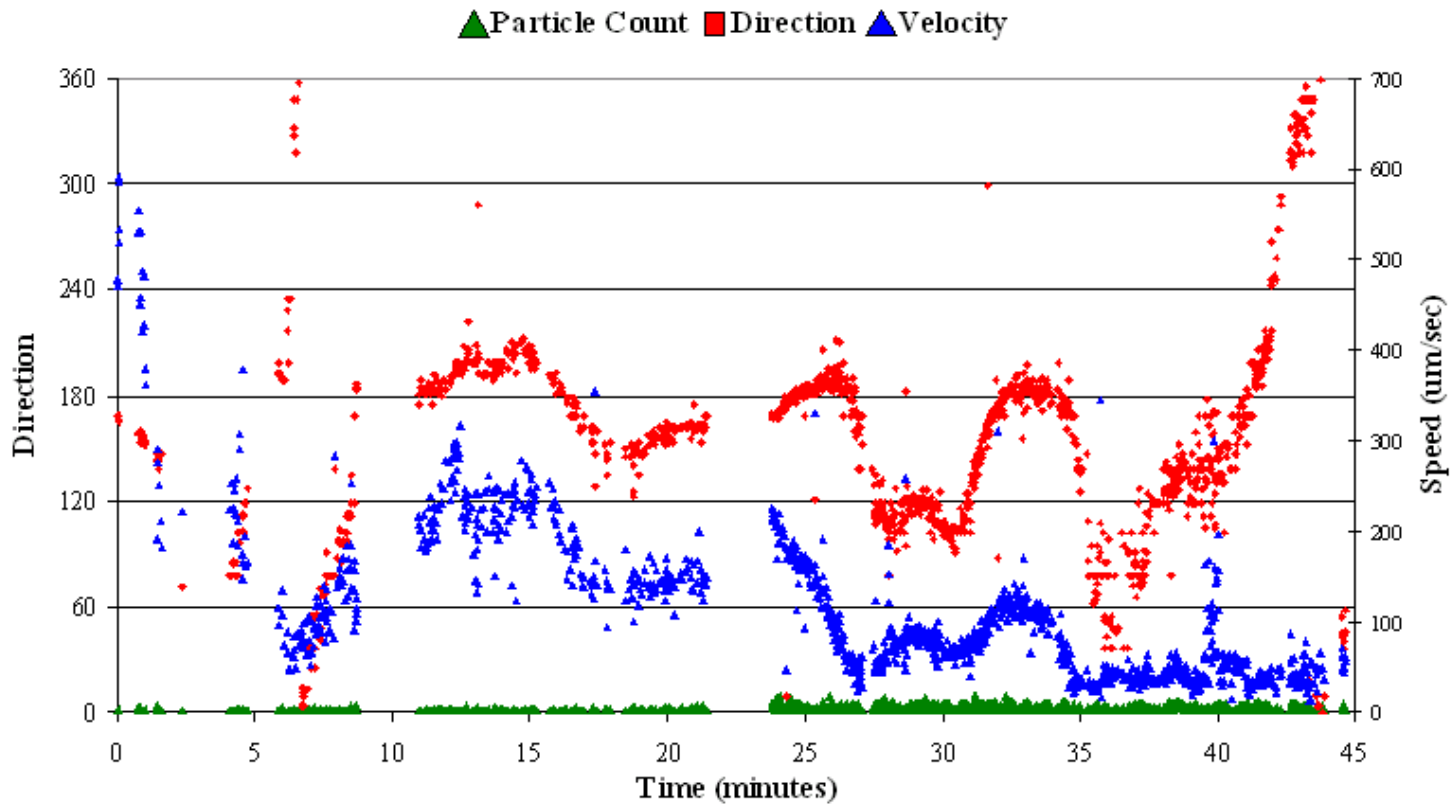


Average Direction: 174 - Average Velocity: 61 um/sec - Average Seepage Velocity: 4.34 ft/day

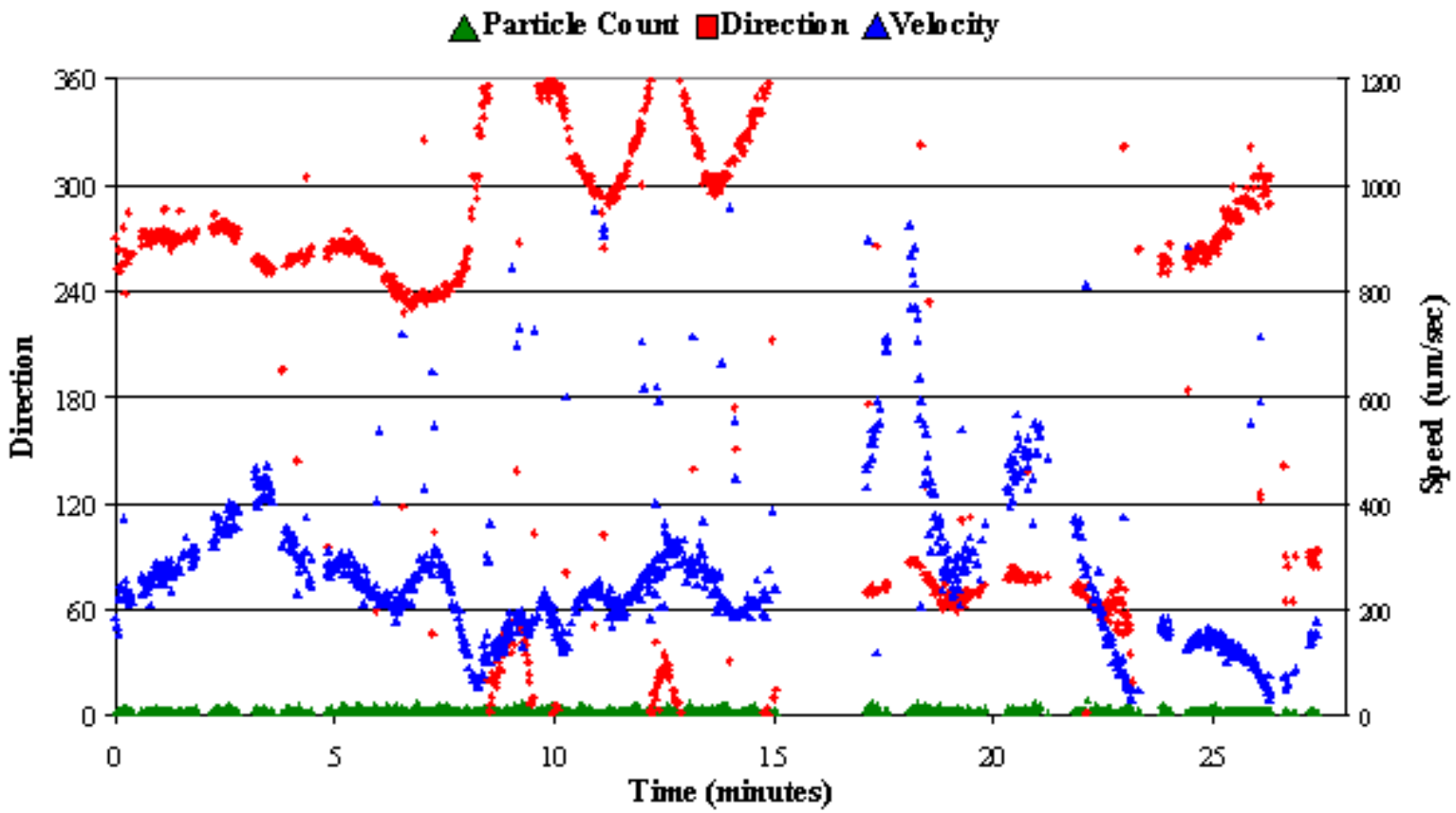
Plot of Reliable Flow
Day 1



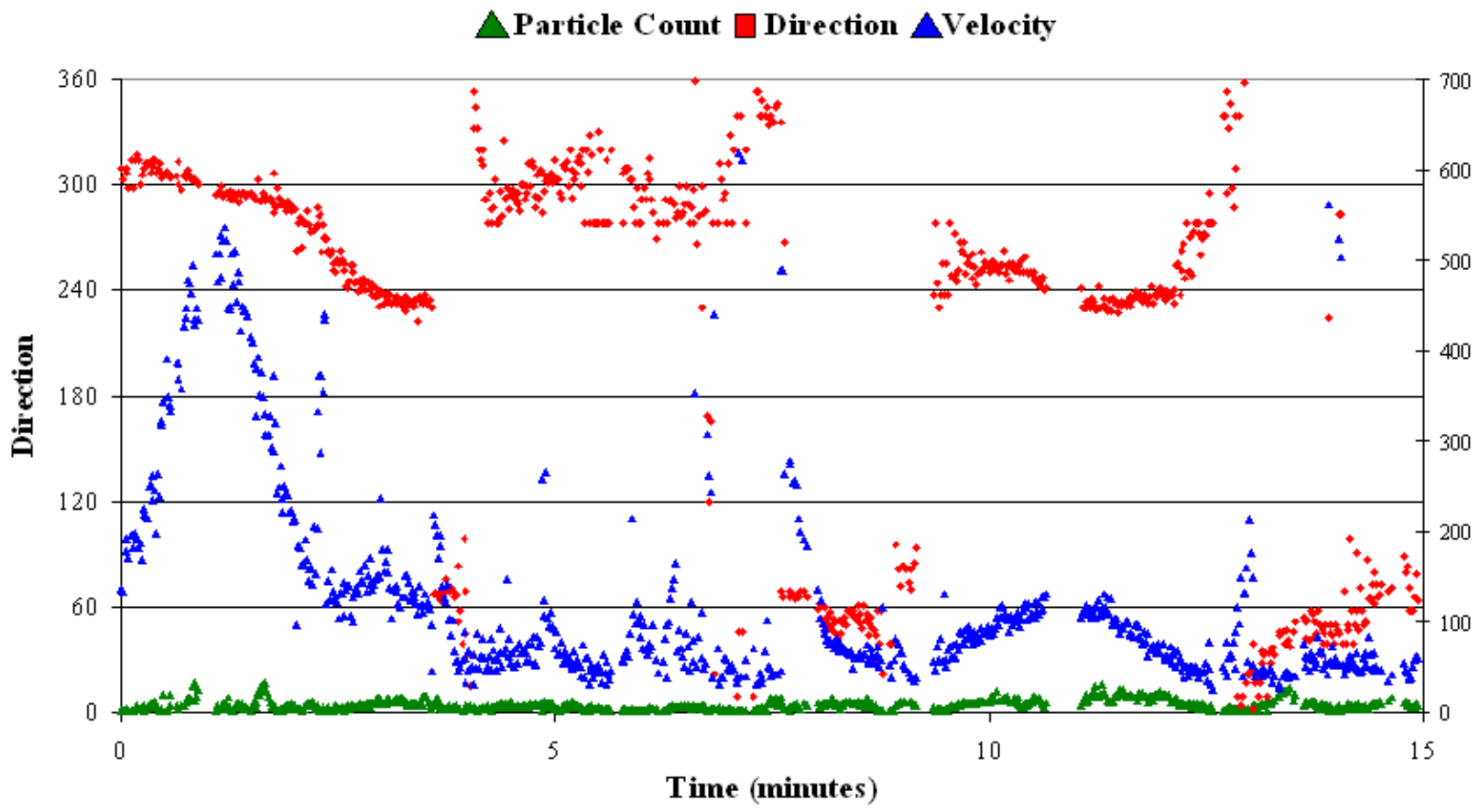
Swirling Non-Directional Flow Zone 464 Ft BGS



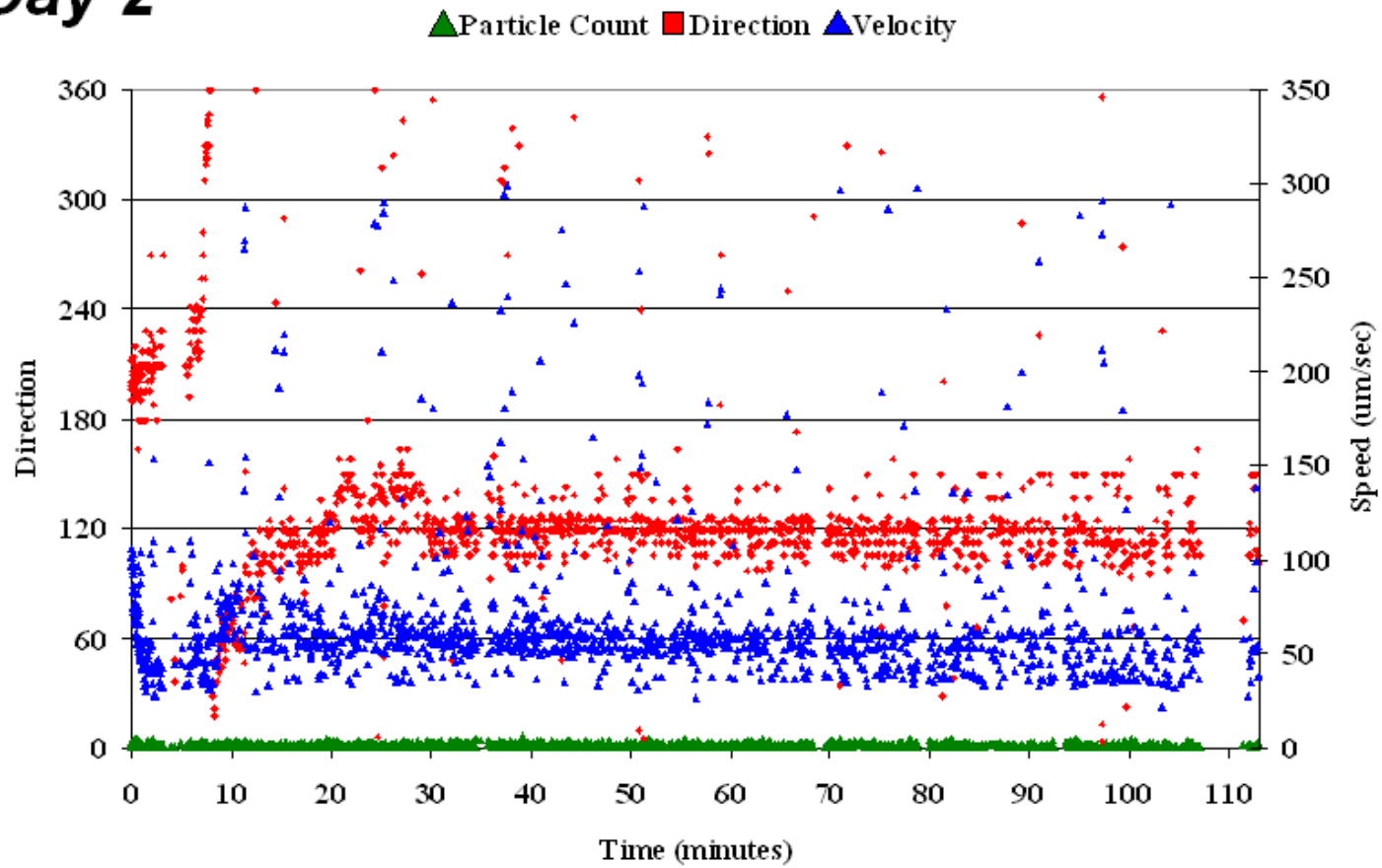
Swirling Non-Directional Flow Zone 465 Ft BGS



Swirling Non-Directional Flow Zone 483 Ft BGS

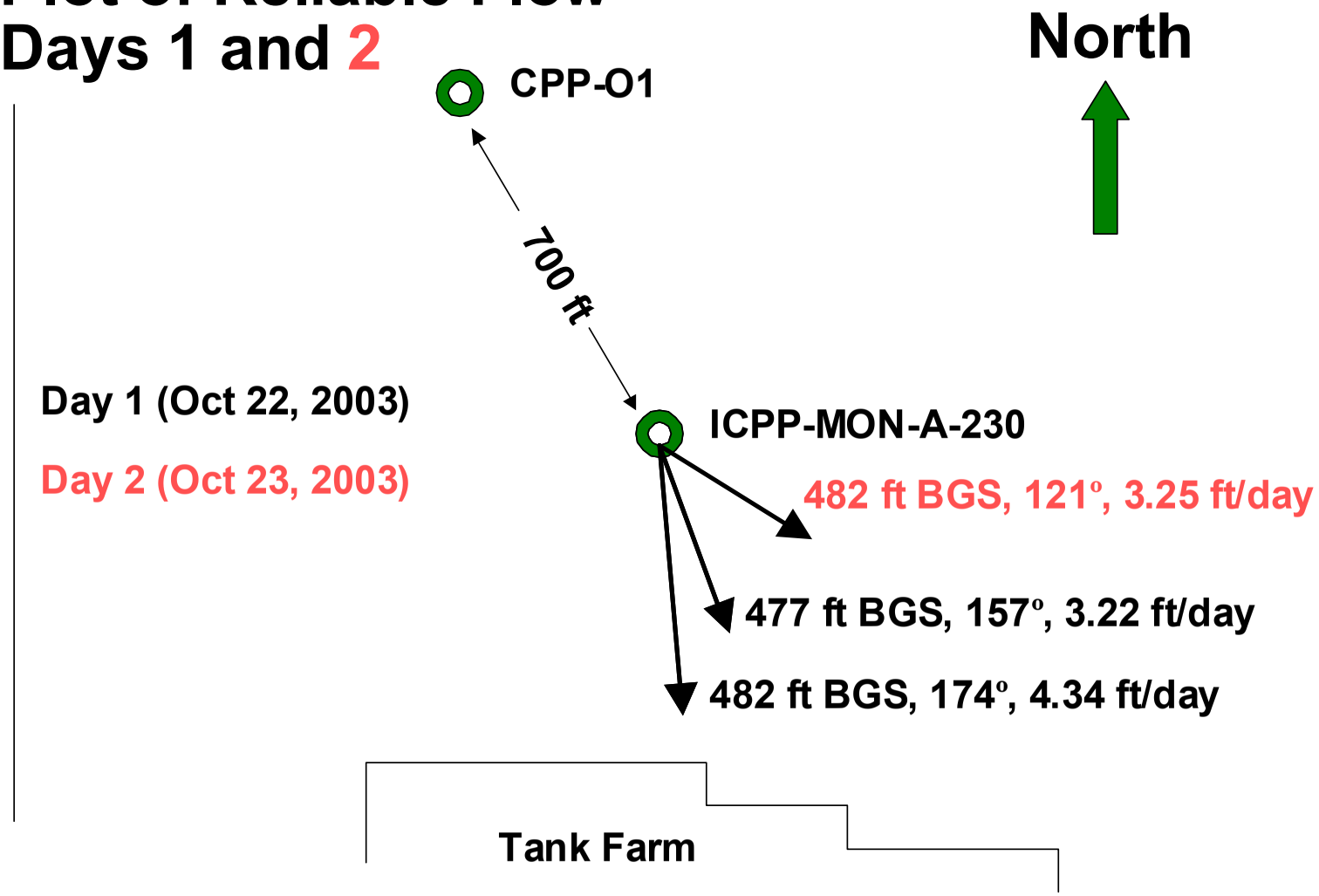


Reliable Flow at 482 Feet BGS Day 2



Average Direction: 121 - Average Velocity: 46 um/sec - Average Seepage Velocity: 3.25 ft/day

Plot of Reliable Flow Days 1 and 2



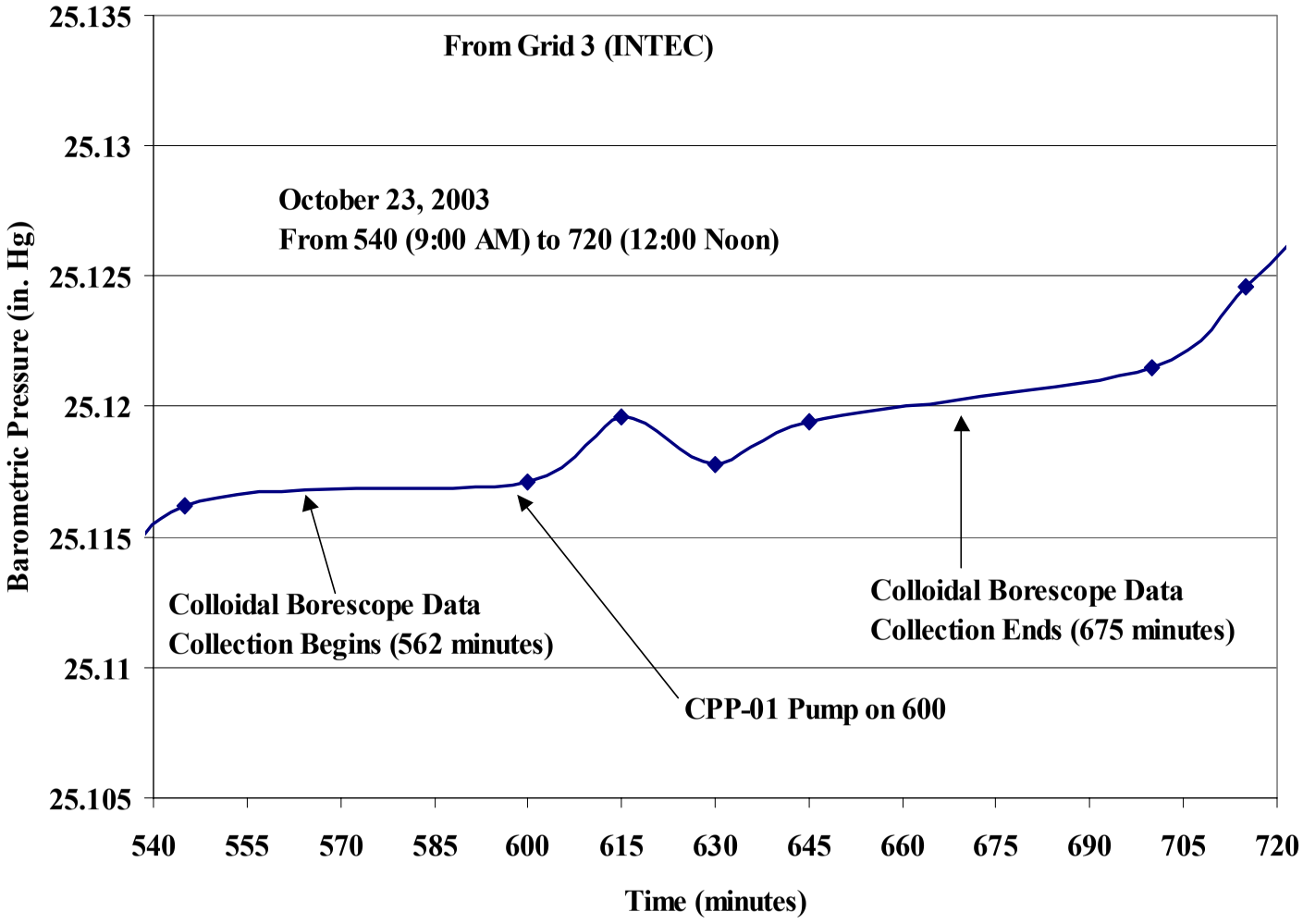
Did CPP-01 Influence Flow Direction?

- *Data collection at ICPP-MON-A-230 began at 9:22 AM on day 2*
- *Production pump at CPP-01 turned on at 10:00 AM, 2,906 gpm*

Minutes Before CPP-01 Turned On		
Time Interval	Direction (degrees)	Velocity (μm/sec)
0 to 10	128	67
10 to 20	not rep. flow	
20 to 30	not rep. flow	
30 to 40	not rep. flow	

Minutes After CPP-01 Turned On		
Time Interval	Direction (degrees)	Velocity (μm/sec)
0 to 10	123	62
10 to 20	124	63
20 to 30	122	56
30 to 40	119	55
40 to 50	120	53
50 to 60	118	56
60 to 70	111	47
70 to 80	111	52

Barometric Pressure



References

- *Kearl, P.M., Korte, N.E., Stites, M,. And Baker, J. 1994. Field comparisons of micro purge vs. Traditional groundwater sampling. Groundwater Monitoring and Remediation, Fall, 183-190.*
- *Shanklin, D.E., 1996. Colloidal Borescope Groundwater Flow Measurements Along the Southern Boundary of the Fernald Environmental Management Project. USDOE, Cincinnati, Ohio, Under Contract DE-AC05-86R21600.*
- *Kearl, P.M. 1997. Observations of particle movement in a monitoring well using the colloidal borescope. Journal of Hydrology, 200, 323-344.*
- *Kearl, P.M., And Roemer, E.K. 1998. Evaluation of groundwater flow directions in a heterogeneous aquifer using the colloidal borescope. Advances in Environmental Research, 2 (1), 12-23.*
- *Kearl, P.M., And Roemer, E.K. 1999. Characterization of a fractured aquifer using the colloidal borescope. Advances in Environmental Research, 3 (1).*
- *Korte, N., R. L. Siegrist, P. M. Kearl, M. T. Muck, and R. M. Schlosser. An evaluation of aquifer heterogeneity using multiple methods: Single well tests, pumping tests, tracer tests and the colloidal borescope. Ground Water Monitoring and Remediation (in press).*

Appendix F

INTEC Well Field Capture Zone Analysis

Evaluation of Well Capture Zones at the Idaho Nuclear Technology Engineering Center

F-1 INTRODUCTION AND BACKGROUND

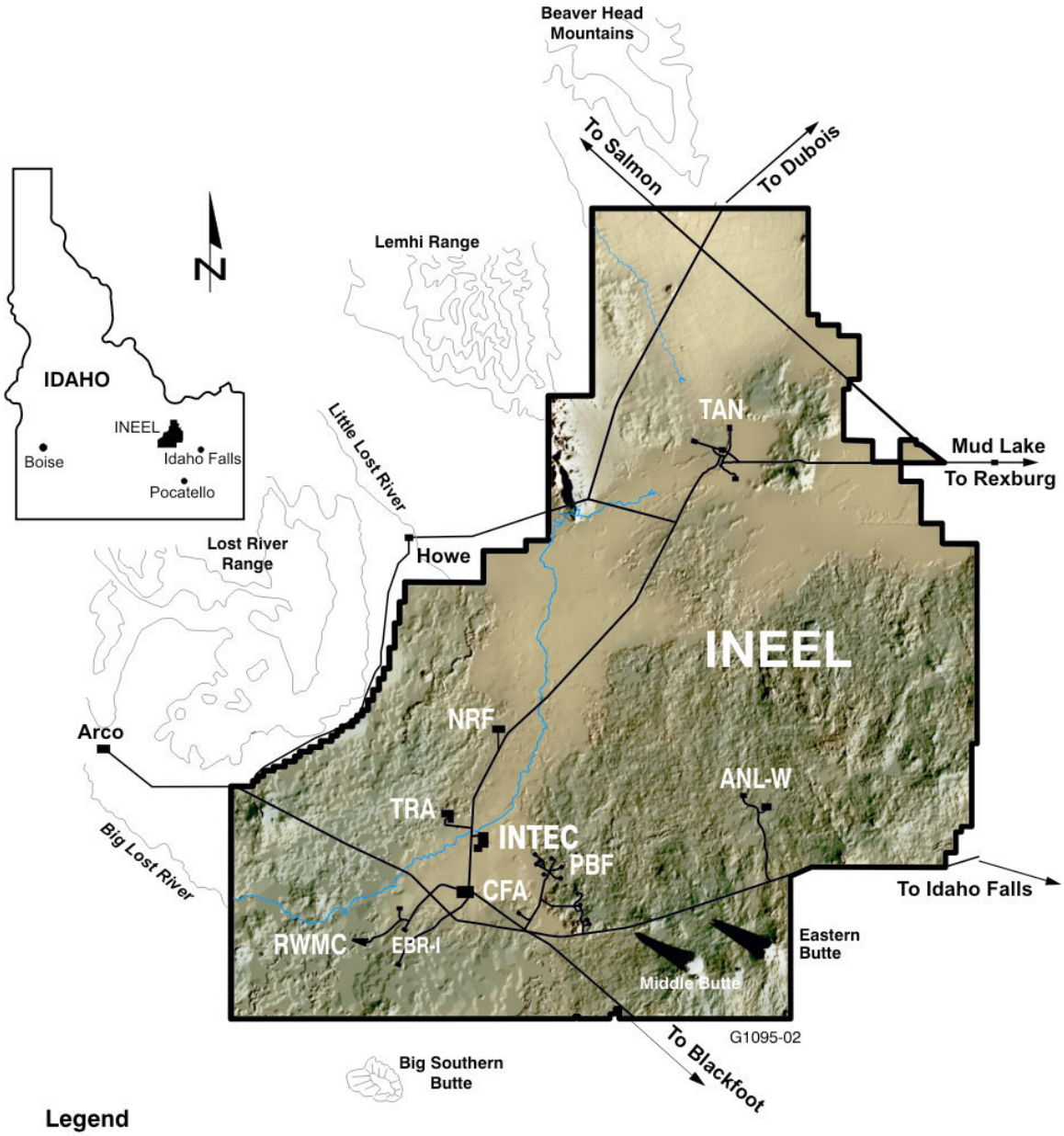
Idaho Nuclear Technology and Engineering Center (INTEC) is a large industrial complex located in the south-central portion of the INEEL. Historically, the mission of INTEC has been to recover fissile uranium by reprocessing spent nuclear fuel. The resulting liquid waste generated from this process was an acidic high-level liquid waste which contained fission products, transuranic elements, and various metals. The liquid waste was temporarily stored in an underground Tank Farm Facility located at the INTEC until the liquid radioactive waste was converted to a solid granular form by a process designated as calcination. During the calcination process, the liquid in the radioactive waste is evaporated and the dissolved metals and fission products are converted to salts and oxides (Palmer et al. 1998). The location of the INEEL, INTEC, and the tank farm is illustrated in Figure F-1.

The Tank Farm Facility includes 11 belowground 300,000-gal tanks in concrete vaults, and four belowground 30,000-gal tanks. Two types of liquid waste have been stored at the Tank Farm Facility. The first is high-level nonsodium-bearing waste, which was generated from first-cycle reprocessing spent nuclear fuel. The second is sodium-bearing waste generated from second- and third-cycle reprocessing and other INTEC operations such as decontamination activities (DOE-ID 1997). The liquid wastes from various INTEC facilities were transferred to the tank farm through a system of interconnected underground pipes. The storage tanks have never leaked, but leaks and spills have occurred during waste transfer activities, thereby releasing contaminants to the alluvial fill material surrounding the tank farm, which may eventually reach the Snake River Plain Aquifer below. The contamination at the INTEC is a site on the National Priorities List and is currently undergoing investigation for remedial actions.

Recent monitoring in a new aquifer well (designated TF-Aquifer or ICPP-MON-A-230), located near the Tank Farm Facility has detected Tc-99 at concentrations exceeding the MCL. The monitoring well is located within the INTEC security fence line and approximately 300 ft north of the tank farm fence line. The detected concentration was 2,220 pCi/L from a water sample collected on May 13, 2003. The Tc-99 drinking water MCL is 900 pCi/L. The previous maximum concentration was 518 pCi/L detected at Well MW-18, located 300 ft south-east of the tank farm in December 1994.

The INTEC has two water production systems designated for industrial process and potable water use and each system has two wells. The process water system produces an average 5,570 m^3/day (1.5 million gpd) from the CPP-1 and CPP-2 wells located near the northern INTEC fence line. The CPP-1 and CPP-2 wells produce 15,525 m^3/day (2,850 gpm) when operating and cycle two times per day for approximately 1.3 hours each cycle. Production is alternated between the CPP-1 and CPP-2 wells every 2 weeks.

The potable water system produces an average of 136 m^3/day (36,000 gpd) from the CPP-4 and CPP-5 wells located approximately 240 m north of the northern INTEC fence line. The CPP-4 well produces 2,453 m^3/day (450 gpm) when operating and cycles three times per day for approximately 0.45 hours each cycle. The CPP-5 well produces 818 m^3/day (150 gpm) when operating and cycles three times per day for approximately 1.3 hours each cycle. Production is alternated between the CPP-4 and CPP-5 wells every 24 hours.



Legend

ANL-W	=	Argonne National Laboratory-West
CFA	=	Central Facilities Area
EBR-I	=	Experimental Breeder Reactor I
INEEL	=	Idaho National Engineering and Environmental Laboratory
INTEC	=	Idaho Nuclear Technology and Engineering Center
NRF	=	Naval Reactors Facility
PBF	=	Power Burst Facility
RWMC	=	Radioactive Waste Management Complex
TAN	=	Test Area North
TRA	=	Test Reactor Area

Figure F-1. Map showing the location of the INEEL and INTEC (from Figure 1 of DOE-ID [2002])

F-1.1 INTEC Hydrogeology

The hydrogeologic setting of the INTEC is very complex, consisting of alternating layers of basalt and sediments. In the vadose zone, numerous perched water bodies have formed beneath surface recharge sources. The geology of the aquifer is more uniform in the vertical direction than that of the vadose zone. The older and deeper basalt flows in the aquifer tend to be thicker than the vadose zone basalt flows, and the sedimentary interbeds are fewer in number. The lowermost basalt flow in the aquifer is thought to have a lower permeability and be significantly thicker than the overlying basalt flows.

The Snake River Plain Aquifer is located approximately 137 m below land surface. The aquifer can behave as either a semi-confined or confined system. Local confining conditions exist below some interbeds and low permeability basalt layers. The Big Lost River flows adjacent to the northern INTEC facility boundary and is an intermittent stream.

Several isolated perched water zones have developed under the tank farm as result of INTEC operations and natural recharge from precipitation and the Big Lost River. Possible INTEC anthropogenic perched water and aquifer recharge sources include a sewage treatment lagoon, below-grade subsurface steam disposal vents, water supply line leaks, and landscape irrigation. In August 2002, the percolation ponds were moved to a new location 2 miles west. A cartoon of the INTEC subsurface is illustrated in Figure F-2.

F-2 OBJECTIVES

Capture zone analysis of the INTEC production wells (CPP-1, -2, -3, and -4) was performed to determine if these wells capture water beneath the tank farm. The analysis used the MODFLOW (MacDonald and Harbaugh 1988) and MODPATH (Pollock 1994) computer software. MODFLOW is a three-dimensional groundwater flow simulator produced by the United States Geological Survey and MODPATH is particle tracking companion software for MODFLOW. The MODFLOW and MODPATH software was used to simulate steady-state and transient flow paths to the INTEC production wells.

F-3. MODEL ASSUMPTIONS AND IMPLEMENTATION

F-3.1 Simulation Domain

The simulation domain was 3-dimensional, extended 2,400 × 2,400 m in the horizontal direction, 240 m in the vertical direction, and was centered on the CPP-1 Production Well. The numerical grid used 40- × 40-m grid blocks in the horizontal and 12-m grid blocks in the vertical directions. Figure F-3 illustrates a plan view of the model domain and location relative to the INTEC facility and the Test Reactor Area, which is located north-west of the INTEC.

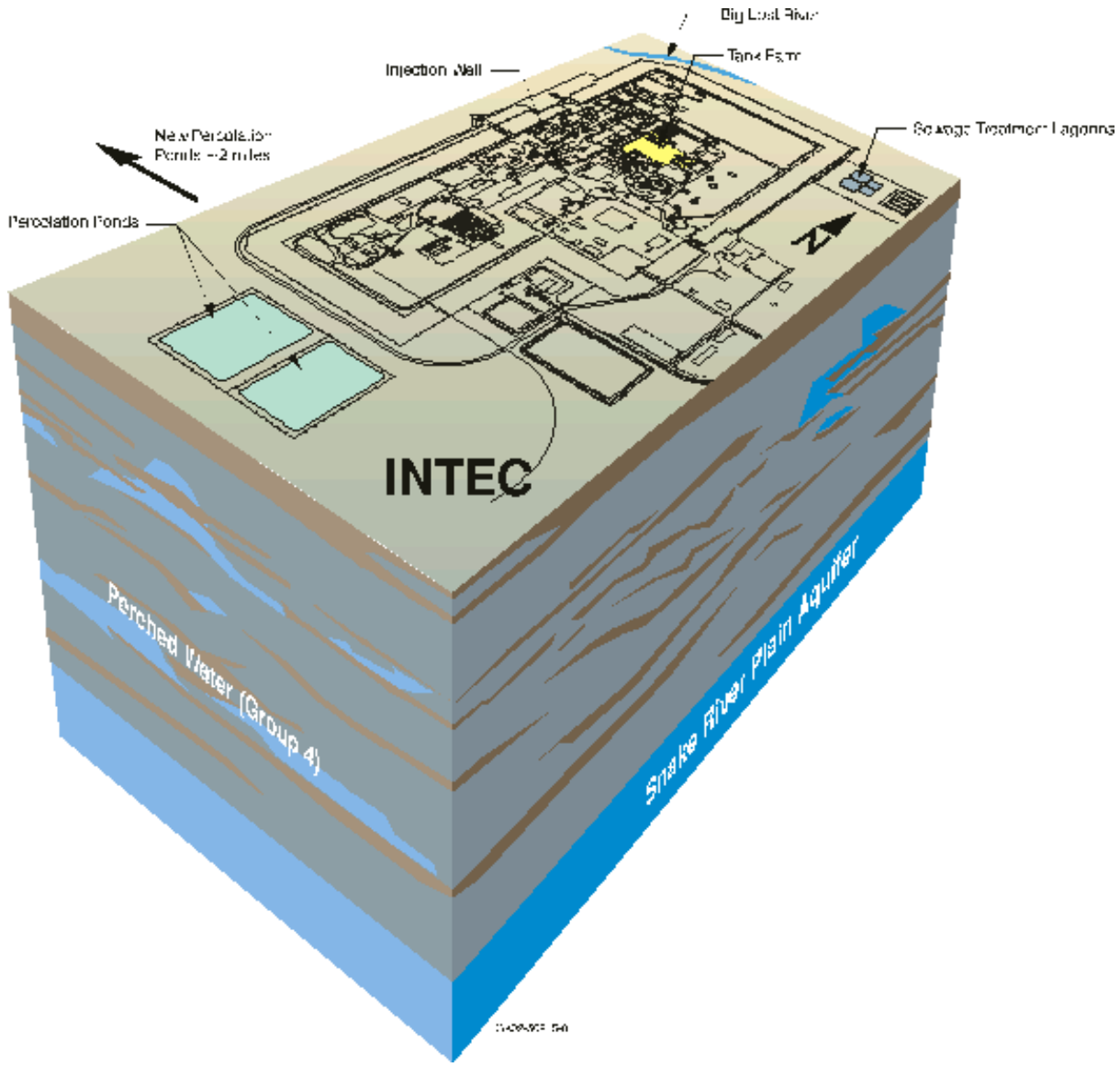


Figure F-2. Cartoon illustrating the INTEC facility footprint and subsurface (from Figure 2-2 of DOE-ID [2003])

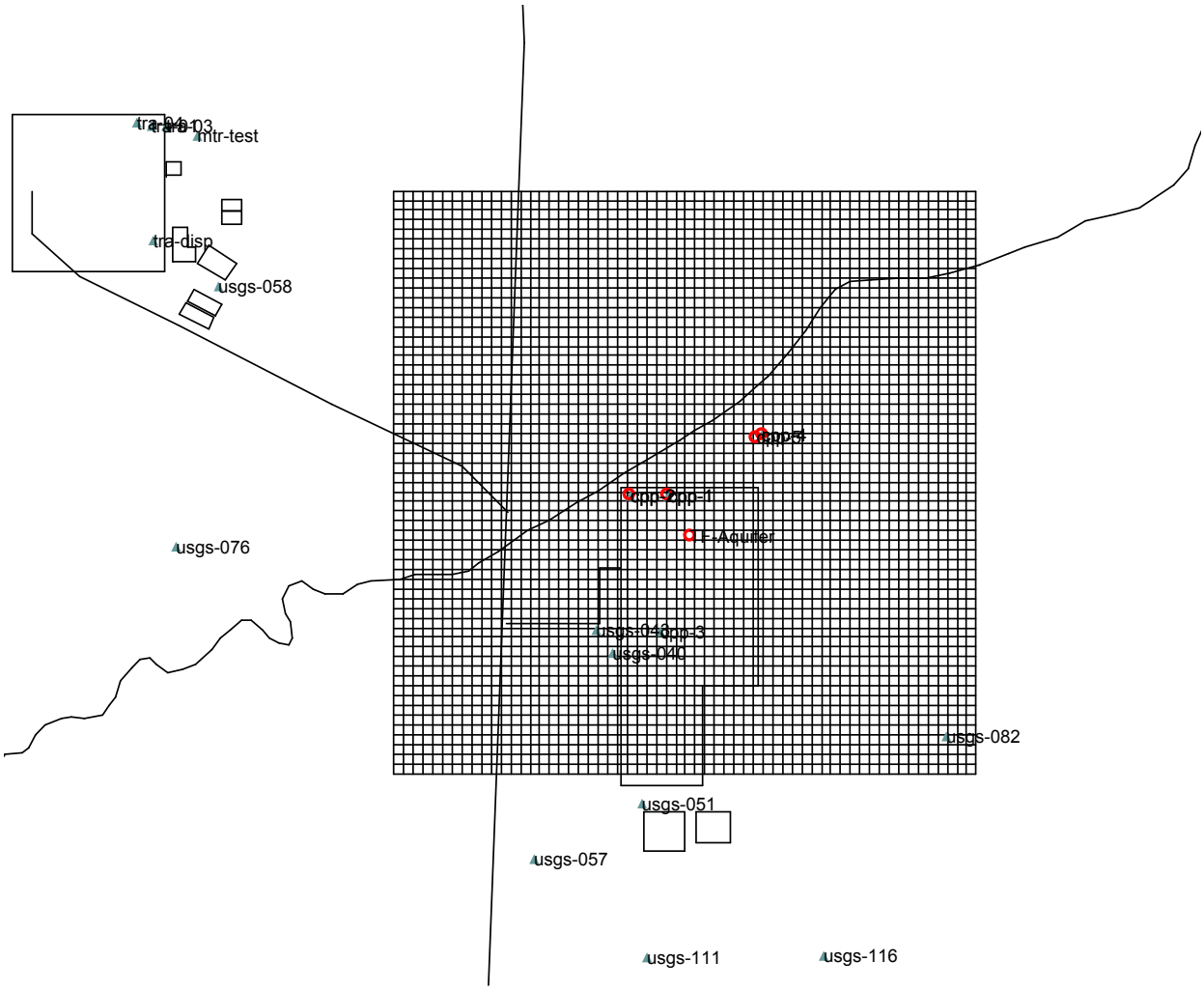


Figure F-3. INTEC production well capture zone model domain.

F-3.2 Boundary Conditions

The capture zone model was parameterized from the Group 5 aquifer model (DOE-ID 2004). The capture zone model lateral boundary conditions were specified head and were estimated from the Group 5 aquifer model's simulated aquifer gradient. These boundary conditions provided a hydraulic gradient of approximately 1/2000 in the capture zone model area.

The Group 5 aquifer model was used to estimate the gradient in the capture zone area because direct measurements of the aquifer potentiometric surface from observation wells do not provide a reliable estimate of aquifer gradient and direction on a local scale. Direct measurement of the aquifer potentiometric surface is unreliable because of measurement error due to barometric effects, well bore deviation, and measurement device accuracy and/or precision. Barometric effects limit well accuracy to approximately ±0.5 m at the INEEL. Well bore deviation can limit accuracy to approximately ±1 m and the accuracy of steel measuring tapes may be limited to approximately ±0.1 m due to tape stretch and temperature effects. Most INEEL wells have been surveyed and corrected for well bore deviations, thus, most measurements are limited to ±0.5 m. This error is approximately 1/2 the aquifer gradient, which is 1.2 m, across the simulated aquifer domain. The Group 5 regional aquifer model adequately matched the large-scale aquifer gradient from north of the INTEC to the southern INEEL boundary.

The capture zone model surface boundary conditions were specified flux, which included surface recharge from the Big Lost River, precipitation and INTEC facility water sources. The surface recharge rates were estimated from the OU 3-13 RI/BRA (DOE-ID 1997). The flow path analysis considered transient effects of the process water wells, but only considered steady-state effects of the potable water wells. The well production rates were estimated from current INTEC well operation logs. The surface recharge rates are presented in Table F-1 and the production well rates are presented in Table F-2.

Table F-1. Capture zone model surface recharge.

Recharge Source	Total Water Release Rate (kg/day)	Recharge Area (m^2)	Flux (m/day)
Big Lost River	897,871	96,000	0.0094
Precipitation outside fenced area (1 cm/yr)	141,667	5,174,400	0.000027
Precipitation inside fenced area (10 cm/yr)	160,328	585,600	0.00027
Water system leaks	41,300	313,200	0.00013
Landscape irrigation	16,300	313,200	0.00005
Sewage treatment lagoon	155,600	313,200	0.00050
Steam vent discharge	13,500	313,200	0.00004
Total Recharge Inside Fence Line			0.00100

Table F-2. INTEC production well rates and screen locations.

Well	Transient Rate (m^3/day)	Transient Period (days)	Pumping Frequency (1/day)	Average Rate for the Period April-July, 2003 (m^3/day)	Screened Interval Depth Below Simulated Water Table (m)	Simulation Vertical Grid Block (from surface @ 12 m each)
CPP-1	16353	0.170	2	2785	2.9-10.9 and 23.5-38.6	1 and 3
CPP-2	Pumping alternates between CPP-1 and CPP-2 every 2 weeks			2785	1.8-9.5 and 30.1 and 45.1	1 and 4
CPP-4	2453	0.019	3	68.29	1.9-45.2	1,2,3, and 4
CPP-5	818	0.056	3	68.29	85.6 open hole	1,2,3,4,5,6, and 7

F-3.3 Hydrologic Parameters

The Group 5 aquifer model (DOE-ID 2004) used three lithologic units, which included an upper basalt layer located above a sedimentary interbed, the interbed (designated as the HI interbed), and a lower basalt layer located below the interbed. The Group 5 model's parameterization of these three lithologic units was performed using aquifer well test data, laboratory analysis of core, and regional scale modeling. Spatial analysis of well test data was used to parameterize the upper basalt, well test data and core analysis were used to parameterize the HI interbed, and hydraulic conductivity taken from the WAG 10 regional model (McCarthy et al. 1995) was used to parameterize the lower basalt. The HI interbed tends to dip in the southeast direction and rises above the water table in the vicinity of the INTEC tank farm. The Group 5 model's upper basalt layer included the top 25 m of aquifer located below the HI interbed, and within 25 m of the water table in the region where the HI interbed nears the water table. This was done because well test data were available to parameterize the basalt located beneath the HI interbed in this region.

The capture zone modeling used a simplified lithology based on the Group 5 aquifer model, which only included the upper and lower basalt layers. The upper basalt layer was 24 m thick and was parameterized from interpolation of the Group 5 model's well test data onto the finer grid. The lower basalt layer was 216 m thick and was parameterized from the Group 5 model's lower basalt layer. The HI interbed was excluded from the capture zone model because a large fraction of the capture zone model area is located where the HI interbed rises above the water table.

The Group 5 aquifer model was calibrated to very early (1950s) tritium disposal in an aquifer injection/disposal well and the resulting tritium plume. Matching the historical tritium plume originating from the INTEC disposal well operations required reducing the interpolated hydraulic conductivity field by a factor of 2. Reducing the interpolated hydraulic conductivity field most likely corrected the bias in the hydraulic conductivity estimated from well tests. Water production wells are usually completed in the most productive depth encountered during drilling, which may not represent the large-scale hydraulic conductivity of the aquifer. This correction was also applied to the capture zone model's upper basalt layer. Table F-3 presents the capture zone model hydrologic parameters and Figure F-4 illustrates the upper basalt layer hydraulic conductivity field.

The capture model used the MODFLOW convertible layer option, which converts a grid block from confined to unconfined as the water level in the grid block falls below the top of the grid block.

Table F-3. Capture zone model hydrologic parameters.

Parameter	Value
Upper basalt (model surface to 25 m)	Hydraulic conductivity field (see Figure F-4)
Lower basalt (25 m to model bottom)	70.1 (m/day)
Porosity	0.03 (dimensionless)
Horizontal to vertical anisotropy	10 to 1 (dimensionless)
Specific storage	0.0005 (dimensionless)
Specific yield	0.03 (dimensionless)

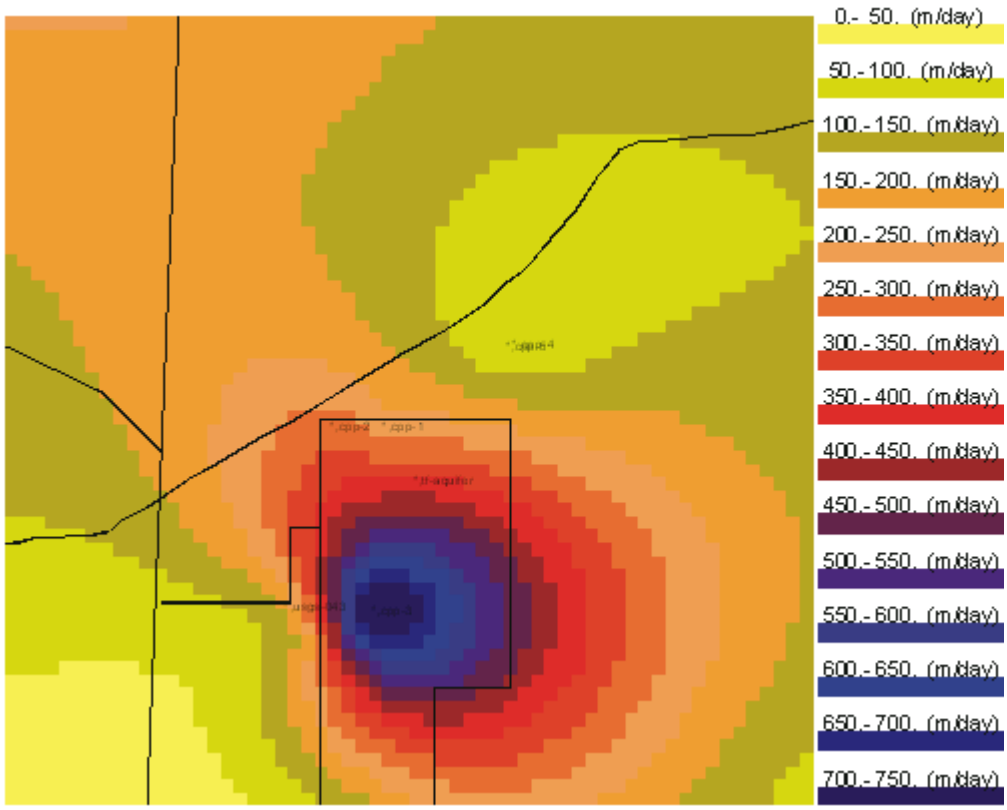


Figure F-4. Upper basalt hydraulic conductivity field.

F-4. SIMULATION RESULTS

F-4.1 Steady-State Results

The most conservative surface recharge scenario for estimating the production well capture zones would include INTEC facility recharge without the Big Lost River. The Big Lost River is located north of the production wells, and the resulting groundwater mound would increase the overall north-south gradient, thus decreasing the southern extent of the production well capture zones.

The steady-state simulations were used to evaluate capture zone sensitivity to surface recharge from INTEC operations and the Big Lost River. The simulations included three scenarios assuming the following recharge conditions:

- Steady-state pumping with surface water recharge originating from the northern INTEC, which included precipitation, water system leaks, landscape irrigation, steam condensate, sewage treatment ponds, and the Big Lost River. All the recharge rates were estimated from Table 1-8 of the OU 3-13 RI/BRA, Appendix F (DOE-ID 1997). The northern INTEC recharge was distributed uniformly over the area within the northern INTEC fence line and the Big Lost River recharge was distributed over grid blocks under the river's path. The Big Lost River recharge was estimated from the average losses between the INEEL diversion dam and Lincoln Boulevard for the period 1967–1987.

- INTEC surface recharge noted in Bullet 1 without the long-term average Big Lost River recharge.

- Steady-state pumping without surface recharge.

F-4.1.1 Steady-State Pumping, INTEC Facility Surface Recharge, and Big Lost River Surface Recharge

The steady-state pumping simulation with INTEC and Big Lost River recharge indicates the process well capture zone will extend approximately midway between the CPP-1 production well and the tank farm aquifer well. The lateral extent of the capture zone is approximately 360 m east or west of each well at the model's northern boundary. The vertical extent of the capture zone is approximately 120 m below the water table. The steady-state capture zone extends within approximately 80 m of the tank farm aquifer well. Drawdown at the CPP-1 production well is approximately 0.22 m over a 40- × 40-m area (1 model grid block). Figure F-5 illustrates the flow pathlines and aquifer potentiometric surface in plan view. Figure F-6 illustrates the flow pathlines in side view looking west, and Figure F-7 illustrates the flow pathlines in side view looking north.

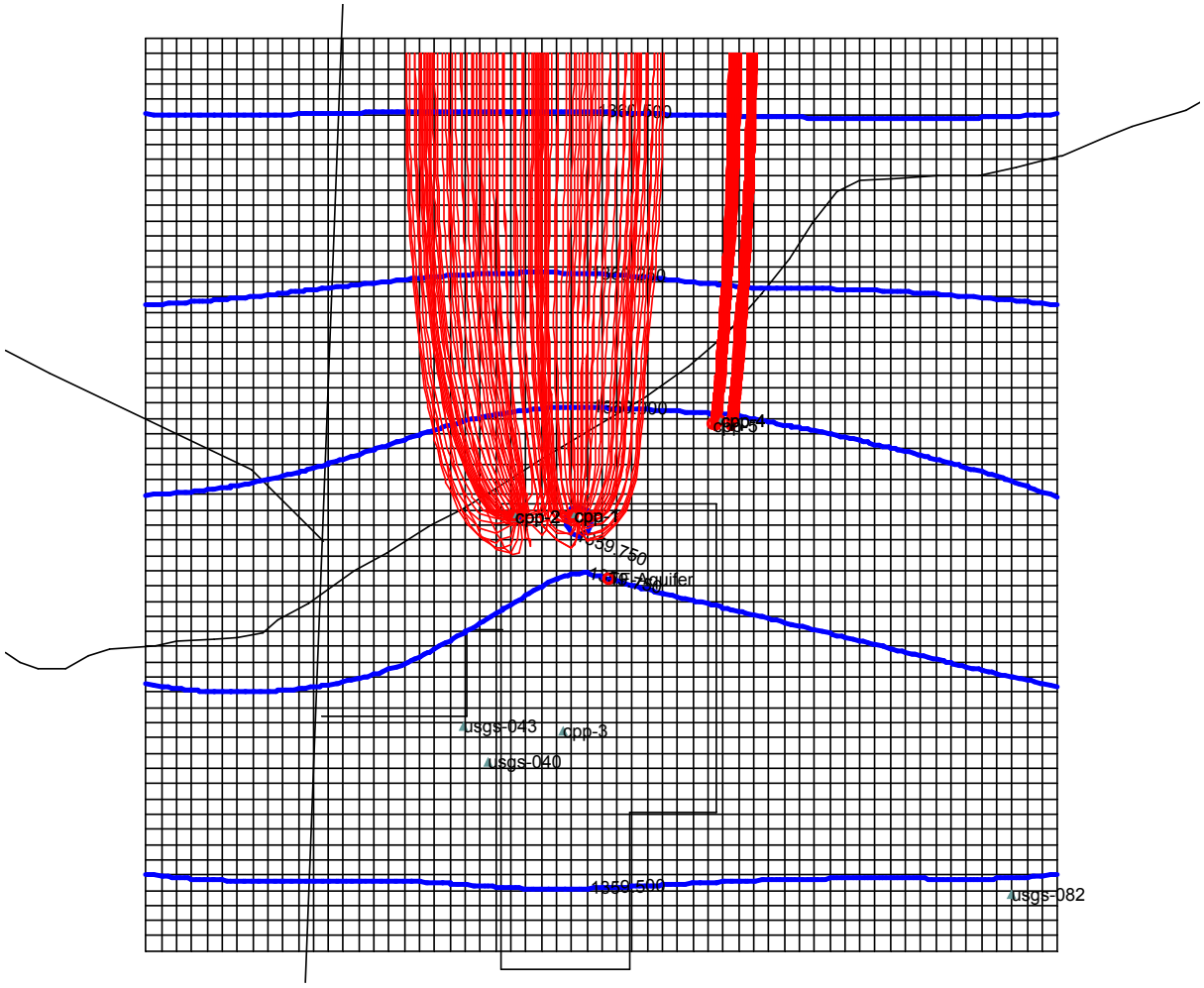


Figure F-5. Steady-state pumping with INTEC and Big Lost River recharge flow pathline plan view.

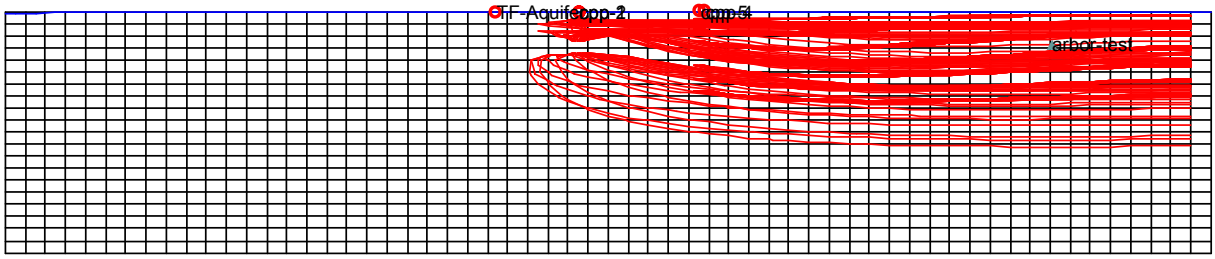


Figure F-6. Steady-state pumping with INTEC and Big Lost River recharge flow pathline side view looking west with 2x vertical exaggeration.

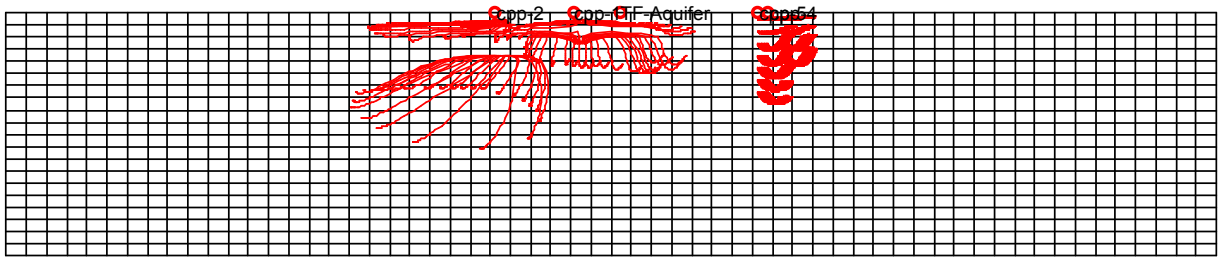


Figure F-7. Steady-state pumping with INTEC facility and Big Lost River recharge flow pathline side view looking north with 2x vertical exaggeration.

F-4.1.2 Steady-State Pumping and Surface Recharge Sensitivity

Removing the Big Lost River and/or INTEC facility surface recharge did not have a dramatic affect on aquifer potentiometric surface. The volume of recharge water is small and distributed over a large area compared to the volume of water extracted from the process water production wells. The daily total volume of water related to INTEC operations was approximately 227 m^3. The daily total volume of water related to the Big Lost River was 898 m^3/day. The average combined production rate of the CPP-1 and CPP-2 production wells was 2,785 m^3/day.

The steady-state simulations with and without surface recharge indicated well capture zones are not significantly changed by the Big Lost River or INTEC facility recharge sources. However, the INTEC facility recharge did not include the relocated percolations ponds (the final recipient of the process water), which were relocated from the southern end of the INTEC facility to a new location approximately 2 miles west of the INTEC facility. Figure F-8 illustrates the flow pathlines and aquifer potentiometric surface in plan view without Big Lost River recharge, and Figure F-9 illustrates the flow pathlines and aquifer potentiometric surface in plan view with precipitation recharge only.

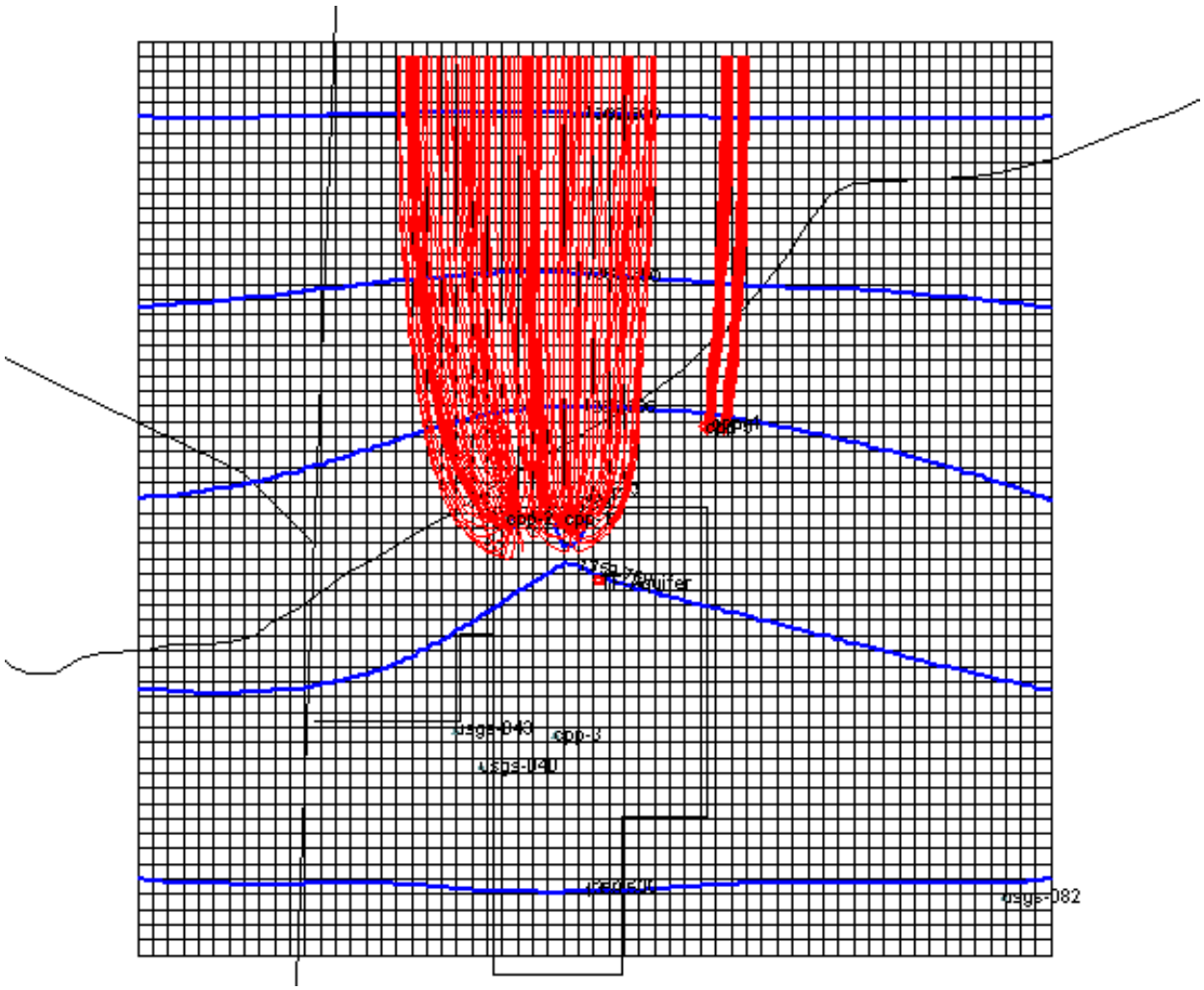


Figure F-8. Flow pathline plan view with steady-state pumping without Big Lost River (INTEC facility recharge and precipitation recharge only).

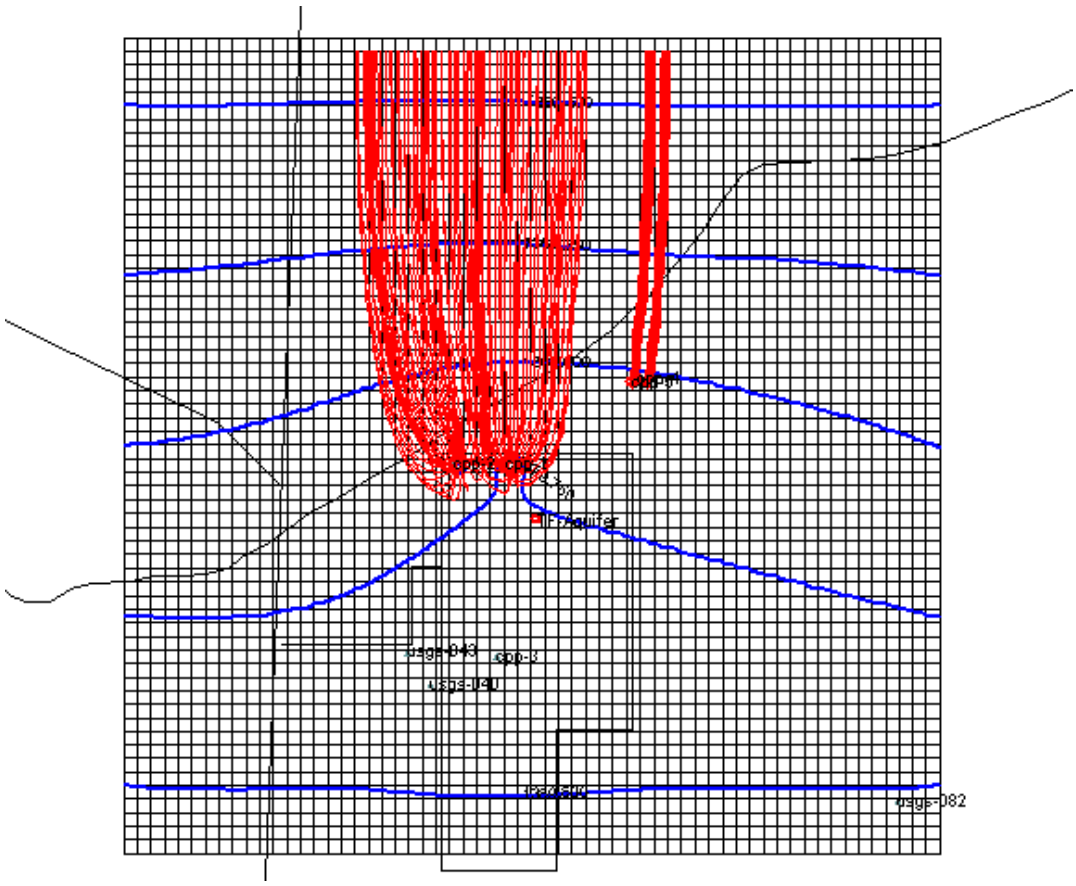


Figure F-9. Flow pathline plan view with steady-state pumping without Big Lost River or facility recharge (precipitation recharge only).

F-4.2 Transient Results

The transient simulations provide the most realistic evaluation of the INTEC production well capture zones but were only performed for a relatively short period of time compared to INTEC operational history because of computational restraints. The twice-daily cycle and large production volume of the process water wells require a large number of simulation time steps even for a short simulation period. The transient analysis was performed to determine sensitivity to the bi-daily cycling and bimonthly switching between the CPP-1 and CPP-2 wells. Two transient simulations were performed to evaluate the transient pumping effects. The first considered a 2-week simulation of transient well CPP-1 operation, which was compared to a 2-week steady-state CPP-1 well operation simulation. The second simulation considered a 14-month simulation with bimonthly switching between the CPP-1 and CPP-2 wells, which was compared to a 14-month steady-state simulation of the CPP-1 and CPP-2 wells.

F-4.2.1 Transient Simulation of Cycling Well CPP-1

The twice-daily cycling of the CPP-1 well did not have a significant impact on the simulated well capture zone. This is because the short pumping cycle and recovery period did not allow the aquifer to completely recover between cycles. The only difference between the steady-state and transient simulation flow paths was a slight zigzag pattern within the transient flow paths. Figure F-10 illustrates the flow pathlines plan view after 14 days of transient cycling in Well CPP-1, and Figure F-11 illustrates the flow pathlines plan view after 14 days of steady-state pumping in Well CPP-1.

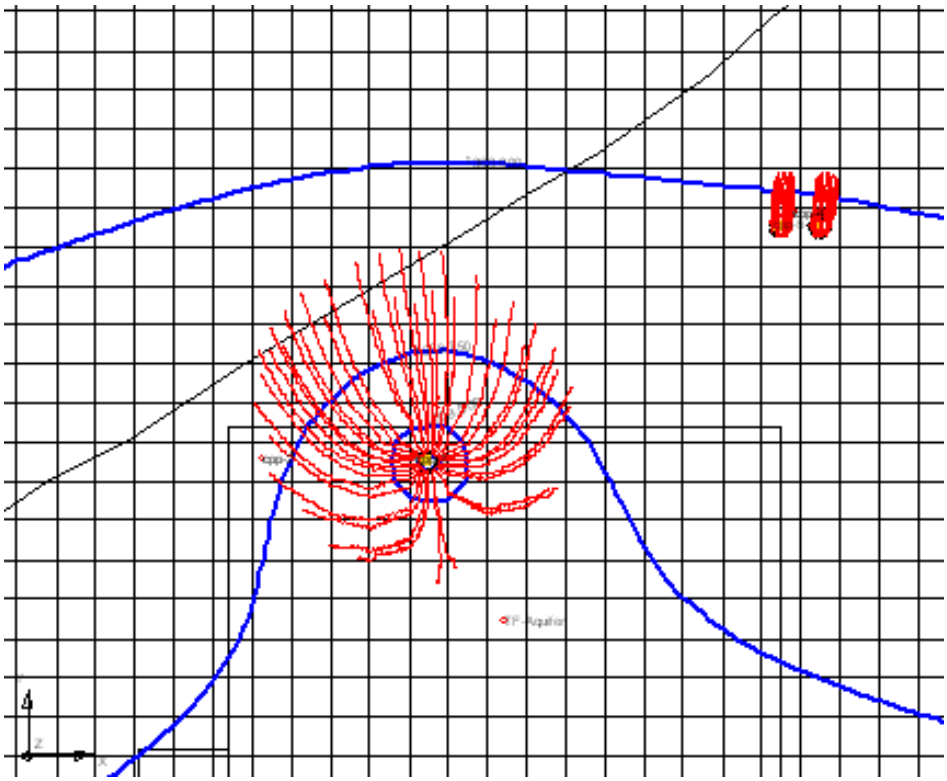


Figure F-10. Flow pathlines plan view for 14 days of Well CPP-1 transient cycling.

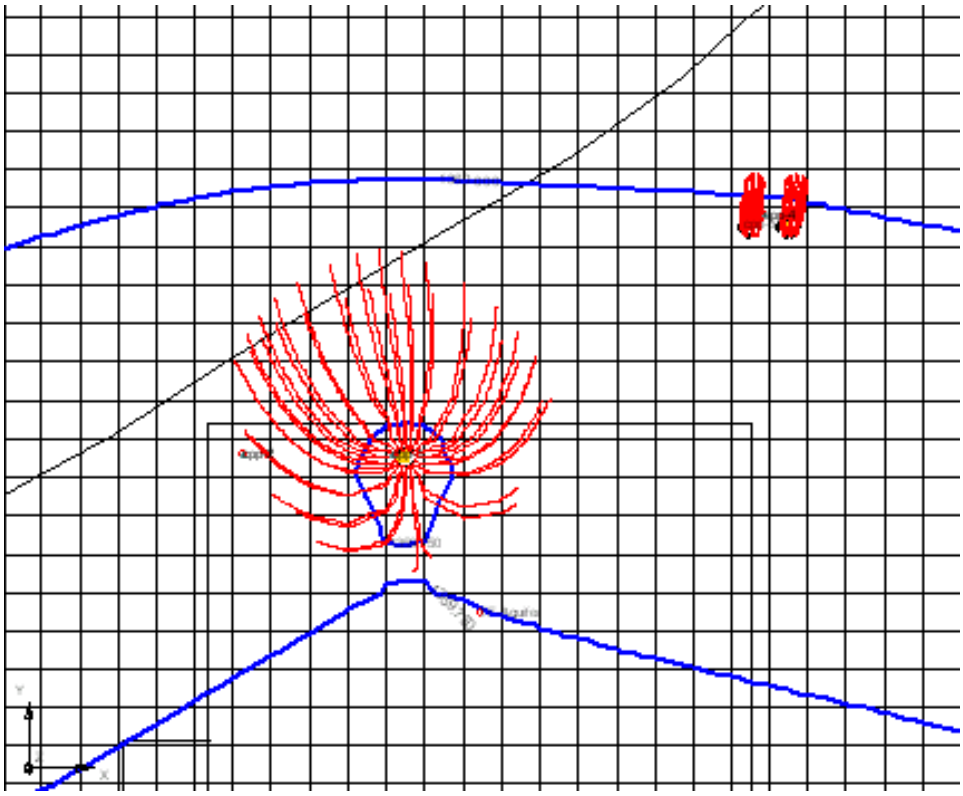


Figure F-11. Flow pathline plan view for 14 days of steady-state Well CPP-1 production.

F-4.2.2 Transient Simulation of Cycling Between Wells CPP-1 and CPP-2

The transient well switching simulation indicates the CPP-1 well capture zone extends to within approximately 40 m of the tank farm aquifer well. The bimonthly switching between CPP-1 and CPP-2 as the process water producer has a large impact on capture zone because the 2-week operation period and the 2-week inactive period allows the aquifer drawdown to reach steady state during pumping and fully recover during the shutdown period. Drawdown at the CPP-1 production well is approximately 0.37 m over a 40- × 40-m area (1 model grid block) at the end of the 14-day operation period. Figure F-12 illustrates the flow pathlines plan view after 784 days of bimonthly switching between wells CPP-1 and CPP-2. Figure F-13 illustrates the flow pathlines plan view after 784 days of steady-state pumping in Wells CPP-1 and CPP-2.

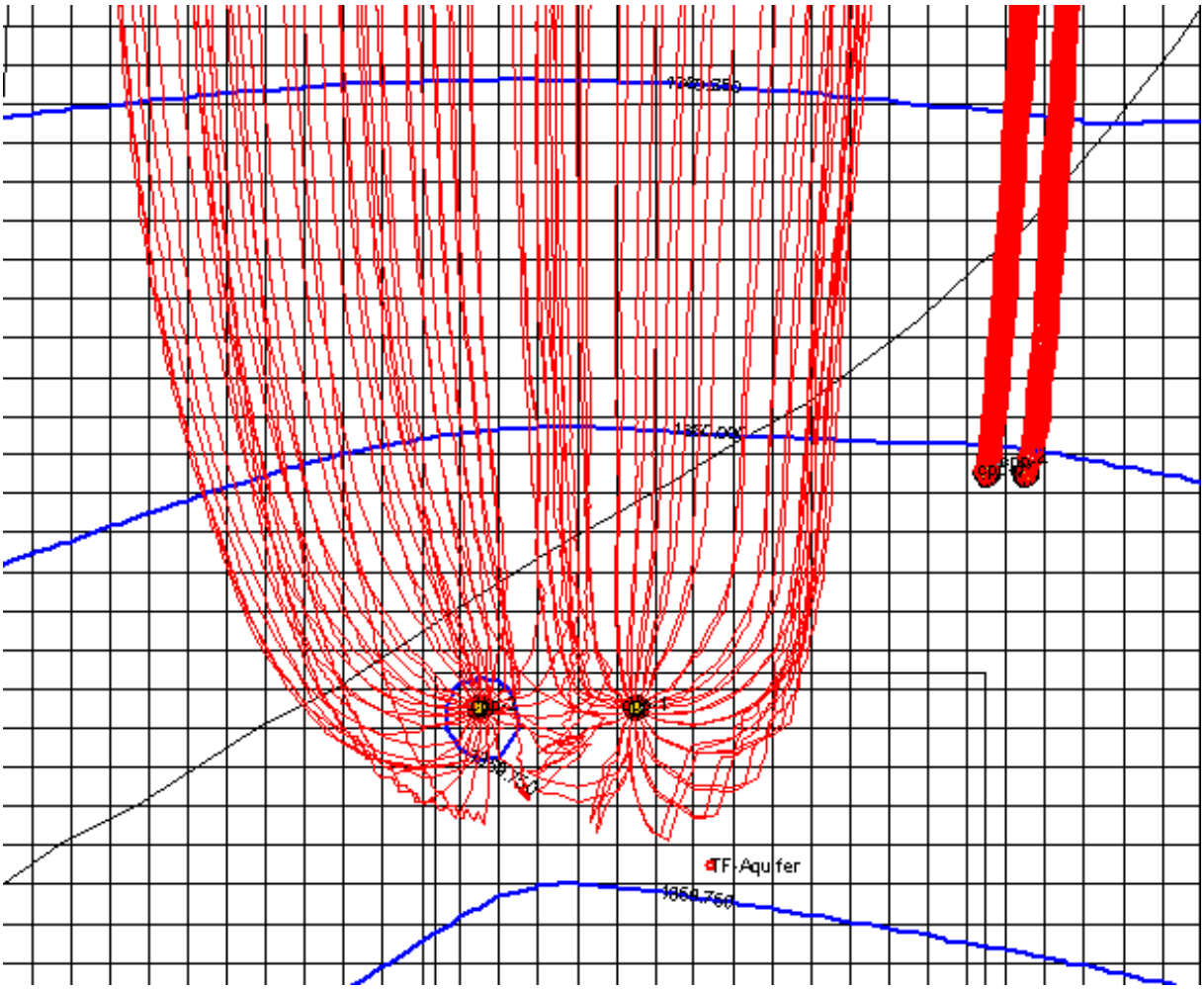


Figure F-12. Flow pathline plan view for 784 days of bimonthly alternating between Well CPP-1 and Well CPP-2.

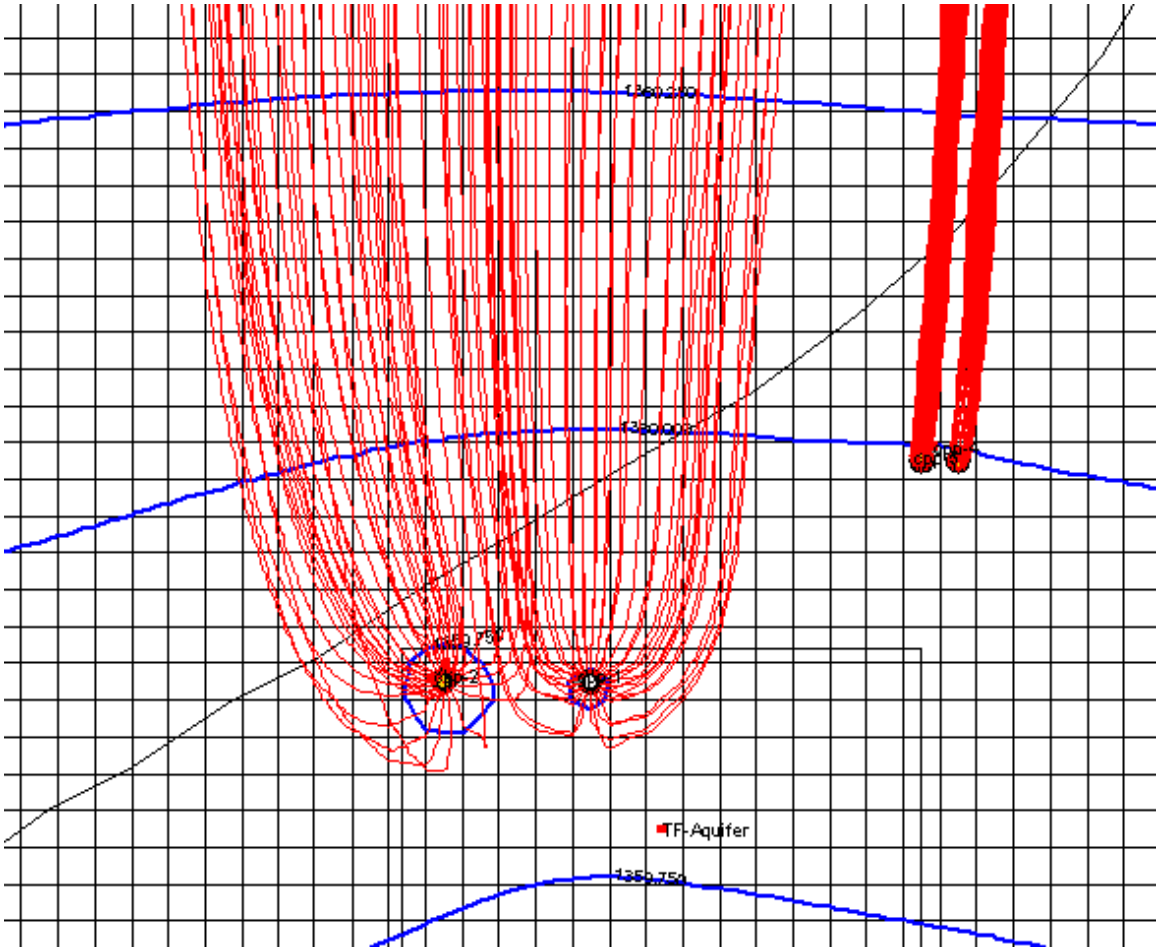


Figure F-13. Flow pathline plan view for 784 days of steady-state Well CPP-1 and Well CPP-2 production.

F-5. CONCLUSIONS

The relatively small production rate (approximately 68 m^3/day each) in potable water wells (CPP-4 and CPP-5) compared to the process water wells (CPP-1 and CPP-2) and large aquifer permeability results in the capture zones extending less than 20 m south of the well locations. Conversely, the process water wells' production rate (approximately 2,785 m^3/day each) results in a very large capture zone extending approximately 150 m south or 3/4 of the distance to the tank farm aquifer well.

Sampling of the two potable water wells was performed on August 18, 2003, after detection of the high Tc-99 in the tank farm well and Tc-99 was not detected. This confirms the simulations in this report that potable water wells have not been impacted by the tank farm contamination. The process water wells may be impacted by the contaminated water beneath the tank farm, if the recent high Tc-99 detections represent an area extending beyond approximately 40 m northwest of the tank farm aquifer well. However, mixing of the contaminated water with clean water in the large capture zone will most likely result in sufficient dilution to prevent production water from exceeding the MCL. Preliminary results of sampling of the process water production wells performed in October 2003 indicated Tc-99 is present in the process water, but the concentration is far below the MCL.

The process water production wells have the largest impact on aquifer gradient. The CPP-1 well steady-state drawdown is approximately 0.22 m and transient drawdown is approximately 0.37 m. The groundwater mounding resulting from the Big Lost River and other surface recharge sources are only a small fraction of this value and small compared to the large-scale gradient. The steady-state simulations with and without surface recharge indicated well capture zones are not significantly changed by the Big Lost River or INTEC facility recharge sources. The INTEC facility recharge did not include the relocated percolation ponds (the final recipient of the process water), which were relocated from the southern end of the INTEC facility to a new location approximately 2 miles west of the INTEC facility.

The twice-daily cycling of the CPP-1 or CPP-2 wells most likely does not have a significant impact on the simulated well capture zone. However, the bimonthly switching between CPP-1 and CPP-2 as the process water producer has a large impact on capture zone because the 2-week operation period affects a larger area of the aquifer than the daily cycling of each well during operation. The 2-week inactive period after each well's operation allows the drawdown around each to recover to ambient conditions.

It is important to note that the simulations presented in this report assume the fractured basalt aquifer beneath the INTEC behaves as an isotropic equivalent porous media and can be simulated as such. Flow is only considered in the basalt fractures and is assumed to behave as a low-porosity and high-permeability equivalent porous medium. The actual capture zones may be influenced by preferential flow paths due to rubble zones that occur near individual flow top and bottoms. These features may exist on the scale of meters in the vertical to hundreds of meters in the horizontal.

F-6. REFERENCES

DOE-ID, 1997, *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEEL-Part A, RI/BRA Report (Final)*, DOE/ID-10534, U.S. Department of Energy Idaho Operations Office, November 1997.

DOE-ID, 2002, *Annual INTEC Groundwater Monitoring Report for Group 5 – Snake River Plain Aquifer (2001),* DOE/ID-10930, Rev. 0, U.S. Department of Energy Idaho Operations Office, February 2002.

DOE-ID, 2003, *Phase I Monitoring Well and Tracer Study Report for Operable Unit 3-13, Group 4, Perched Water,* DOE/ID-10967, Rev. 1, U.S. Department of Energy Idaho Operations Office, June 2003. (Revision 1 is the public version; Revision 2 is the Official Use Only version.)

DOE-ID, 2004, *Monitoring Report/Decision Summary for Operable Unit 3-13, Group 5, Snake River Plain Aquifer*, DOE/ID-11098, Rev. 0, U.S. Department of Energy Idaho Operations Office, January 2004.

MacDonald, M. G., and A. W. Harbaugh, 1988, *Techniques of Water Resources Investigations of the United States Geological Survey,* Book 6, Chapter A1 "A Modular Three Dimensional Finite Difference Ground-Water Flow Model," U. S Geological Survey, 1998.

McCarthy, J. M., R. C. Arnett, R. M. Neupauer, M. J. Rohe, and C. Smith, 1995, *Development of a Regional Groundwater Flow Model for the Area of the Idaho National Engineering Laboratory, Eastern Snake River Plain Aquifer,* INEL-95/0169, Rev. 1, Lockheed Idaho Technologies Company, Idaho National Engineering Laboratory, March 1995.

Palmer, W. B., C. B. Millet, M. D. Staiger, and F. S. Ward, 1998, *ICPP Tank Planning Through 2012,* INEEL/EXT-98-00339, Lockheed Martin Idaho Technologies Company, April 1998.

Pollock, D. W., 1994, *User's Guide for MODPATH/MODPATH-PLOT, Version 3: A particle tracking post- processing package for MODFLOW, the U. S. Geological Survey finite-difference ground water flow model*, Open-File Report 94-464, U. S. Geological Survey, 1994.

Appendix G

Tc-99 Sources at INTEC

Idaho National Engineering and Environmental Laboratory

INTEROFFICE MEMORANDUM

Date: September 1, 2004

To: J. R. Forbes MS 3419 6-9685

From: M. C. Swenson MS 3404 6-3576

Subject: SOURCE OF ELEVATED TC-99 ACTIVITY IN ICPP-MON-A-230 MONITORING WELL

Summary

The aquifer beneath the Idaho Nuclear Technology and Engineering Center (INTEC) is contaminated with small quantities of radionuclides. Most of the contamination came from the historical disposal of slightly contaminated PEW Evaporator condensate to the service waste system. The service waste was sent to the aquifer via an injection well (and later, two percolation ponds). PEW Evaporator condensate is no longer sent to service waste, but the contamination remains in the aquifer from the past practice. Several monitoring wells have been installed in and around INTEC to monitor the contamination levels in the aquifer. A recent sample from a new monitoring well, ICPP-MON-A-230, contained tritium (H-3) and iodine (I-129) activity similar to that of other wells. However, well ICPP-MON-A-230 contained significantly more technetium (Tc-99) activity than other monitoring wells. The Tc-99 activity in well ICPP-MON-A-230 was nearly two orders of magnitude above that of other monitoring wells and exceeded the drinking water standard.

The differences in the relative quantities of radionuclides in well ICPP-MON-A-230 from those of other wells suggest its contamination came from a different source than the other wells. An evaluation of possible sources of contamination in well ICPP-MON-A-230 was performed. Well ICPP-MON-A-230 is located about 300 feet north of the INTEC Tank Farm where leaks from waste transfer piping contaminated the soil. This report evaluates the possibility that historical leaks from Tank Farm piping are the primary source of the contamination and elevated Tc-99 activity in well ICPP-MON-A-230. The relative quantities of H-3, Tc-99, and nitrate in well ICPP-MON-A-230 are close to those in the waste that leaked into the soil from Tank Farm piping in the late 1960s and early 1970s. The relative amounts of H-3, Tc-99, and nitrate in well ICPP-MON-A-230 do not correlate with the composition of the PEW Evaporator condensate and service waste that were sent to the aquifer via the injection well. Based on the relative amounts of the contaminants, historical Tank Farm piping leaks are a more likely source of the contamination in well ICPP-MON-A-230 than the service waste discharges. Details of the analysis leading to this conclusion are attached.

INTEC Waste Processing and Aquifer Contamination Background

The Idaho National Engineering and Environmental Laboratory (INEEL) reprocessed spent nuclear fuel (SNF) from 1953 to 1992 using facilities located at the Idaho Nuclear Technology and Engineering Center (INTEC), formerly known as the Idaho Chemical Processing Plant (ICPP). Historically, SNF was brought to INTEC from a variety of reactors throughout the world and stored for an interim period. Some of the SNF was chemically reprocessed to recover highly enriched uranium and other nuclear products for the Department of Energy and its predecessor organizations. SNF reprocessing produced liquid radioactive waste, which was stored in the Tank Farm. Most of the liquid waste was removed from the Tank Farm and solidified using a process called calcination. The granular solids from this process, called calcine, are stored in stainless steel storage bins contained in concrete vaults.

Although the bulk of the radioactive constituents associated with SNF reprocessing went to the Tank Farm and calcine solids storage facilities, trace quantities were released. Some of the released material contaminated the aquifer beneath INTEC. There are numerous wells in and around INTEC that are used to monitor the contamination in the aquifer. In May 2003 a sample was obtained from a new well (ICPP-MON-A-230) located about 300 feet north of the INTEC Tank Farm. The sample from well ICPP-MON-A-230 contained approximately the same amount of tritium (H-3) and iodine (I-129) as other INTEC wells. However, the sample contained significantly more (nearly two orders of magnitude higher) technetium (Tc-99) than other INTEC monitoring wells. The water in well ICPP-MON-A-230 was resampled and reanalyzed to assure the radionuclide data were valid.

Most of the radionuclides in the aquifer came from the historical disposal of slightly contaminated PEW Evaporator condensate via the service waste injection well. However, because the relative quantities of radionuclides in well ICPP-MON-A-230 differed so much from those of other wells, an evaluation was performed to determine if the contamination in well ICPP-MON-A-230 came from a different source. Another possible source of aquifer contamination is the material that leaked to the environment from waste transfer piping. There have been several radioactive waste leaks during the history of INTEC. Two leaks that occurred in the Tank Farm in the late 1960s and early 1970s contributed the bulk of the activity inadvertently released to the environment. Those two leaks are also located close to well ICPP-MON-A-230. This report evaluates the Tank Farm piping leaks and the PEW Evaporator condensate as possible sources of the contamination in well ICPP-MON-A-230.

Contamination in Well ICPP-MON-A-230

There have been many analyses of the water in the aquifer beneath INTEC from a variety of monitoring wells. Table 1 shows typical results for H-3, Tc-99, and I-129 from a few wells in 2001 and 2003 as reported in References 1 and 2. Wells # 47 and 57 have H-3, Tc-99 and I-129 activity typical of most INTEC monitoring wells. Data from well ICPP-MON-A-230 are also included on Table 1, though it has data only for 2003 because it is a new well. The H-3 and I-129 activity in well ICPP-MON-A-230 is similar to that of the other wells. However, the Tc-99 activity in well ICPP-MON-A-230 is nearly two orders of magnitude higher than that of other wells.

Table 1. Activities of H-3, Tc-99, and I-129 in selected INTEC aquifer monitoring wells.

Well #	H-3 (pCi/L)		Tc-99 (pCi/L)		I-129 (pCi/L)	
	2001	2003	2001	2003	2001	2003
USGS-47	3890	2560	38.3	42.5	0.75	0.46
USGS-57	5110	5450	38.8	51.4	0.57	0.51
ICPP-MON-A-230	NA	3700	NA	2220	NA	0.12

The radionuclide data in Table 1 are given in concentration units (activity per unit volume). The concentration of the radionuclides in the aquifer is much lower than the original waste source term due to dispersion of the contamination in the environment. However, if one assumes H-3, Tc-99, and I-129 are highly mobile and move freely through the environment without significant interaction with the soil, the relative amounts of these species in the aquifer should be the same as that in the original waste source. Table 2 contains relative (ratio) radionuclide data for a number of wells around INTEC for 2001 and 2003, including well ICPP-MON-A-230.

Table 2. Activity ratios of selected radionuclides in INTEC aquifer wells*.

Well #	H-3/Tc-99 ratio		H-3/I-129 ratio		Tc-99/I-129 ratio	
	2001	2003	2,001	2003	2001	2003
USGS-48	38	46	NA	11,290	NA	245
USGS-47	102	60	5187	5565	51	92
USGS-57	132	106	8,965	10,686	68	101
USGS-112	200	95	NA	NA	NA	NA
USGS-123	79	116	11,688	21,028	148	181
USGS-67	231	223	10,926	20,194	47	91
Average of 6 USGS Wells	130	108	9191	13,753	79	142
ICPP-MON-A-230	NA	1.7	NA	30,833	NA	18,500

Note: NA is given in well ICPP-MON-A-230 in 2001 because it is a new well and there are no 2001 data. For other cells, the NA is because the I-129 was below the analytical method detection limit.

A review of the data in Table 2 shows the average H-3/Tc-99 ratio in most wells to be about 100, while that in well 230 is about 1, two orders of magnitude lower than most wells. This is the result of the elevated Tc-99 value in well ICPP-MON-A-230 (see Table 1). Similarly, the Tc-99/I-129 ratio of well ICPP-MON-A-230 is nearly 20,000, two orders of magnitude above the value of about 100 in other wells. The H-3/I-129 ratio of 30,000 in well ICPP-MON-A-230, though higher than the value of 10,000 in other wells, is within the same order of magnitude as that of the other wells.

Historical Aquifer Contamination by the PEW Evaporator

The PEW Evaporator was the major source of the contamination in the aquifer. When reprocessing SNF, the PEW Evaporator treated large quantities (over 1 million gallons per year) of waste that was too dilute to send to the Tank Farm, but too contaminated for environmental disposal. The primary sources of waste to the PEW Evaporator were decontamination processes, ion exchange regeneration, water from contaminated cells and vaults, and other similar dilute wastes. The PEW Evaporator feed solution could be characterized as a small volume of concentrated waste mixed with a large volume of water. The feed solution to the PEW Evaporator generally had the same relative ratios of fission products as the Tank Farm waste, but in significantly lower quantities.

The output from the PEW Evaporator consisted of two streams; a large volume of very slightly contaminated water, and a small volume of concentrated and highly contaminated waste that contained most of the activity in the PEW Evaporator feed solution. The PEW Evaporator boiled most of the water in the feed solution and then condensed it. The condensate was the large volume of slightly contaminated water. It was referred to as "overheads" or "process condensate". Because most of the contamination in the Evaporator feed solution was not volatile, the process condensate was only slightly contaminated. Historically, the process condensate was sampled, verified to meet disposal criteria for radioactivity, and sent to service waste. The service waste transported the slightly contaminated PEW Evaporator condensate into the aquifer via the injection well. That disposal path no longer exists. Currently, the Liquid Effluent Treatment and Disposal (LET&D) treats the PEW

Evaporator condensate and disposes it to the atmosphere as a gas via the main INTEC stack (CPP-708). The small volume of concentrated Evaporator waste was called the "bottoms". The bottoms contained the bulk of the radionuclides in the Evaporator feed solution. The bottoms were sent to the Tank Farm for storage.

The PEW Evaporator is one of the INTEC processes in which radionuclide separation occurs. Most of the radionuclides in the Evaporator feed, such as Cs-137 and Sr-90, do not volatilize in the Evaporator. Those radionuclides concentrate in the Evaporator bottoms. However, a few radionuclides, such as H-3 and I-129, are volatile in the Evaporator. The bulk of the H-3 and I-129 in the Evaporator feed solution passes through the Evaporator to the overhead stream. The differences in radionuclide volatility results in very different relative amounts of some radionuclides in the Evaporator overheads compared with those in the original feed solution, bottoms, and Tank Farm. It is the differences in the relative amounts of radionuclides that make it possible to identify different sources for various aquifer well samples.

Historical Tank Farm Waste

Fuel reprocessing activities produced two general categories of Tank Farm wastes; first-cycle raffinate and sodium-bearing waste (SBW). First-cycle waste was produced by the dissolution of SNF and the recovery of uranium. First cycle waste contained the bulk of the radioactive constituents in the SNF and had the highest radionuclide activity of any INTEC liquid waste. SBW came from several sources including the uranium purification process (often called second and third cycle waste) and from incidental activities such as equipment decontamination associated with operation of the INTEC (including the PEW Evaporator bottoms). The name "sodium bearing waste" came from the waste's high concentration (1 to 2 Molar) of sodium ion. The high sodium content was the result of activities that made extensive use of sodium-based chemicals such as sodium hydroxide and sodium carbonate. Typically, the radionuclide content of SBW was much lower (an order of magnitude) than HLW.

The chemical and radionuclide content of the Tank Farm waste has been determined by a combination of sample analyses and calculations. Radionuclides that could not be measured in the waste were calculated based on fuel characteristics, burn-up time, cooling time, etc. Table 3 contains order-of-magnitude data for two INTEC wastes that could be sources of aquifer contamination. Table 3 includes PEW Evaporator condensate that was sent to the injection well via the service waste system, and first-cycle raffinate that leaked from Tank Farm piping. The relative quantities of the nuclides are approximate and vary with the type and age of waste. The radionuclide activity decreases with time due to radioactive decay. The nuclides in Table 3 have half-lives ranging from 12.3 years for H-3 to nearly 16 million years for I-129. The data in Table 3 are typical of waste generated in the early 1970s with the activity decayed to the present time. The data for the activity in the PEW Evaporator condensate come from References 3 and 4 except for that of Tc-99. There are no historical data for Tc-99 in the PEW Evaporator condensate and service waste. The Tc-99 value was estimated assuming the bulk of the H-3 and Tc-99 in the aquifer came from the PEW Evaporator condensate and were present in the condensate in the same relative quantities as in the aquifer. Currently, the ratio of H-3:Tc-99 in the average aquifer well is about 100. At the time of Evaporator condensate disposal, an average of 20 years ago, the ratio would have been about 300, so the amount of Tc-99 was likely 1/300 that of the H-3 at the time of disposal.

Table 3. Relative radionuclide activities of INTEC first-cycle waste and PEW Evaporator condensate.

Radionuclide	Relative Activity in Tank Farm Waste (Ci)	Relative Activity in PEW Evaporator Condensate (Ci)
Cs-137	10,000,000	1
Sr-90	10,000,000	1
H-3	10,000	1,000
Tc-99	1,000	10
I-129	1	0.1

Table 3 shows the significant differences between the relative radionuclide activities in the Tank Farm waste and the PEW Evaporator condensate. The PEW Evaporator condensate is relatively rich in H-3 and I-129 compared to the Tank Farm waste because those nuclides are volatile in the PEW Evaporator and go with the process condensate. The Evaporator condensate is depleted in Cs-137 and Sr-90 compared to the Tank Farm waste, because those nuclides concentrate in the PEW Evaporator bottoms. The amount of Tc-99 in the Evaporator condensate is reduced in comparison to H-3 and I-129. This agrees with studies (Reference 5) that conclude Tc-99 is not highly volatile in the PEW Evaporator process. Although Tc-99 does not appear to be as volatile as H-3 or I-129, Table 3 data suggests it is more volatile than Cs-137 or Sr-90.

Table 3 indicates the Tank Farm waste is enriched in Tc-99 compared to service waste. Since the water from well ICPP-MON-A-230 was enriched in Tc-99 compared to other INTEC wells, Tank Farm leaks were evaluated as the potential source of contamination to well ICPP-MON-A-230.

Historical Tank Farm Leaks

A logical source of the contamination in well ICPP-MON-A-230 is one having a large source term near the location of the monitoring well. Contamination levels in the aquifer will be less than the original source term as rainwater and snowmelt disperse the contamination and carry it to the aquifer. Contamination from small leaks, dilute waste, or leaks far from the monitoring well will likely have no significant effect on the activity in well ICPP-MON-A-230. There are two contamination sources at INTEC that have high activity and are located near well ICPP-MON-A-230. These contamination sources were leaks from Tank Farm piping that occurred in the late 1960s and early 1970s. Both leaks were discovered several years after they occurred. Therefore, remediation efforts such as soil removal and surface coverings likely had little effect on highly mobile nuclides such as H-3, Tc-99 and I-129. The mobile radionuclides were likely flushed from the original contamination site by rainfall, snowmelt, utility system leaks, etc. before remediation occurred.

The first potential contamination source is leak from a hole drilled into a waste transfer pipe during the installation of the encasement around the transfer pipe in the 1950s (Reference 6). The leak contaminated an area designated CPP-28 on current INTEC contaminated soil maps. The leak occurred in an area just south of the WM-181 tank. The leak was discovered in October 1974. Although the hole in the primary waste transfer piping existed for nearly 20 years, the secondary containment likely prevented any loss of activity and soil contamination for a number of years. The soil contamination likely occurred in the late 1960s and early 1970s. This is supported by the fact that the amount of soil contamination was not extensive, and the soil contamination included significant quantities of short-lived radionuclides. The leak investigation report (Reference 6) estimated 120

gallons of waste containing 6000 Ci of activity leaked into the soil. The type of waste that leaked was first cycle raffinate. This leak was a relatively small volume of waste with very high activity.

The second potential contamination source is a leak that occurred in November 1972 when the contents of WM-181 were transferred to WM-180. The leak was discovered in September 1975, approximately three years after it occurred. The leak occurred when a valve on a junction line with the main transfer route leaked, allowing acidic waste into a section of line that was not constructed of stainless steel. The non-stainless section of line corroded, allowing waste to leak into the ground. The leak occurred in an area immediately south of WM-183 and is designated CPP-31 on current INTEC contaminated soil maps. The report of the discovery and investigation of the leak (Reference 7) estimated 14,000 gallons of waste containing 28,000 Ci of activity leaked into the soil. This leak was 100 times larger in volume than the first leak, but had only about four times the activity of the first leak. This is because the second leak was SBW, which had a significantly less activity than first-cycle waste.

Other leaks occurred in the Tank Farm area, but they were not included in this analysis. Most of the other leaks were small, involving only a few gallons of waste. The amount of activity released to the ground from such leaks was insignificant compared to the two leaks discussed. The next largest leak was a leak on the east side of CPP-604 involving a waste transfer line from the WCF. A total of 1000 to 3000 Curies of activity was estimated to have leaked in that area (Reference 8). A 2000 Ci leak (midpoint of the estimated range) represents only 6% of the 34,000 Ci of the two combined leaks associated with contaminated areas CPP-28 and –31. The amounts and activities of the waste that leaked at CPP-28 and –31 are not precisely known. The amount of error in estimating those two leaks is larger than the leak east of CPP-604. Therefore, in additive terms, the other Tank Farm area leaks are negligible compared to the two leaks discussed in this report. In terms of waste characteristics, the source terms of the other Tank Farm leaks would be similar to the two leaks discussed.

In addition to the data for H-3, Tc-99, and I-129, there are also data for non-radioactive components in the Tank Farm waste, service waste, and well contaminants that can be used to help determine the source of contamination in the aquifer. One of the significant components of both Tank Farm waste and PEW Evaporator condensate is nitrate (NO_3). Nitrate does not form precipitates or otherwise react with the soil, is mobile in the ground, and was detected in quantities significantly above background in the well ICPP-MON-A-230. The nitrate concentration in well ICPP-MON-A-230 was approximately 40 mg/L, or 10 mg/L expressed as NO_3-N (References 9 and 10). The nitrate concentration in most aquifer monitoring wells and in the INTEC production wells is approximately 10 mg/L (2.5 mg/L NO_3-N). Nitrate levels in "clean" groundwater (upstream of any INTEC contamination) are 4 mg/L or less.

Nitrate is present in high concentrations in Tank Farm waste. For example, the nitrate was 4.38 molar (272 g/L) in the SBW that contaminated CPP-31. There is also nitrate in the PEW Evaporator system. However, because nitrate is semivolatile, partitioning of nitrate occurs in the Evaporator, similar to that of some radionuclides. Consequently, the nitrate concentration in the PEW evaporator condensate is lower than the bottoms and Tank Farm waste, typically about an order of magnitude. This makes the Tank Farm waste enriched in nitrate compared to PEW Evaporator condensate and the service waste stream.

Nitrate was the only non-radioactive constituent for which well and waste source data were compared. Some of the other non-radioactive waste constituents react with the soil. Some constituents are present in such small quantities that they would be below background levels in the aquifer. Some aquifer contaminants could have additional sources (such as sodium and chloride coming from salt that was widely used around INTEC) that could

make it difficult to identify a single source term. Because of these reasons, nitrate was the only non-radioactive contaminant for which well contamination and source term comparisons were made.

Evaluation of Sources of Contamination in Well ICPP-MON-A-230

The composition of the waste from the two previously described Tank Farm leaks was estimated and decayed to the present time in order to be able to compare the radionuclides in the waste that leaked with those found in well ICPP-MON-A-230. The two Tank Farm leaks were located in close proximity to each other and occurred about the same time. The aquifer would likely see those two leaks as a single contamination source. Therefore, this analysis combined them into a common source term. The data for the Tank Farm leaks, well ICPP-MON-A-230, and an "average" INTEC monitoring well were then manipulated to obtain relative activities and quantities of contaminants. This was done by calculating ratios of the Tank Farm waste components with contaminants in the wells. The results are shown in Table 4.

Table 4. Comparison of contaminants in aquifer wells with constituents of Tank Farm waste.

	Well ICPP-MON-A-230	Combined CPP-28 and –31 Tank Farm leaks	Average Aquifer Well*
H-3/Tc-99 ratio	1.7	2.2	100
NO_3/H-3 ratio (g/microCi)	9.7	4.7	0.1
NO_3/Tc-99 ratio (g/microCi)	16.2	10	100
NO_3/I-129 ratio (g/nanoCi)	300	11	3
Tc-99/I-129 ratio	18,500	1100	100
H-3/I-129 ratio	30,800	2400	10,000

*Average of six USGS wells shown in Table 2

The first three lines of data in Table 4 show an excellent correlation between the H-3, Tc-99, and NO_3 in well ICPP-MON-A-230 and the Tank Farm waste that leaked. The relative amounts (ratios) of H-3, Tc-99, and NO3 in the Tank Farm are within a factor of two with those in well ICPP-MON-A-230. In contrast, the relative amounts of those three contaminants in the average aquifer well (which have the same relative quantities as the PEW Evaporator and service waste) differ by as much as two orders of magnitude from the amounts in well ICPP-MON-A-230.

Table 4 shows the ratios involving I-129 are inconsistent and do not closely correspond with either the Tank Farm waste or the contaminants in other well. The Tc-99/I-129 and the NO_3/I-129 ratios in well ICPP-MON-A-230 are closer to the Tank Farm waste than the average well, but the H-3/I-129 ratio in well ICPP-MON-A-230 is closer to that of the service waste and average well. However, there is not a close relationship in any of the ratios involving I-129.

There are two potential reasons for the discrepancies with the I-129 ratios. One reason is the I-129 activity in the Tank Farm source term is overestimated. Using too large a value for the Tank Farm source term would reduce the ratios involving I-129 in Table 4. The Tank Farm source term is based on historical sample analyses and theoretical calculations (Reference 11). Reference 11 reduced the H-3 content of SBW (the largest portion of the Tank Farm source term) by 86% from its theoretical value based on samples of SBW. The PEW Evaporator

bottoms are a significant source of the SBW. Most of the H-3 in the PEW Evaporator went to the overheads, producing H-3 depleted bottoms. Based on service waste samples, H-3 and I-129 were lost in approximately equal relative amounts to the PEW Evaporator overheads. Therefore the PEW Evaporator bottoms (and SBW) should be depleted in I-129 in an amount equal to that of H-3. However, Reference 11 made no reduction to the theoretical value of I-129 in SBW. This was because there weren't any reliable I-129 analyses from which to make a defensible reduction in I-129. The I-129 used for the SBW source term was based on a SBW sample. It was lower than that predicted by Reference 11, but not as low as the 86% reduction used by Reference 11 for the H-3. The I-129 in the first-cycle Tank Farm waste is also overestimated. Studies (Reference 12) show some (15%) I-129 is lost from the first cycle waste before being sent to the Tank Farm. Reference 11 does not include this loss in its source term. The result is the I-129 in the Tank Farm waste was overestimated, resulting in too low ratios for the Tank Farm leaks in Table 4.

Another reason for inconsistent I-129 ratios in Table 4 is there is evidence that I-129, though highly mobile, is not quite as mobile as H-3, Tc-99, and nitrate. Reference 13 contains sorption coefficients (K_d) for several elements (including iodine and technetium) in various types of soils. In general the sorption coefficient for technetium in a given type of soil is lower than that of iodine. Because of its higher sorption coefficient, some I-129 retardation in the soil/basalt may occur. This would yield low I-129 activity in the aquifer samples, compared to those of the other mobile contaminants. This could explain the data in Table 4 in which the I-129 in well ICPP-MON-A-230 appears to be too low.

Conclusion

Samples from a new aquifer well, ICPP-MON-A-230, have elevated Tc-99 activity compared to other aquifer monitoring wells. The activity of H-3 and I-129 in well ICPP-MON-A-230 is similar to those in other aquifer monitoring wells. The Tc-99 activity in well ICPP-MON-A-230 was confirmed with multiple samples and independent laboratory analyses. One possible explanation for the elevated Tc-99 activity in well ICPP-MON-A-230 is the contamination came from a different source than the contamination in the other aquifer wells. Most of the contamination in the aquifer originated with the PEW Evaporator overheads that were historically combined with the INTEC service waste stream and disposed to the injection well. However, historical leaks from Tank Farm piping could also be a source of contamination to the aquifer. The relative amounts of contaminants in the Tank Farm waste were significantly different from that of the PEW Evaporator condensate and service waste. There is a close correlation between the H-3, Tc-99, and NO_3 content of two significant Tank Farm waste leaks that occurred in the late 1960s and early 1970s, and that in the samples from well ICPP-MON-A-230. The H-3, Tc-99, and NO3 content of well ICPP-MON-A-230 do not correlate with PEW Evaporator condensate and service waste composition. The correlation between the I-129 in the Tank Farm waste and well ICPP-MON-A-230 is less conclusive. However, the I-129 source term for the Tank Farm waste is likely lower than the estimated value and may contribute to some of the difference in the I-129 data. Additionally, there is evidence that the migration of I-129 may be retarded slightly in the ground which could also account for a low concentration in the aquifer well samples. Based on these data, the contamination in well ICPP-MON-A-230 more likely came from Tank Farm piping leaks that occurred in the late 1960s and early 1970s than the service waste and injection well system.

References

1. DOE-ID, *Annual INTEC Groundwater Monitoring Report for Group 5 – Snake River Plain Aquifer (2001)*, DOE/ID-10930, Rev. 0, February 2002.
2. DOE-ID, Annual INTEC Groundwater Monitoring Report for Group 5—Snake River Plain Aquifer (2003) (Draft), DOE/ID-11118, Rev 0, September 2003.
3. M. C. Swenson to W. B. Palmer and G. G. Simpson, "PEW Evaporator Feed Stream Composition", MCS-1-84, February 1, 1984.
4. R. J. Honkus, *ICPP CY-1981 Effluent Monitoring Report*, ENICO-1115, May 1982.
5. T. R. Thomas to M. C. Swenson, "Volatility of Technetium from Process Evaporator and Calciner Operations", TRT-01-03, October 20, 2003.
6. ACC-ICP, "ICPP Tank Farm contaminated Soil Incident October 1, 1974", March 1, 1975.
7. ACC ICP, "Investigation Report ICPP Tank Farm Contaminated Soil Incident September 18, 1975".
8. WINCO, "Installation Assessment Report", May 1986.
9. J. R. Forbes to M. C. Swenson, Personal Communication and Email, "Groundwater Quality Results for Monitor Well MON-A-230", October 10, 2003.
10. D. R. Rhodes to M. C. Swenson, Personal Communication, "Four Raw Water Samples Taken in 1981 and 1982, June 13, 1984.
11. D. R. Wenzel, "Relative Inventories of Reactor-Produced Species in INTEC Waste Types", EDF-CRPD-001, Rev 1, November 2002.
12. G. J. McManus et al., *A Model of Iodine-129 Process Distributions in a Nuclear Fuel Reprocessing Plant*, ENICO-1108, April 1982.
13. A. Poloski, "Sandpad Contamination Analysis", EDF-15722-046, October 19, 2000.

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