LMS/SAL/S04251

Post-Closure Inspection and Monitoring Report for the Salmon, Mississippi, Site

Calendar Year 2007

May 2008

U.S. Department of Energy

Office of Legacy Management

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Acronyms and Abbreviations

AEC	U.S. Atomic Energy Commission
COC	contaminant of concern
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	feet/foot
GEMS	Geospatial Environmental Mapping System
LM	Office of Legacy Management
MCL	maximum contaminant level
mg/L	milligram(s) per liter (1×10^{-3} g/L)
pCi/L	picocurie(s) per liter (1×10^{-12} Ci/L)
SEEPro	Site Environmental Evaluation for Projects
TRG	target remediation goal
VOC	volatile organic compound
USFWS	U.S. Fish and Wildlife Service
µg/L	microgram(s) per liter (1×10^{-6} g/L)

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1.0 Introduction

This report summarizes inspection and monitoring activities performed on and near the Salmon, Mississippi, Site in calendar year 2007. The *Draft Long-Term Surveillance and Maintenance Plan for the Salmon Site, Lamar County, Mississippi* (DOE 2007) specifies the submittal of an annual report of site activities and the results of sample analyses. This report is submitted to comply with that requirement.

The Tatum Salt Dome was used by the U.S. Atomic Energy Commission (AEC) for underground nuclear testing during the cold war. The land surface above the salt dome, the Salmon Site, is located in Lamar County, Mississippi, approximately 12 miles west of Purvis (Figure 1). The U.S. Department of Energy (DOE), the successor to the AEC, is responsible for long-term surveillance and maintenance of the site. The DOE Office of Legacy Management (LM) was assigned this responsibility effective October 2006.

Between 1964 and 1970, two underground nuclear tests and two chemical explosive tests were conducted in the salt dome. The first nuclear test, Salmon, created a cavity 2,710 feet (ft) below ground surface; all subsequent tests were conducted within this cavity. Radioactive products from the tests were contained within the salt dome, and no radioactivity was released during the tests. After each test, boreholes were drilled into the cavity for post-shot measurements, resulting in the release of some contamination.

The site was decommissioned in 1972. During the site cleanup, boreholes were drilled in the southwest corner of the site, and contaminated material was injected through one of the boreholes into Aquifer 5, which is a deep, briny aquifer. Contaminated material was also injected into the test cavity. Residual volatile organic compounds (VOCs) and metals from two drilling mud pits could not be removed effectively and safely. Both mud pits are below the shallow water table under concrete or covered with clean fill. One mud pit is located at surface ground zero; the other is located nearby. Laboratory analyses of surface and ground water samples collected annually since 1972 by DOE show this contamination is attenuating naturally as expected. Current surface water sample points and monitor well locations are shown in Figure 2.

Contamination remaining at the site consists of radioactive materials (tritium), VOCs, and metals from drilling. The potential sources of contamination of the surface water and ground water at the site are:

- The two drilling mud pits.
- The explosion cavity and the boreholes drilled into the cavity.
- The wastes injected into Aquifer 5 and the borehole used to inject the wastes.

All boreholes were sealed and abandoned in accordance with the requirements of the State of Mississippi.

The contaminants of concern (COCs) for the site are tritium, arsenic, chromium, and trichloroethene and one of its degradation products, *cis*-1,2-dichlorethene. Historically, concentrations of COCs have exceeded either the drinking water maximum contaminant level (MCL) (EPA 2004) or the Mississippi target remediation goal (TRG) (MDEQ 2006).

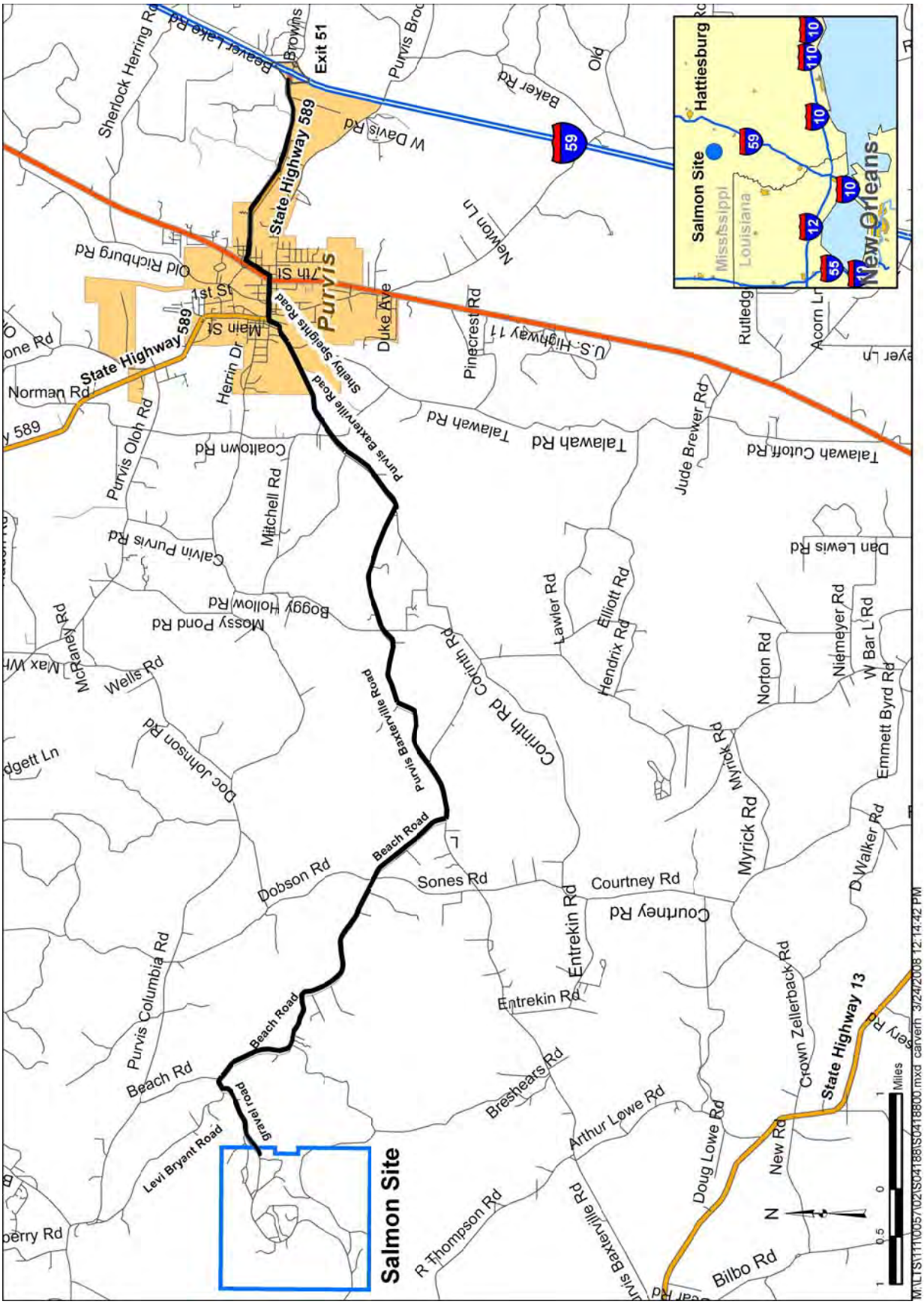

Figure 1. Regional Location Map for the Salmon, Mississippi, Site

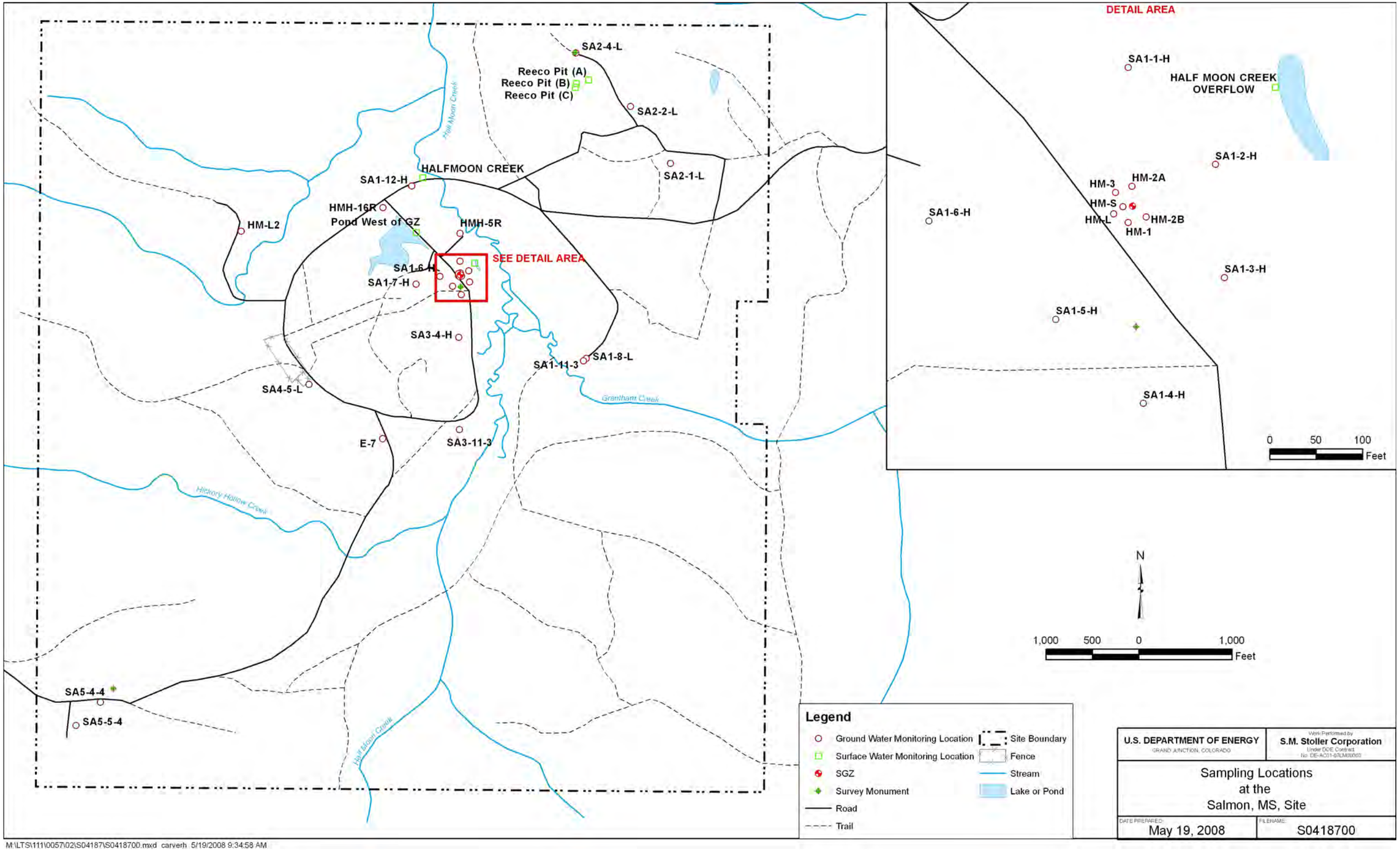

Figure 2. Sampling Locations at the Salmon, Mississippi, Site

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The determination of VOCs and metals as COCs was based on concentrations detected in ground water samples collected in 2005 and 2006. Although tritium is a COC, it has not been detected on site since 2002. The source of the arsenic is unknown and may be unrelated to DOE activities. Methylene chloride and naphthalene have also been detected at concentrations above the MCL; however, the detections are sporadic. Since naphthalene is a common solvent and methylene chloride is a common laboratory contaminant, these compounds are not believed to be due to DOE activities at the site.

Site inspections are required annually, but because of the recent transfer of the site to LM, five site maintenance visits occurred in 2007. These are documented in trip reports and site photographs. Selected photographs are included in Appendix A. The inspections were designed to achieve the objectives shown in Table 1.

Table 1. Long-Term Surveillance and Maintenance Objectives for the Salmon Site

Surveillance and Maintenance Objective	Strategies to Achieve Objective
Prevent exposure to radioactive materials contained in the salt dome	• Monitor ground water, evaluate results • Monitor and maintain institutional controls
Control exposure to contaminated ground water	• Monitor ground water, evaluate results • Monitor institutional controls
Maintain the physical integrity of the site surface	• Conduct regular inspections • Perform needed maintenance • Maintain access controls
Prevent loss of knowledge	• Comply with DOE requirements of mandatory surveillance and maintenance program • Communicate with regulators and stakeholders regularly (including public education, outreach information, and notices) • Record site institutional controls in Lamar County with real property records and management agencies • Comply with National Archives and Records Administration records management requirements • Maintain local records collection and make annual reports available

2.0 Inspection and Maintenance Activities

2.1 Institutional, Engineering, and Physical Controls

2.1.1 Deed Restrictions

DOE representatives visited the Lamar Country Chancery Office in April 2007. The county clerk acknowledged that restrictions are attached to the site deed; however, the County is not responsible for enforcing the restrictions. The federal government owns the surface and subsurface estates of the Salmon Site.

2.1.2 Fences

Site inspections showed that the fence around the property was in very poor condition because of damage by falling trees. This may be due in part to the impact of Hurricane Katrina in August of 2005. Although the fence is no longer functional in most areas, the dense vegetation prevents access along much of the site boundary.

Along the northern perimeter, the owner of the adjacent property has cleared a 100-ft-wide strip of property adjacent to the site boundary and installed a new fence (see Photo A−1).

Along the western perimeter the fence is down in many places, and there are several signs of roads and incursions onto the site by ATVs. Trash has been dumped in the northwest corner of the site. The fence installed by the owner of the adjacent property should block future public access to this area.

2.1.3 Gates

The fence that partially surrounds the site has two gates—one at the northeast corner of the site and one at the southwest corner. A fenced, gated, and locked storage area is inside the property boundary west of surface ground zero. The main access gate, near the northeast corner of the property, was broken and no longer had hinges. It was repaired, and a new lock was installed. The entrance at the southwest corner of the property was reopened. A trench blocking access to it was filled and compacted and a new gate was installed. This repair allows heavy equipment access for roadwork without having to cross the road by the pond or the bridge over Half Moon Creek.

2.1.4 Signs

New DOE-LM "No Trespassing" signs were installed at the gates and other access locations. The new signs identify the site as part of DOE-LM and include a 24-hour phone number for the LM office in Grand Junction.

2.1.5 Locks

A new lock for the southwestern gate is needed to standardize access to the site. Replacement padlocks also are needed for all wells to standardize access for sampling. Replacement of the locks is planned for April 2008.

2.2 Physical Site Conditions

2.2.1 Roads and Roadwork

The roads at the site were in poor condition. Some were impassible because of fallen trees. Beavers had undermined the levee road and built dams, which resulted in flooding of the pond and extensive erosion of the levee road. In April 2007 a subcontractor used an excavator to breach the beaver dams and lower the pond levels. Several roads were cleaned and graded. In September 2007 a subcontractor used an excavator (Photo A−2) to remove the main beaver dam, some smaller dams, and a beaver lodge. This restored the pond to its preexisting level. A contract to control the beavers will be necessary to prevent future damage from beavers. DOE has

initiated an interagency agreement with the U.S. Department of Agriculture for beaver control beginning in March 2008.

In order to improve visibility of the bridge, steel pipes were welded to the sides of the Half Moon Creek bridge (Photo A−3.) The pipes were painted orange, steel cable was strung between them, and reflective tape was hung from the cables.

All site roads were cleared of fallen trees and reopened (Photo A−4). The sides of the roads were scraped to clear the vegetation. Areas around the monitoring wells and the former cable storage area were also cleared. A contract will be put in place to mow these areas regularly to prevent growth of vegetation.

2.3 Monitoring Wells

DOE personnel supervised the removal of submersible electric pumps from 14 monitoring wells at the site. Two deep wells (SA5-5-4 and SA5-4-4) will continue to use submersible electric pumps. The electric pump in SA5-5-4 was replaced with a new pump, and both pump controllers were rewired to ensure compliance with state electrical codes. All other wells had bladder pumps and sampling tubing installed. This will allow the wells to be micropurged for future sampling and will significantly decrease the volume of purge water generated.

The concrete pad for well SA2-4-L was cracked by tree roots. The tree was removed, and the broken pad was replaced. Lockable steel protective casings were installed on seven wells. At well HM-L2, a new well pad was constructed, riser pipe was added, and a new protective casing was installed. All of the site wells were painted with a rust-resistant primer and repainted with white rust-resistant paint. Well number-plates were made but were not installed because of time constraints. They will be installed during the annual sampling event in April 2008.

2.4 Empty Drum Removal

Empty drums were stored at the site inside a locked, fenced area. The drums were surveyed for radioactive contamination, and no activity above background was detected. All drums were hauled off site for recycling.

2.5 Site Ecology Conditions

2.5.1 Gopher Tortoise Habitat

During the April and September site visits, representatives of the U.S. Fish and Wildlife Service (USFWS) and DOE inspected portions of the site and areas adjacent to the western perimeter. One inactive gopher tortoise burrow was located in the southwestern corner of the site, and two other burrows were located immediately west and within 100 ft of the western site boundary.

Gopher tortoises are a federally listed threatened species and are also listed by the state of Mississippi as endangered. Gopher tortoise habitat is well-drained open areas preferably in longleaf pine forests. However, the site is now densely forested and provides little favorable habitat. The USFWS representative expressed an interest in working with DOE-LM to improve the tortoise habitat. This could be accomplished through reestablishing the longleaf pine ecosystem.

2.5.2 Vegetation

The USFWS biologist present during the April site visit identified a species of grass near well SA1-1-H that is not native to the area. He recommended eradication, since the non-native grass does not provide productive forage for site species.

2.6 Cultural Resource Conditions

A Mississippi State-approved archeologist was present during the September site visit to monitor roadwork near monitor well SA2-2-L. Earlier cultural resource surveys had indicated that cultural resources might be present in the area. None were found during the road grading.

The archaeologist was also present to monitor proposed work installing security gates in the northwest corner of the site. An extensive cultural resource site covers a large portion of that area. DOE determined that the gates were unnecessary because of the new fencing installed by the owner of the adjacent property. The archeologist walked portions of that area and identified several chert shards.

The archaeologist inspected an abandoned bridge over Half Moon Creek and recommended that DOE determine the actual date of construction. If the bridge is over 50 years old, it may qualify for protection as a historic structure under the National Historic Preservation Act.

2.7 Public Information Access

DOE representatives visited the Purvis library in April 2007 to check the status of the Salmon Site public records. Several records were missing from the library. The DOE-LM site lead sent the missing records to the library on May 16, 2007.

Analytical results from samples collected by DOE, the US Environmental Protection Agency (EPA), and the Mississippi Department of Health for the 2007 water sampling at the site are posted on the Geospatial Environmental Mapping System (GEMS), which is a publicly accessible interactive website maintained by DOE-LM at: http://gems.lm.doe.gov/imf/sites/gems_continental_us/jsp/launch.jsp. Historical results for tritium and water levels are also available. Future analytical data will be added to GEMS, and additional historical data will be available after it is loaded into the SEEPro database.

3.0 Analytical Results and Interpretation

In 2007 DOE sampled 21 monitoring wells and 6 surface locations for metals. Fourteen wells were sampled for VOCs. Temperature, pH, turbidity, and conductivity were measured prior to sampling each well. Analytical results above the laboratory detection limits are shown in Appendix B, Table B−1. The EPA and the State of Mississippi collected samples both on and off site for radionuclide analysis during the April inspection and monitoring event (Photo A−5).

3.1 Sample Results Greater than the EPA MCL or the Mississippi TRG

There were 168 unique results above the detection limit. Of these, nine met or exceeded the MCL or TRG. These are shown in Table 2.

Table 2. 2007 Analytical Results Exceeding the MCL or TRG

Location	Date	Analyte	Result	MCL or TRG	Units
FRAC TANK	19 Apr 07	Chromium	0.11	0.10	mg/L
HM-3	16 Apr 07	Chromium	0.12	0.10	mg/L
HMH-5R	17 Apr 07	Trichloroethene	190	5	µg/L
HMH-5R	17 Apr 07	*cis*-1,2-dichloroethene	130	70	µg/L
SA1-3-H	17 Apr 07	Arsenic	0.012	0.01	mg/L
SA1-6-H	17 Apr 07	Arsenic	0.019	0.01	mg/L
SA1-6-H	17 Apr 07	Lead	0.016	0.015[a]	mg/L
SA2-1-L	18 Apr 07	Arsenic	0.011	0.01	mg/L
SA4-5-L	19 Apr 07	Barium	2	2	mg/L

[a]EPA Action Level

The FRAC TANK contained purge water from sampling. The purge water was disposed of at a Mississippi licensed disposal facility.

In addition to the metals shown in Table 2, cadmium, mercury, nickel, selenium, silver, and zinc were detected, but at levels below the MCL or TRG.

The only additional VOC detected was *trans*-1,2-dichloroethene, which was below the MCL and the TRG.

Laboratory results for samples collected by EPA during 2007 for radionuclide analysis are reported elsewhere (EPA 2008)

3.2 Contaminant Concentration Trends

Lead was detected at well SA1-6-H at a concentration slightly above the TRG. Figure 3 shows a graph of lead detections over time.

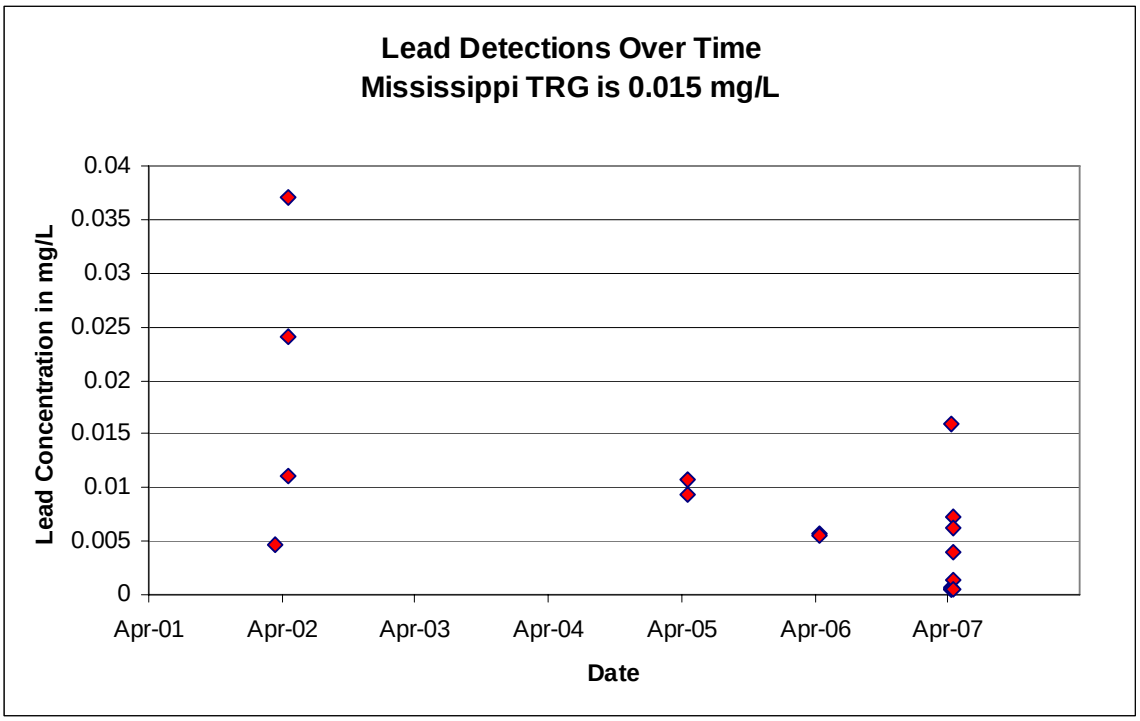

Figure 3. Lead Detections Over Time

Contaminant concentration trends for chromium, arsenic, and trichloroethene for selected wells are shown in Figures 4, 5, and 6.

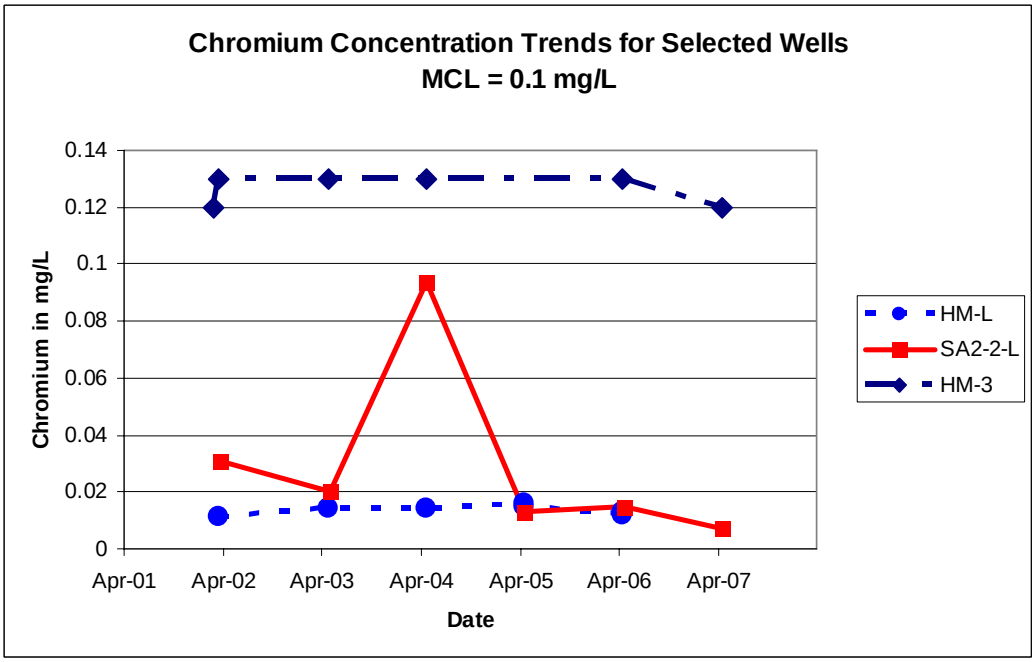

Figure 4. Chromium Concentrations Trends for Selected Wells

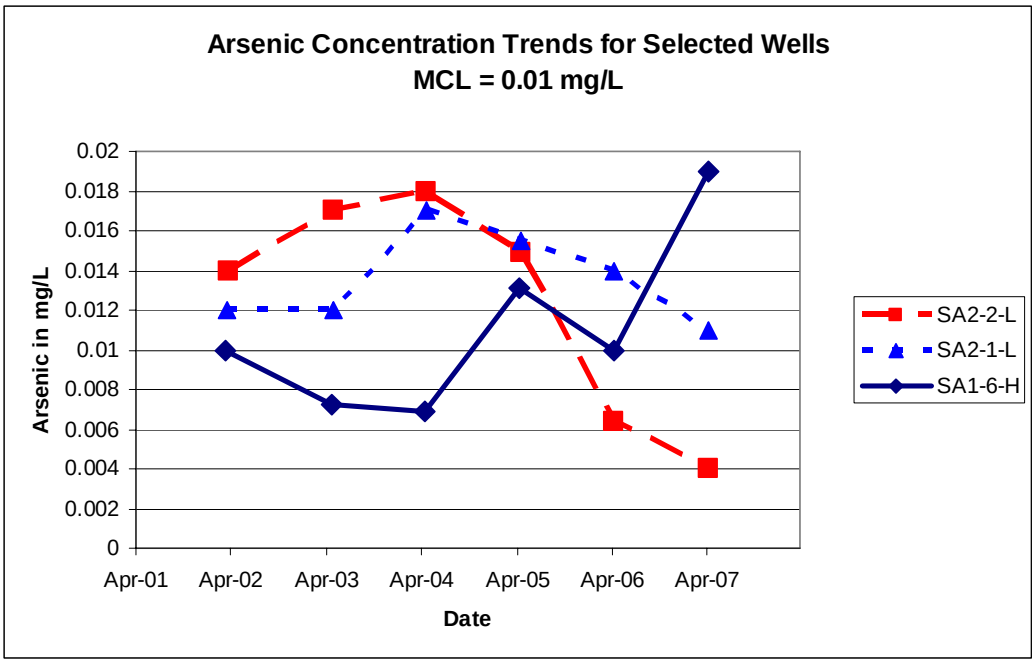

Figure 5. Arsenic Concentration Trends for Selected Wells

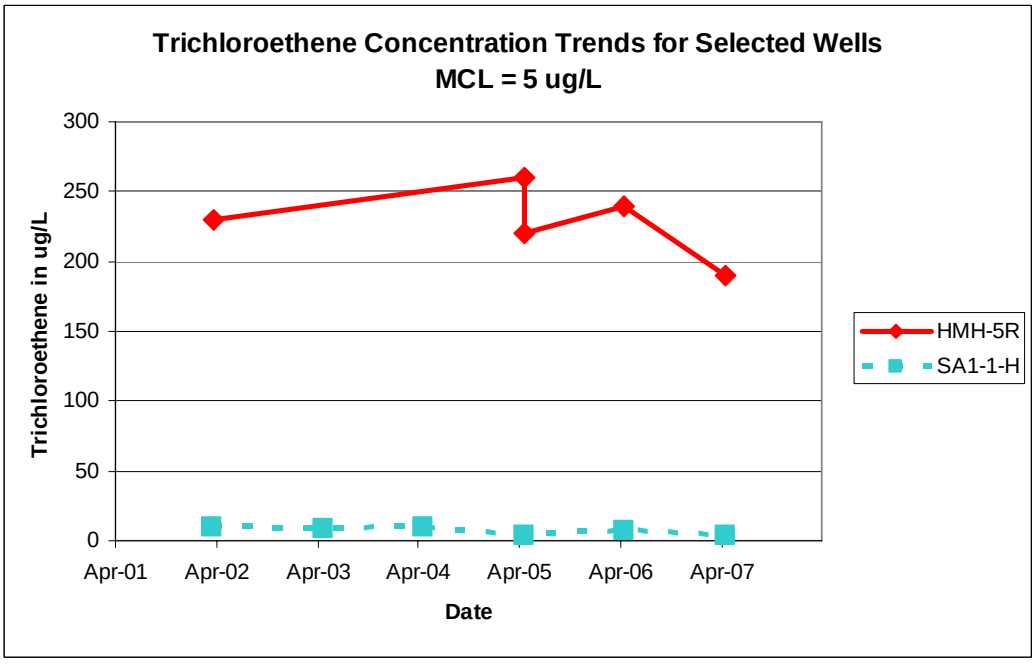

Figure 6. Trichloroethene Concentration Trends for Selected Wells

Figure 7 shows tritium concentrations in off-site municipal well water. Results for off-site surface locations are shown in Figure 8. These graphs are semilog plots of data collected by EPA (Las Vegas) from locations near the Salmon Site since 1972. The MCL for tritium is

20,000 picocuries per liter (pCi/L). Only results above the detection limit are shown. For comparison of decay trends, the graph also shows tritium in precipitation (Brown 1995). The large increase in the 1950s and 1960s is due to atmospheric testing of nuclear weapons.

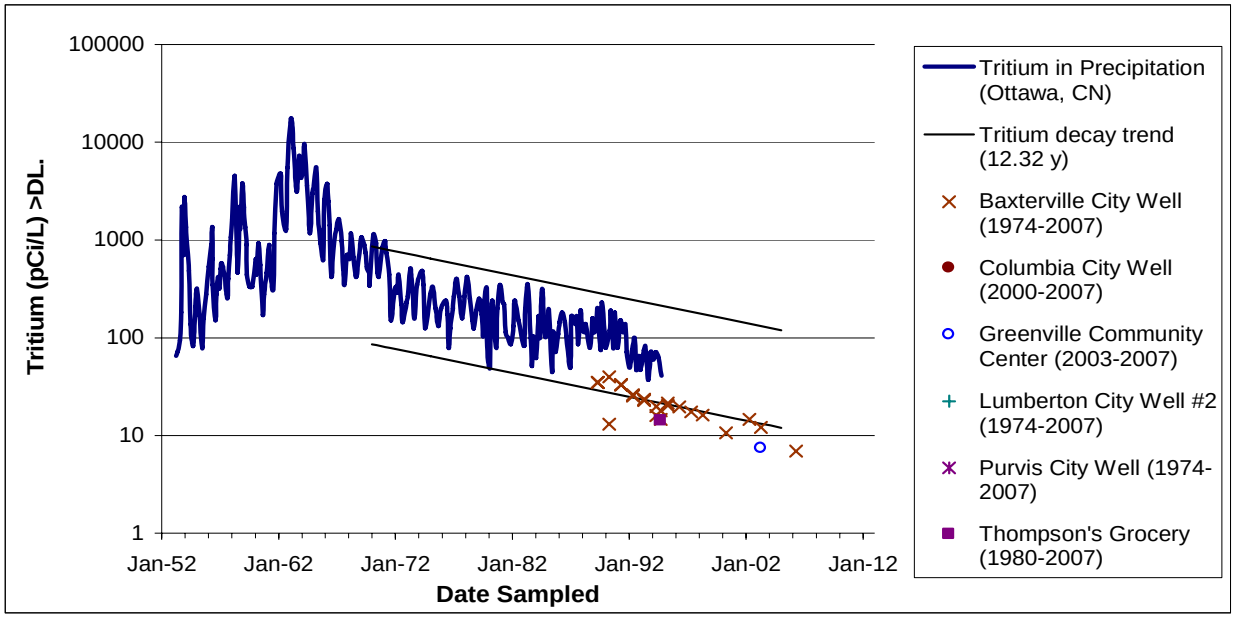

Figure 7. Tritium Decay Trend and Off-Site Sample Concentrations

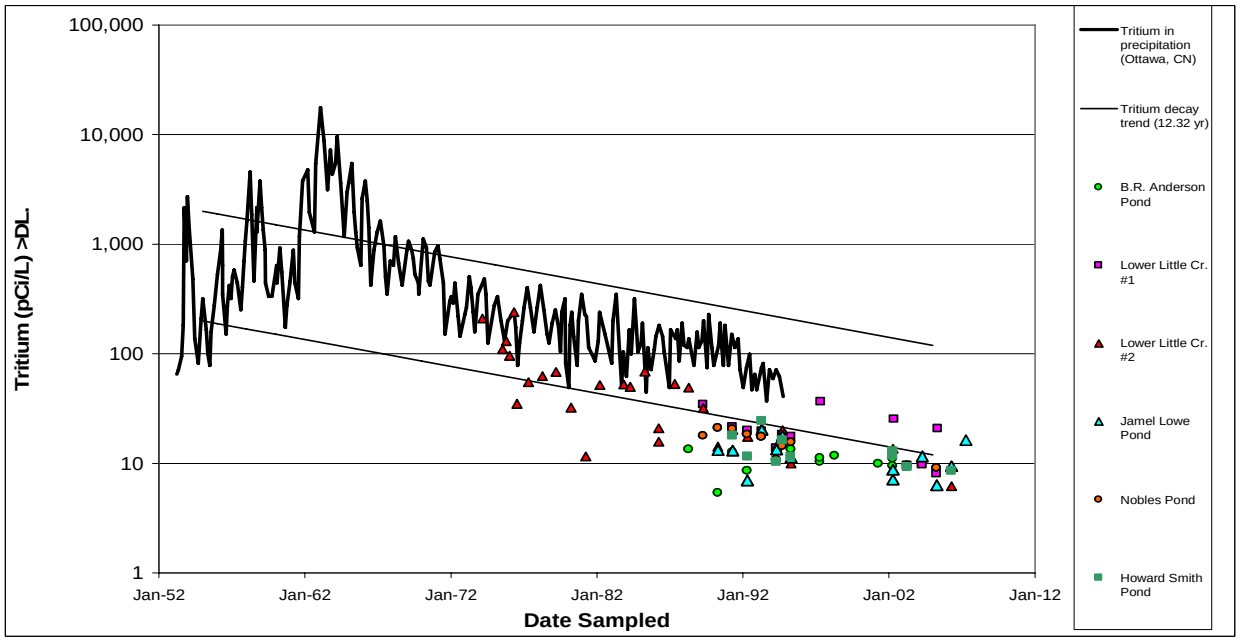

Figure 8. Tritium Decay Trend and Off-Site Surface Water Sample Concentrations

The tritium results for the Baxterville well are not believed to be due to contamination from the site. If the contamination had originated at the site, the decay curve for that well would show both the normal tritium decay curve and the effects of dilution in the ground water. This would result in a curve steeper than the tritium decay trend line. Tritium in the sample collected in Baxterville in April 2007 was below the detection limit.

Based on the fact that recent tritium detections in the off-site wells have been below or very near the detection limit, 2008 will be the last year for off-site tritium sampling. On-site sampling for tritium will continue to ensure that any tritium releases from the contamination in the blast cavity or Aquifer 5 will be detected in a timely manner.

3.3 Water Level Trends

Water levels were measured during four site visits in 2007. Ground water elevations are shown in Appendix B, Table B−2. Figure 9 is a trend plot that shows yearly ground water elevations for representative wells in selected aquifers.

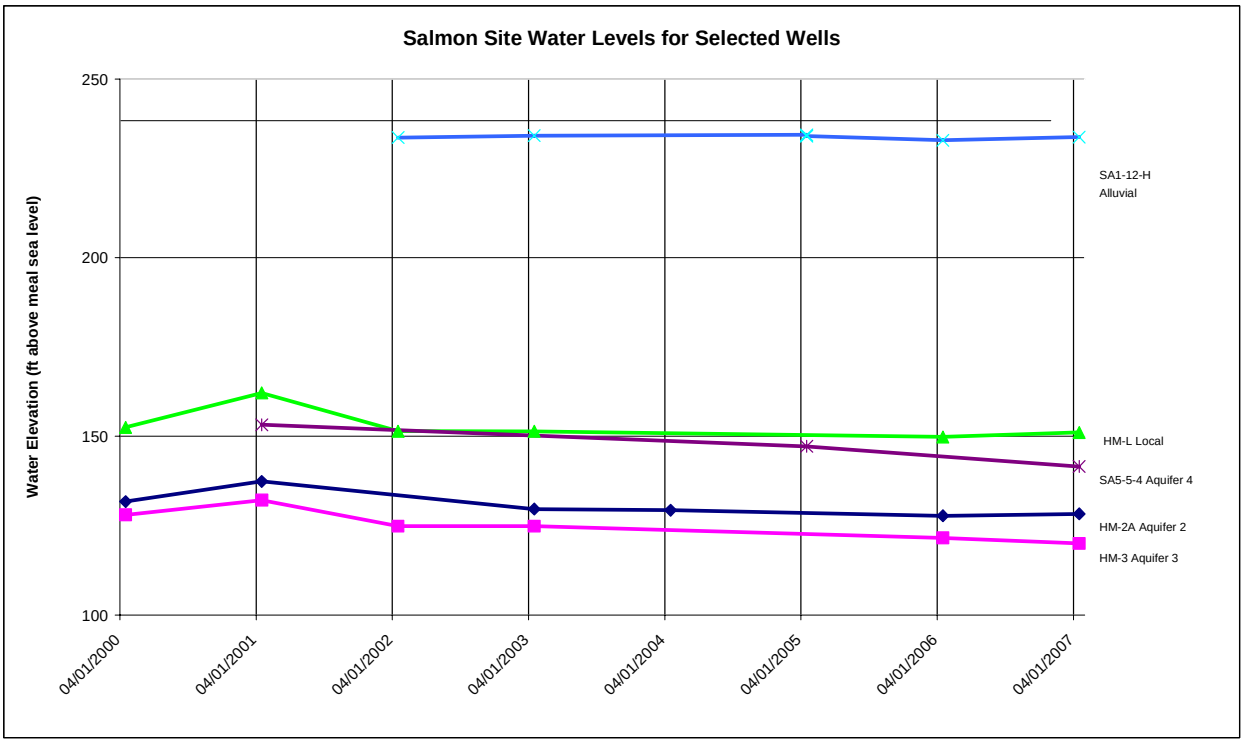

Figure 9. Hydrograph for Selected Wells

No elevation data for Aquifer 1 are presented because a top-of-casing elevation for the single well in that aquifer has not been surveyed. The elevation for Aquifer 4 is shown as higher than the elevations for Aquifers 2 and 3. The higher elevation in Aquifer 4 is because the aquifer is confined, resulting in a higher potentiometric surface.

4.0 Recommendations

The following actions are recommended for the Salmon Site:

- Implement an interagency agreement for beaver control to prevent future road damage along the pond.
- Contract for mowing of the road right-of-way.
- Discontinue off-site tritium sampling in 2009 with concurrence of the State of Mississippi.
- Continue the current on-site water sample plan that includes sampling of:
    - Resource Conservation and Recovery Act metals plus antimony, beryllium, nickel and zinc.
    - VOCs.
    - tritium and gamma-emitting elements.
- Survey new top-of-casing well elevations.
- Install well name plates.
- Replace locks to allow consistent access to gates and wells.
- Remove the Salmon display from the old Lamar County Courthouse and install an updated display in the new Lamar County Building and Courthouse.
- Determine who has enforcement authority for the deed restrictions at the site.
- Determine if the old bridge is considered a historical structure.
- Dispose of old pumps and well casing.
- Load historical analytical data into the SEEPro database for posting on GEMS.

5.0 References

Brown, R.M., 1995. Monthly Tritium in Precipitation at Ottawa, Canada 1953–1995, Atomic Energy of Canada Limited, http://www.science.uottawa.ca/~eih/ch7/7tritium.htm, last accessed August 2007.

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EPA Annual Water Sampling and Analysis at the Salmon Test Site Area, Lamar County, Mississippi, April 2007, EPA-402-R-08-002.

MDEQ (Mississippi Department of Environmental Quality), 2006. Subpart 11, *Risk Evaluation Procedures for Voluntary Cleanup and Redevelopment of Brownfield Sites*, http://www.deq.state.ms.us/MDEQ.nsf/pdf/GARD_brownfieldrisk/$File/Proced.pdf, Open Element, accessed 28 December 2006.

Appendix A

Site Photographs

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Photo A−1. New Fence Along North Site Boundary

Photo A−2. Beaver Dam Removal

Photo A−3. Half Moon Creek Bridge

Photo A−4. Road Blocked by Fallen Tree

Photo A−5. Monitor Well Sampling by EPA Sampling Team

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Appendix B

Analytical Results

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Table B−1. April 2007 Analytical Results

Location Type	Location	Date Sampled	Analyte	Result	Units	Detection Limit	Lab Qualifier	MCL or TRG
TN	FRAC TANK	04/19/07	Arsenic	0.0004	mg/L	0.000012		
TN	FRAC TANK	04/19/07	Barium	0.24	mg/L	0.0001		
TN	**FRAC TANK**	**04/19/07**	**Chromium**	**0.11**	**mg/L**	**0.00058**		**0.1**
TN	FRAC TANK	04/19/07	Lead	0.0006	mg/L	0.000026		
TN	FRAC TANK	04/19/07	Selenium	7E-05	mg/L	0.000038	B	
TN	FRAC TANK	04/19/07	Zinc	0.0088	mg/L	0.001	B	
SL	HALFMOON CREEK	04/16/07	Arsenic	0.0002	mg/L	0.000012		
SL	HALFMOON CREEK	04/16/07	Barium	0.038	mg/L	0.0001		
SL	HALFMOON CREEK	04/16/07	Selenium	1E-04	mg/L	0.000038	B	
SL	HALFMOON CREEK	04/16/07	Zinc	0.0043	mg/L	0.001	B	
SL	HALFMOONCRKOVER FLOW	04/16/07	Arsenic	0.0008	mg/L	0.000012		
SL	HALFMOONCRKOVER FLOW	04/16/07	Barium	0.054	mg/L	0.0001		
SL	HALFMOONCRKOVER FLOW	04/16/07	Mercury	7E-06	mg/L	3.8E-06	B	
SL	HALFMOONCRKOVER FLOW	04/16/07	Selenium	0.0001	mg/L	0.000038		
SL	HALFMOONCRKOVER FLOW	04/16/07	Zinc	0.0048	mg/L	0.001	B	
WL	HM-3	04/16/07	Arsenic	0.0001	mg/L	0.000012	B	
WL	HM-3	04/16/07	Barium	0.29	mg/L	0.0001		
WL	**HM-3**	**04/16/07**	**Chromium**	**0.12**	**mg/L**	**0.00058**		**0.1**
WL	HM-3	04/16/07	Selenium	6E-05	mg/L	0.000038	B	
WL	HM-3	04/16/07	Zinc	0.0053	mg/L	0.001	B	
WL	HMH-16R	04/17/07	Arsenic	0.0004	mg/L	0.000012		
WL	HMH-16R	04/17/07	Barium	0.17	mg/L	0.0001		
WL	HMH-16R	04/17/07	Beryllium	0.0004	mg/L	0.000082	B	
WL	HMH-16R	04/17/07	Mercury	7E-05	mg/L	3.8E-06	B	
WL	HMH-16R	04/17/07	Selenium	5E-05	mg/L	0.000038	B	
WL	HMH-16R	04/17/07	Zinc	0.023	mg/L	0.001		
WL	HMH-5R	04/17/07	Arsenic	0.0046	mg/L	0.000012		
WL	HMH-5R	04/17/07	Barium	0.75	mg/L	0.0001		
WL	HMH-5R	04/17/07	Beryllium	0.0001	mg/L	0.000082	B	
WL	**HMH-5R**	**04/17/07**	***cis*-1,2-Dichloroethene**	**130**	**µg/L**	**1.7**		**70**
WL	HMH-5R	04/17/07	Mercury	2E-05	mg/L	3.8E-06	B	
WL	HMH-5R	04/17/07	Selenium	5E-05	mg/L	0.000038	B	
WL	HMH-5R	04/17/07	*trans*-1,2-Dichloroethene	6.4	µg/L	1.7		
WL	**HMH-5R**	**04/17/07**	**Trichloroethene**	**190**	**µg/L**	**3.3**		**5**
WL	HMH-5R	04/17/07	Zinc	0.024	mg/L	0.001		
WL	HM-L	04/16/07	Arsenic	0.0003	mg/L	0.000012		
WL	HM-L	04/16/07	Barium	0.2	mg/L	0.0001		
WL	HM-L	04/16/07	Nickel	0.001	mg/L	0.00091	B	
WL	HM-L	04/16/07	Selenium	5E-05	mg/L	0.000038	B	
WL	HM-L	04/16/07	Zinc	0.0018	mg/L	0.001	B	
WL	HM-L2	04/17/07	Arsenic	0.0003	mg/L	0.000012		
WL	HM-L2	04/17/07	Barium	0.13	mg/L	0.0001		
WL	HM-L2	04/17/07	Selenium	4E-05	mg/L	0.000038	B	

Table B−1 (continued). April 2007 Analytical Results

Location Type	Location	Date Sampled	Analyte	Result	Units	Detection Limit	Lab Qualifier	MCL or TRG
WL	HM-L2	04/17/07	Silver	0.0007	mg/L	0.00047	B	
WL	HM-L2	04/17/07	Zinc	0.0058	mg/L	0.001	B	
WL	HM-S	04/17/07	Arsenic	0.0002	mg/L	0.000012		
WL	HM-S	04/17/07	Barium	0.033	mg/L	0.0001		
WL	HM-S	04/17/07	Mercury	1E-05	mg/L	3.8E-06	B	
WL	HM-S	04/17/07	Selenium	0.0001	mg/L	0.000038		
WL	HM-S	04/17/07	Zinc	0.025	mg/L	0.001		
SL	Pond West of GZ	04/16/07	Arsenic	0.0005	mg/L	0.000012		
SL	Pond West of GZ	04/16/07	Barium	0.042	mg/L	0.0001		
SL	Pond West of GZ	04/16/07	Mercury	5E-06	mg/L	3.8E-06	B	
SL	Pond West of GZ	04/16/07	Selenium	8E-05	mg/L	0.000038	B	
SL	Pond West of GZ	04/16/07	Zinc	0.0068	mg/L	0.001	B	
SL	Reeco Pit (A)	04/18/07	Arsenic	0.0003	mg/L	0.000012		
SL	Reeco Pit (A)	04/18/07	Barium	0.041	mg/L	0.0001		
SL	Reeco Pit (A)	04/18/07	Mercury	9E-06	mg/L	3.8E-06	B	
SL	Reeco Pit (A)	04/18/07	Selenium	6E-05	mg/L	0.000038	B	
SL	Reeco Pit (A)	04/18/07	Zinc	0.0045	mg/L	0.001	B	
SL	Reeco Pit (B)	04/18/07	Arsenic	0.001	mg/L	0.000012		
SL	Reeco Pit (B)	04/18/07	Barium	0.062	mg/L	0.0001		
SL	Reeco Pit (B)	04/18/07	Beryllium	0.0002	mg/L	0.000082	B	
SL	Reeco Pit (B)	04/18/07	Chromium	0.011	mg/L	0.00058		
SL	Reeco Pit (B)	04/18/07	Lead	0.004	mg/L	0.000026		
SL	Reeco Pit (B)	04/18/07	Mercury	2E-05	mg/L	3.8E-06	B	
SL	Reeco Pit (B)	04/18/07	Selenium	9E-05	mg/L	0.000038	B	
SL	Reeco Pit (B)	04/18/07	Zinc	0.013	mg/L	0.001	B	
SL	Reeco Pit (C)	04/18/07	Arsenic	0.0005	mg/L	0.000012		
SL	Reeco Pit (C)	04/18/07	Barium	0.031	mg/L	0.0001		
SL	Reeco Pit (C)	04/18/07	Lead	0.0013	mg/L	0.000026		
SL	Reeco Pit (C)	04/18/07	Mercury	1E-05	mg/L	3.8E-06	B	
SL	Reeco Pit (C)	04/18/07	Selenium	6E-05	mg/L	0.000038	B	
SL	Reeco Pit (C)	04/18/07	Zinc	0.0085	mg/L	0.001	B	
WL	SA1-12-H	04/17/07	Arsenic	0.0004	mg/L	0.000012		
WL	SA1-12-H	04/17/07	Barium	0.39	mg/L	0.0001		
WL	SA1-12-H	04/17/07	Beryllium	0.0002	mg/L	0.000082	B	
WL	SA1-12-H	04/17/07	Nickel	0.0086	mg/L	0.00091	B	
WL	SA1-12-H	04/17/07	Selenium	8E-05	mg/L	0.000038	B	
WL	SA1-12-H	04/17/07	Zinc	0.047	mg/L	0.001		
WL	SA1-1-H	04/17/07	Arsenic	0.0052	mg/L	0.000012		
WL	SA1-1-H	04/17/07	Barium	0.36	mg/L	0.0001		
WL	SA1-1-H	04/17/07	*cis*-1,2-Dichloroethene	6.1	µg/L	1.7		
WL	SA1-1-H	04/17/07	Mercury	4E-06	mg/L	3.8E-06	B	
WL	SA1-1-H	04/17/07	Selenium	7E-05	mg/L	0.000038	B	
WL	SA1-1-H	04/17/07	Zinc	0.013	mg/L	0.001	B	
WL	SA1-2-H	04/17/07	Arsenic	0.0045	mg/L	0.000012		
WL	SA1-2-H	04/17/07	Barium	0.032	mg/L	0.0001		
WL	SA1-2-H	04/17/07	Beryllium	9E-05	mg/L	0.000082	B	
WL	SA1-2-H	04/17/07	*cis*-1,2-	11	µg/L	1.7		

Table B−1 (continued). April 2007 Analytical Results

Location Type	Location	Date Sampled	Analyte	Result	Units	Detection Limit	Lab Qualifier	MCL or TRG
			Dichloroethene					
WL	SA1-2-H	04/17/07	Mercury	7E-06	mg/L	3.8E-06	B	
WL	SA1-2-H	04/17/07	Selenium	0.0001	mg/L	0.000038		
WL	SA1-2-H	04/17/07	Silver	0.0006	mg/L	0.00047	B	
WL	SA1-2-H	04/17/07	Zinc	0.12	mg/L	0.001		
WL	**SA1-3-H**	**04/17/07**	**Arsenic**	**0.012**	**mg/L**	**0.000012**		**0.01**
WL	SA1-3-H	04/17/07	Barium	0.05	mg/L	0.0001		
WL	SA1-3-H	04/17/07	Beryllium	0.0002	mg/L	0.000082	B	
WL	SA1-3-H	04/17/07	*cis*-1,2-Dichloroethene	25	µg/L	1.7		
WL	SA1-3-H	04/17/07	Mercury	6E-06	mg/L	3.8E-06	B	
WL	SA1-3-H	04/17/07	Selenium	0.0002	mg/L	0.000038		
WL	SA1-3-H	04/17/07	Silver	0.0008	mg/L	0.00047	B	
WL	SA1-3-H	04/17/07	*trans*-1,2-Dichloroethene	12	µg/L	1.7		
WL	SA1-3-H	04/17/07	Zinc	0.016	mg/L	0.001	B	
WL	SA1-4-H	04/17/07	Arsenic	0.0003	mg/L	0.000012		
WL	SA1-4-H	04/17/07	Arsenic	0.0004	mg/L	0.000012		
WL	SA1-4-H	04/17/07	Barium	0.32	mg/L	0.0001		
WL	SA1-4-H	04/17/07	Beryllium	0.0001	mg/L	0.000082	B	
WL	SA1-4-H	04/17/07	Cadmium	5E-05	mg/L	0.00004	B	
WL	SA1-4-H	04/17/07	Lead	0.0002	mg/L	0.000026	B	
WL	SA1-4-H	04/17/07	Mercury	4E-06	mg/L	3.8E-06	B	
WL	SA1-4-H	04/17/07	Selenium	5E-05	mg/L	0.000038	B	
WL	SA1-4-H	04/17/07	Selenium	9E-05	mg/L	0.000038	B	
WL	SA1-4-H	04/17/07	Zinc	0.012	mg/L	0.001	B	
WL	SA1-4-H	04/17/07	Zinc	0.014	mg/L	0.001	B	
WL	SA1-5-H	04/17/07	Arsenic	0.0036	mg/L	0.000012		
WL	SA1-5-H	04/17/07	Barium	0.023	mg/L	0.0001		
WL	SA1-5-H	04/17/07	*cis*-1,2-Dichloroethene	5.2	µg/L	1.7		
WL	SA1-5-H	04/17/07	Mercury	4E-06	mg/L	3.8E-06	B	
WL	SA1-5-H	04/17/07	Selenium	0.0003	mg/L	0.000038		
WL	SA1-5-H	04/17/07	Zinc	0.053	mg/L	0.001		
WL	SA1-6-H	04/17/07	Antimony	0.0006	mg/L	0.000036		
WL	**SA1-6-H**	**04/17/07**	**Arsenic**	**0.019**	**mg/L**	**0.000012**		**0.01**
WL	SA1-6-H	04/17/07	Barium	0.041	mg/L	0.0001		
WL	SA1-6-H	04/17/07	Cadmium	0.0005	mg/L	0.00004		
WL	SA1-6-H	04/17/07	Chromium	0.015	mg/L	0.00058		
WL	**SA1-6-H**	**04/17/07**	**Lead**	**0.016**	**mg/L**	**0.000026**		**0.015[a]**
WL	SA1-6-H	04/17/07	Mercury	0.0001	mg/L	3.8E-06	B	
WL	SA1-6-H	04/17/07	Selenium	0.0002	mg/L	0.000038		
WL	SA1-6-H	04/17/07	Zinc	0.023	mg/L	0.001		
WL	SA1-7-H	04/17/07	Arsenic	0.0074	mg/L	0.000012		
WL	SA1-7-H	04/17/07	Barium	0.46	mg/L	0.0001		
WL	SA1-7-H	04/17/07	Beryllium	0.0002	mg/L	0.000082	B	
WL	SA1-7-H	04/17/07	Mercury	2E-05	mg/L	3.8E-06	B	
WL	SA1-7-H	04/17/07	Selenium	0.0002	mg/L	0.000038		
WL	SA1-7-H	04/17/07	Zinc	0.02	mg/L	0.001	B	

Table B−1 (continued). April 2007 Analytical Results

Location Type	Location	Date Sampled	Analyte	Result	Units	Detection Limit	Lab Qualifier	MCL or TRG
WL	SA1-8-L	04/18/07	Arsenic	0.0051	mg/L	0.000012		
WL	SA1-8-L	04/18/07	Barium	0.17	mg/L	0.0001		
WL	SA1-8-L	04/18/07	Selenium	0.0001	mg/L	0.000038		
WL	SA1-8-L	04/18/07	Zinc	0.011	mg/L	0.001	B	
WL	**SA2-1-L**	**04/18/07**	**Arsenic**	**0.011**	**mg/L**	**0.000012**		**0.01**
WL	SA2-1-L	04/18/07	Barium	0.055	mg/L	0.0001		
WL	SA2-1-L	04/18/07	Selenium	0.0001	mg/L	0.000038		
WL	SA2-1-L	04/18/07	Zinc	0.006	mg/L	0.001	B	
WL	SA2-2-L	04/18/07	Arsenic	0.004	mg/L	0.000012		
WL	SA2-2-L	04/18/07	Barium	0.32	mg/L	0.0001		
WL	SA2-2-L	04/18/07	Chromium	0.0073	mg/L	0.00058		
WL	SA2-2-L	04/18/07	Lead	0.0072	mg/L	0.000026		
WL	SA2-2-L	04/18/07	Nickel	0.003	mg/L	0.00091	B	
WL	SA2-2-L	04/18/07	Selenium	0.0002	mg/L	0.000038		
WL	SA2-2-L	04/18/07	Zinc	0.0056	mg/L	0.001	B	
WL	SA3-4-H	04/17/07	Arsenic	0.0011	mg/L	0.000012		
WL	SA3-4-H	04/17/07	Barium	0.27	mg/L	0.0001		
WL	SA3-4-H	04/17/07	Barium	0.28	mg/L	0.0001		
WL	SA3-4-H	04/17/07	Cadmium	5E-05	mg/L	0.00004	B	
WL	SA3-4-H	04/17/07	Lead	0.0003	mg/L	0.000026	B	
WL	SA3-4-H	04/17/07	Mercury	1E-05	mg/L	3.8E-06	B	
WL	SA3-4-H	04/17/07	Selenium	8E-05	mg/L	0.000038	B	
WL	SA3-4-H	04/17/07	Selenium	9E-05	mg/L	0.000038	B	
WL	SA3-4-H	04/17/07	Silver	0.0007	mg/L	0.00047	B	
WL	SA3-4-H	04/17/07	Zinc	0.023	mg/L	0.001		
WL	SA3-4-H	04/17/07	Zinc	0.025	mg/L	0.001		
WL	SA4-5-L	04/19/07	Antimony	0.0009	mg/L	0.000036		
WL	SA4-5-L	04/19/07	Arsenic	0.0003	mg/L	0.000012		
WL	**SA4-5-L**	**04/19/07**	**Barium**	**2**	**mg/L**	**0.0001**		**2**
WL	SA4-5-L	04/19/07	Chromium	0.039	mg/L	0.00058		
WL	SA4-5-L	04/19/07	Lead	0.0063	mg/L	0.000026		
WL	SA4-5-L	04/19/07	Selenium	0.0002	mg/L	0.000038		
WL	SA4-5-L	04/19/07	Zinc	0.43	mg/L	0.001		

[a]EPA Action Level

Note: bold rows identify results that exceed the MCL or TRG
SL = Surface location; surface water sample
WL = Well
TN = Tank
B = Result is between the instrument detection limit and contract required detection limit.

Statistics:
28 Total number of sample locations (no duplicates)
1,601 Total number of lab analyses on field samples (no duplicates)
168 Number of unique analyses greater than the detection limit AND with data (F, J or, null) or lab (B, D, I, or null) qualifiers.
9 Number of analyses above a standard
7 Number of sample locations with one or more results above a standard

Table B−2. 2007 Water Level Measurements

Sample Date			2/16/07		4/13/07		5/30/07		9/21/07	
Well ID	Well TOC Elevation	Aquifer	Ground Water Elevation (ft)	Depth to Water (ft)	Ground Water Elevation (ft)	Depth to Water (ft)	Ground Water Elevation (ft)	Depth to Water (ft)	Ground Water Elevation (ft)	Depth to Water (ft)
HMH-16R	243.51	Alluvial	240.09	3.42	238.42	5.09	236.03	7.48	*	8.67
HMH-5R	239.44	Alluvial	236.00	3.44	235.29	4.15	233.48	5.96	*	5.13
HM-S	ND	Alluvial	ND	6.68	ND	7.55	ND	9.28	*	8.77
SA1-12-H	241.4	Alluvial	234.68	6.72	233.76	7.64	232.80	8.60	*	9.24
SA1-1-H	242.26	Alluvial	237.06	5.20	236.26	6.00	234.48	7.78	*	7.25
SA1-2-H	243.06	Alluvial	237.06	6.00	236.29	6.77	234.64	8.42	*	7.91
SA1-3-H	241.95	Alluvial	237.15	4.80	236.41	5.54	234.85	7.10	*	6.51
SA1-4-H	242.14	Alluvial	238.70	3.44	237.69	4.45	235.75	6.39	*	5.94
SA1-5-H	243.51	Alluvial	239.21	4.30	238.29	5.22	236.40	7.11	*	7.00
SA1-6-H	241.91	Alluvial	ND	ND	238.65	3.26	236.91	5.00	*	5.15
SA1-7-H	243.05	Alluvial	239.66	3.39	238.28	4.77	237.09	5.96	*	6.10
SA3-4-H	ND	Alluvial	ND	ND	ND	ND	ND	5.98	*	5.25
HM-L	242.35	Local	151.05	91.30	151.12	91.23	150.93	91.42	*	91.73
HM-L2	252.59	Local	155.95	96.64	155.89	96.70	ND	ND	*	99.20
SA1-8-L	251.51	Local	157.22	94.29	ND	ND	156.58	94.93	*	95.54
SA2-1-L	335.75	Local	157.35	178.40	ND	ND	ND	>150	*	179.70
SA2-2-L	325.79	Local	ND	ND	ND	ND	272.78	53.01	*	169.04
SA2-4-L	290.61	Local	157.63	132.98	ND	ND	156.99	133.62	*	134.40
SA4-5-L	267.21	Local	154.25	112.96	ND	ND	154.40	112.81	*	113.35
HM-1	ND	1	ND	96.30	ND	96.47	ND	96.60	*	97.17
HM-2A	243.57	2a	128.34	115.23	128.32	115.25	128.07	115.50	*	116.43
HM-2B	243.47	2b	120.44	123.03	120.43	123.04	120.07	123.40	*	124.08
HM-3	240.35	3	120.08	120.27	120.07	120.28	119.74	120.61	*	121.30
SA1-11-3	250.13	3	ND	ND	ND	ND	119.56	130.57	*	131.09
SA3-11-3	253.42	3	ND	ND	ND	ND	118.37	135.05	*	135.59
SA5-4-4	301.51	4	ND	ND	ND	ND	208.45	93.06	*	107.92
SA5-5-4	301.05	4	142.97	158.08	141.58	159.47	ND	>150	*	158.89
E-7	260	Caprock	122.02	137.98	ND	ND	121.89	138.11	*	138.63

Note: Water level elevations are in feet above mean sea level and are calculated based on depth to water measurements.
*Because of changes to the wells, new top-of-casing elevations need to be surveyed before the ground water elevation can be determined.
ND = Not Determined

End of current text