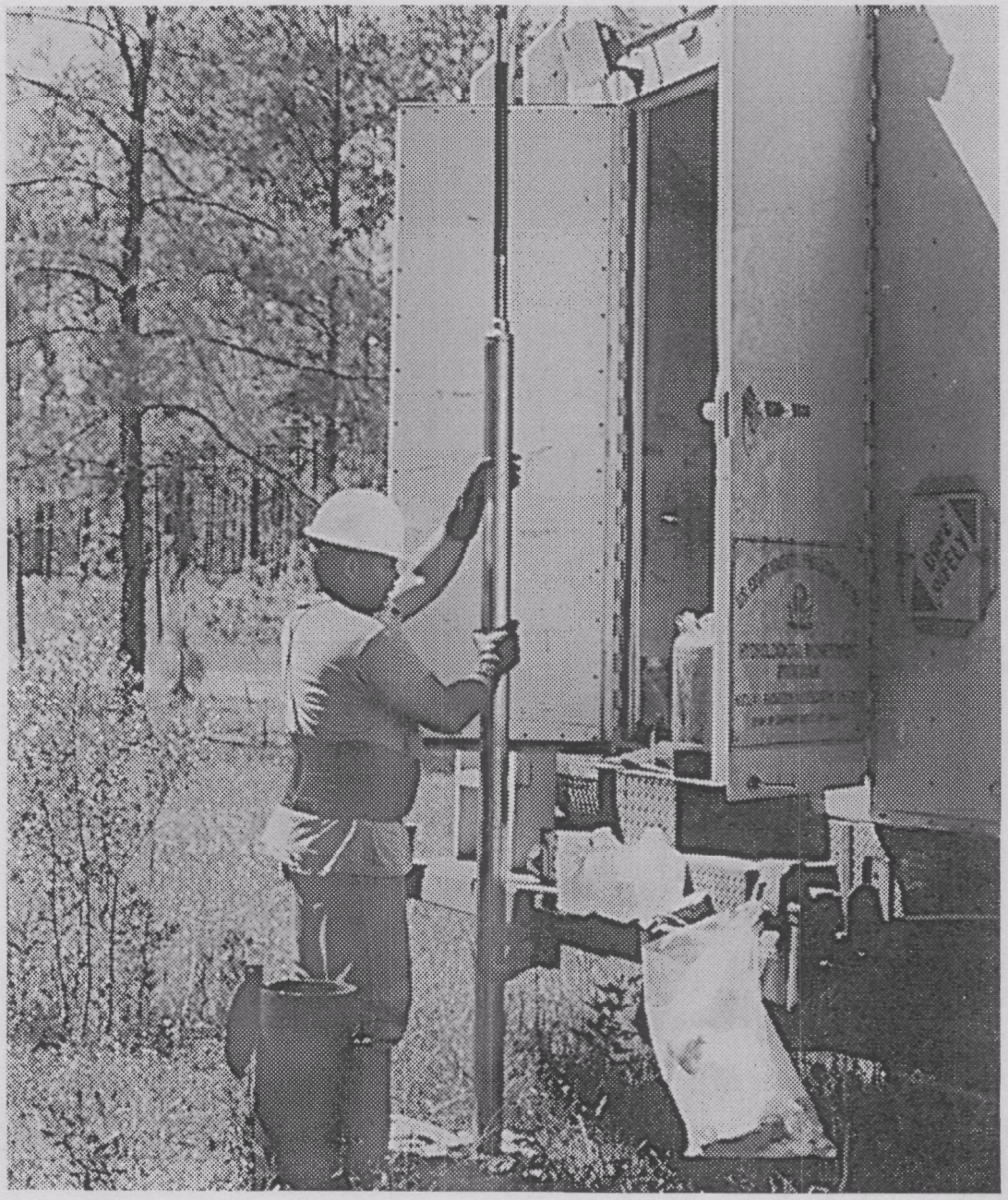
United States
Environmental Protection
Agency

Office of Radiation
and Indoor Air
Washington DC 20460

EPA 402-R-96-008
February 1996

EPA

Annual Water Sampling and Analysis at the Salmon Test Site Area, Lamar County, Mississippi April 1995



786RSB.95

Annual Water Sampling and Analysis at the Salmon Test Site Area, Lamar County, Mississippi April 1995

by

Max G. Davis
Scott H. Faller

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Radiation Sciences Laboratory - Las Vegas
P.O. Box 98517
Las Vegas, NV 89193-8517

prepared for the U.S. Department Of Energy
under Interagency Agreement
DE-A108-91NV10963

RADIATION SCIENCES LABORATORY - LAS VEGAS
OFFICE OF RADIATION AND INDOOR AIR
U.S. ENVIRONMENTAL PROTECTION AGENCY
LAS VEGAS, NV 89193-3478

786RSB95

NOTICE

The information in this document has been funded wholly or in part by the United States Environmental Protection Agency (EPA) through Interagency Agreement DE-A108-91NV10963 from the United States Department of Energy (DOE). It has been subject to the Agency's peer and administrative review, and it has been approved for publication as an EPA document. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Subsequent to the completion of this study but prior to publication of this report an internal EPA reorganization resulted in a name change for some organizational elements. The EPA Environmental Monitoring Systems Laboratory - Las Vegas (EMSL-LV) is now the Characterization Research Division - Las Vegas (CRD-LV), part of the EPA National Exposure Research Laboratory (NERL). The Radiation Sciences Division (RSD) is now the ORIA Radiation Sciences Laboratory-Las Vegas, September 30, 1995.

ABSTRACT

In 1964 and 1966, nuclear explosives were detonated approximately 2,700 feet (823 m) underground in the Salmon Test Site Area located in Lamar County, Mississippi. Drilling and clean-up activities have resulted in tritium contamination in close proximity to the surface ground zero. The Long-Term Hydrological Monitoring Program directed by the U.S. Environmental Protection Agency conducts annual water sampling on and around the Salmon Test Site Area.

No radioactive materials from the Salmon Test Site Area were detected in any water samples collected offsite. The highest tritium concentration found in water collected in the offsite area was 33 pCi/L, which is typical of background tritium levels is 0.16 percent of the National Interim Primary Drinking Water Regulations (40CFR141). The highest tritium concentration found onsite was 5,110 pCi/L. This was detected in a water sample collected from Well HM-S, which is a shallow well near surface ground zero. The water from this well is not available to the public nor is it potable.

CONTENTS

	Page
Notice	ii
Abstract	iii
Figures	v
Acronyms and Abbreviations	vi
Acknowledgments	vii
Introduction	1
History	1
Historical Monitoring Results	1
Sampling	4
Sample Analysis Procedures	7
Water Analysis Results	7
Conclusion	10
References	11
Glossary of Terms	12
Appendices	
A. Summary of Analytical Procedures	13

FIGURES

Figure Number		Page
1	General site location of Project Salmon Test Site Area	2
2	Topographic map of the Salmon Test Site Area showing the Surface Ground Zero and outline of Test Area at 2,700 feet below land surface	3
3	Test cavity and aquifers	4
4	Tritium concentration vs. sampling year for HMH-1 (depth = 10 ft)	5
5	Tritium concentration vs. sampling year for HMH-2 (depth = 10 ft)	5
6	Tritium concentration vs. sampling year for HMH-5 (depth = 10 ft)	6
7	Tritium concentration vs. sampling year for HM-S (depth = 30 ft)	6
8	Tritium concentration vs. sampling year for HM-L (depth = 200 ft)	7
9	Locations on the Salmon Test Site Area sampled in 1995	8
10	Offsite locations sampled in 1995	9

ACRONYMS AND ABBREVIATIONS

DOE	U.S. Department of Energy
EMSL-LV	Environmental Monitoring Systems Laboratory - Las Vegas
U.S. EPA	U.S. Environmental Protection Agency
g	gram
Ge(Li)	lithium-drifted germanium gamma detector
HpGe	High purity germanium gamma detector
keV	kilo electron volts = thousand electron volts
kg	kilogram, 1000 grams
kt	kiloton (TNT equivalent)
LTHMP	Long-Term Hydrological Monitoring Program
L	liter
m	meter
min	minute
MDC	minimum detectable concentration
MeV	million electron volts
mL	milliliter = one thousandth of a liter
pCi/L	picocuries per liter = 10^{-12} curies per liter = 1/1,000,000,000,000 curies per liter
PHS	U.S. Public Health Service
SGZ	surface ground zero
^{3}H	tritium
$^{3}H+$	enriched tritium
HMH	Hydrological Monitoring Hole (1-16)
HM-L, HM-L2	Hydrological Monitoring Well - Local Aquifer
HM-S	Hydrological Monitoring Well - Surficial Aquifer
HM-1	Hydrological Monitoring Well - Aquifer 1
HM-2a	Hydrological Monitoring Well - Aquifer 2a
HM-2b	Hydrological Monitoring Well - Aquifer 2b
HM-3	Hydrological Monitoring Well - Aquifer 3
HT-2c	Hydrological Test Hole
HT-4	Hydrological Test Hole
HT-5	Hydrological Test Hole
RSD	Radiation Sciences Division

ACKNOWLEDGMENTS

The authors would like to acknowledge James R. Harris, Herbert Maunu, Kenneth Giles, Julius Barth, and the staff of the hydrological monitoring group, U.S. Environmental Protection Agency, for their dedication to quality and their tireless work in the execution of the sampling effort.

INTRODUCTION

Under an Interagency Agreement with the U.S. Department of Energy (DOE), the Radiation Sciences Division (RSD) of the U.S. Environmental Protection Agency (EPA) located in Las Vegas, NV, conducts a Long-Term Hydrological Monitoring Program (LTHMP) to measure radioactivity concentrations in water sources near the sites of underground nuclear explosions. The results of the LTHMP provide assurance that radioactive materials from the tests have not migrated into drinking water supplies. This report presents the results for the samples collected in April 1995, on and around the Salmon Test Site Area, in Lamar County, Mississippi.

History

Project Dribble, consisting of two nuclear explosions, and Project Miracle Play, consisting of two non-nuclear gas explosions, were conducted in the Salmon Test Site Area, near Baxterville, Lamar County, Mississippi, between 1964 and 1970. The general area is depicted in Figure 1. This area is now called the Salmon Test Site Area (Figure 2) and contains approximately 1,470 acres located in Sections 11, 12, 13, and 14, Township 2 North, Range 16 West.

Test Date	Name	Type	Yield (kt)
10-22-64	Salmon	Nuclear	5.3
12-03-66	Sterling	Nuclear	0.38
02-02-69	Diode Tube	Gas	0.32
04-19-70	Humid Water	Gas	0.32

These tests were part of the Vela Uniform program of the U.S. Atomic Energy Commission (now the DOE). The purpose was to measure and evaluate the phenomena of seismic waves that are induced from the explosions as compared to those that occur naturally from earthquakes.

The first explosion, the Salmon Event, created a cavity in the Salt Dome underlying the Salmon Test Site Area that was used for the following three explosions. The top of the cavity is 1,160 feet (360 m) below the top of the salt dome which lies 1,500 feet (460 m) below the land surface (Figure 3).

Following each detonation, the surrounding area was closely monitored by the U.S. Public Health Service (PHS). Radiological monitoring became the responsibility of the EPA at its inception in 1970, and after the second site cleanup operation in 1971-72, the LTHMP was instituted. In this program, all potable aquifers, several wells, public water supplies, and some surface waters in the vicinity of the Salmon Test Site are sampled and analyzed to determine the presence of tritium and other radioactive contamination.

Historical Monitoring Results

The disposal of drilling mud and fluids near the surface ground zero (SGZ) is possibly responsible for tritium (^3H) contamination of the nearby ground water and surficial aquifer. These waters lie at depths of 4 to 10 feet (1.3 to 3 m) and 30 feet (9 m), respectively, and are not potable. Tritium contamination is also present in the potable water of the Local Aquifer which lies at about 200 feet (62 m). The observed concentration of ^3H at that depth is well below the concentration specified in the National Interim Primary Drinking Water Regulations (40CFR141), and is thought to be due to drilling activities at the site (Fenske and Humphrey, 1980; Fordham and Fenske, 1985).

Of the twenty-eight wells that are sampled on the Salmon Site, five regularly have tritium values

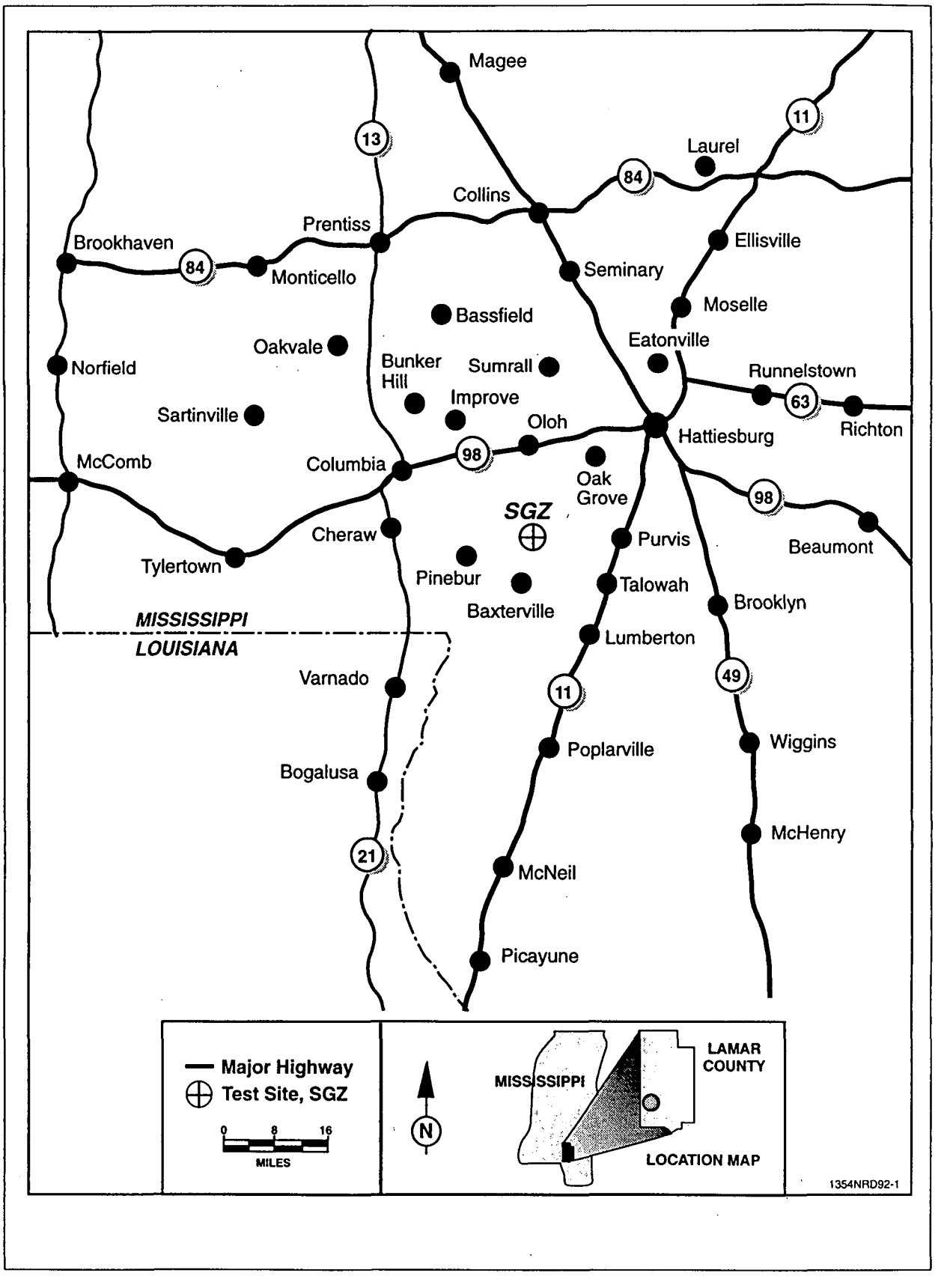


Figure 1. General site location of Project Salmon Test Site Area.

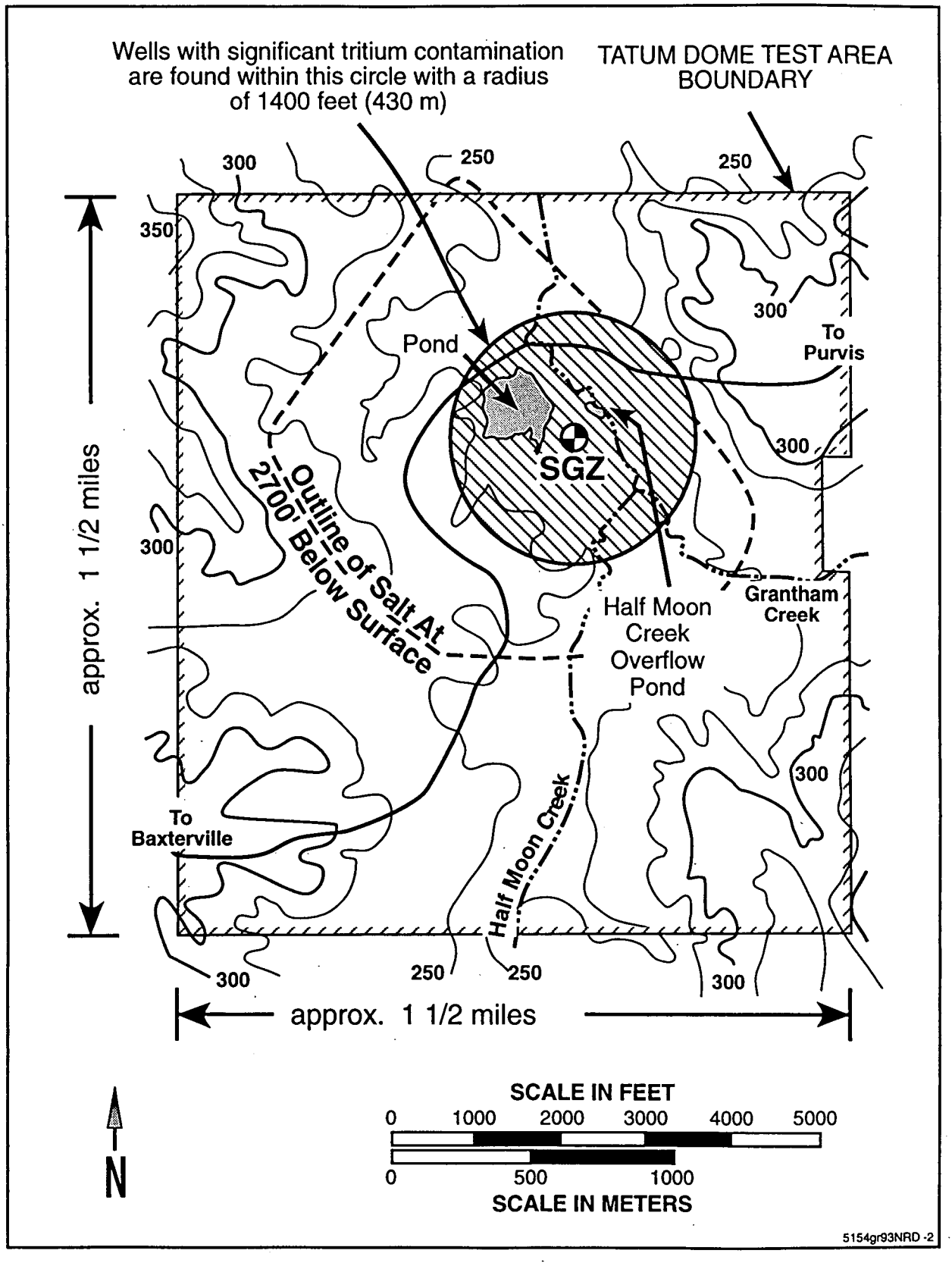


Figure 2. Topographic map of the Salmon Test Site Area showing the Surface Ground Zero and outline of Test Area at 2,700 feet (830 m) below land surface.

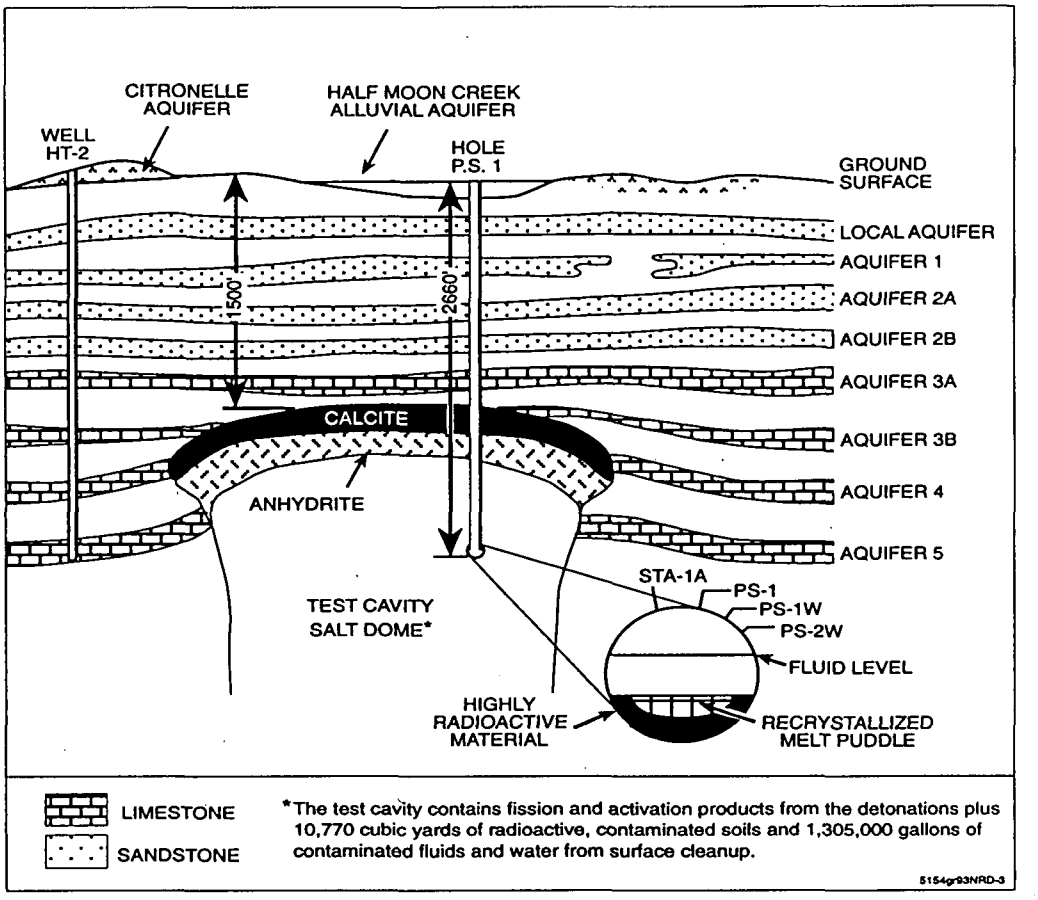


Figure 3. Test cavity and aquifers.

above those expected in surface water. These include surface ground water wells HMH-1, HMH-2, HMH-5, Local Aquifer well HM-L, and Surficial Aquifer well HM-S. Plots of tritium concentration vs. time for these wells are shown in Figures 4-8. The solid line in the graphs represents the normal radioactive decay of tritium.

Surface water collected from the Half Moon Creek overflow pond, which lies adjacent to the SGZ area, has tritium values above background. Also, the REECo Pit drainage area, used for the disposal of drilling mud, occasionally shows elevated levels of tritium.

Sampling

According to standard operating procedures (U.S. DOE 1981), the HMH wells on the test site were first sampled, pumped dry, and sampled again the following day. Wells HM-1, HM-2A, HM-2B, and HM-3, which lie adjacent to SGZ, were first sampled and then pumped steadily while further samples were taken at 30 min intervals until the pH and conductivity of the water stabilized. A final sample was taken from each well 30 min after stability was reached. Well HM-L, which also lies near SGZ, was initially sampled and then pumped steadily for 24 hrs, with samples taken at one hour intervals. Water samples were taken from sources near the SGZ area (i.e. Half Moon Creek, Half Moon Creek Overflow, and the Pond west of SGZ) before and after the pumping operations to identify any resulting changes in tritium concentration. Well HM-L2 was first sampled and then pumped for one hour before a second sample was taken. All other water supplies of this study were sampled only once.

The locations of all sampling sites are shown in Figures 9 - 10. Sampling also included three locations in Columbia, Mississippi (not shown). The sampling results are discussed in the following sections.

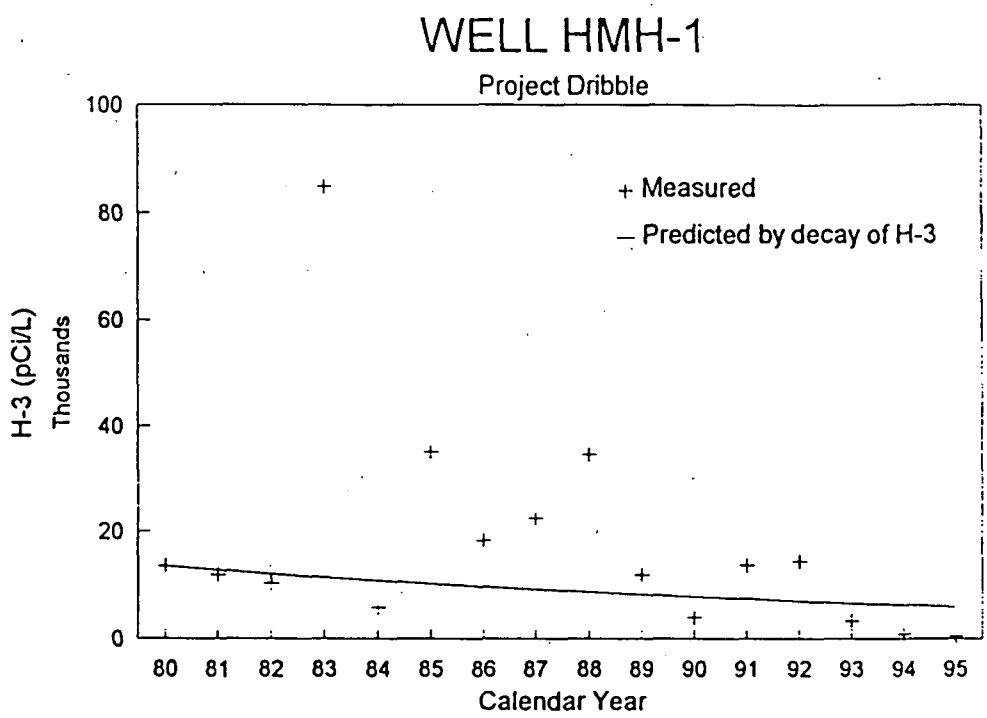


Figure 4. Tritium concentration vs. sampling year for HMH-1 (depth = 10 ft). The high value in 1983 occurred in a sample taken during the dry fall season.

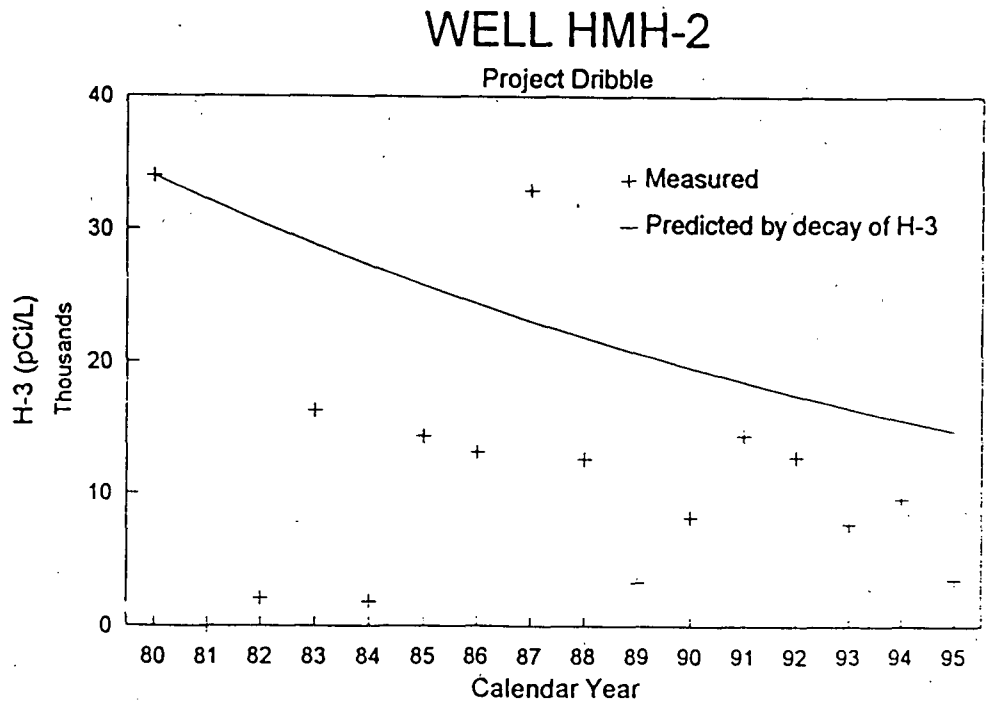


Figure 5. Tritium concentration vs. sampling year for HMH-2 (depth = 10 ft).

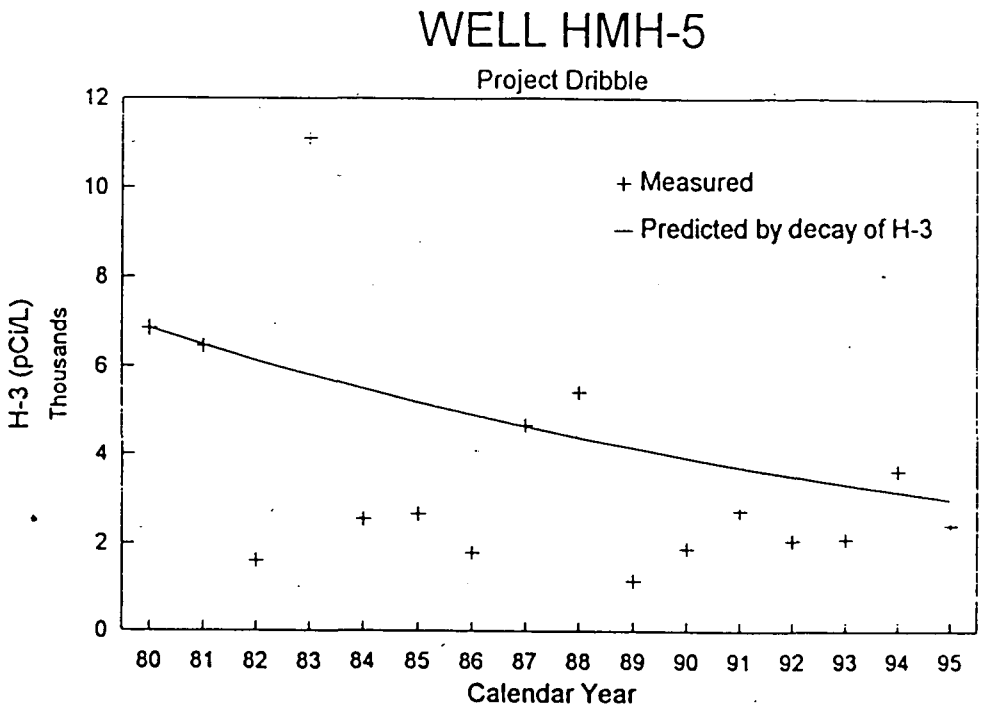


Figure 6. Tritium concentration vs. sampling year for HMH-5 (depth = 10 ft).

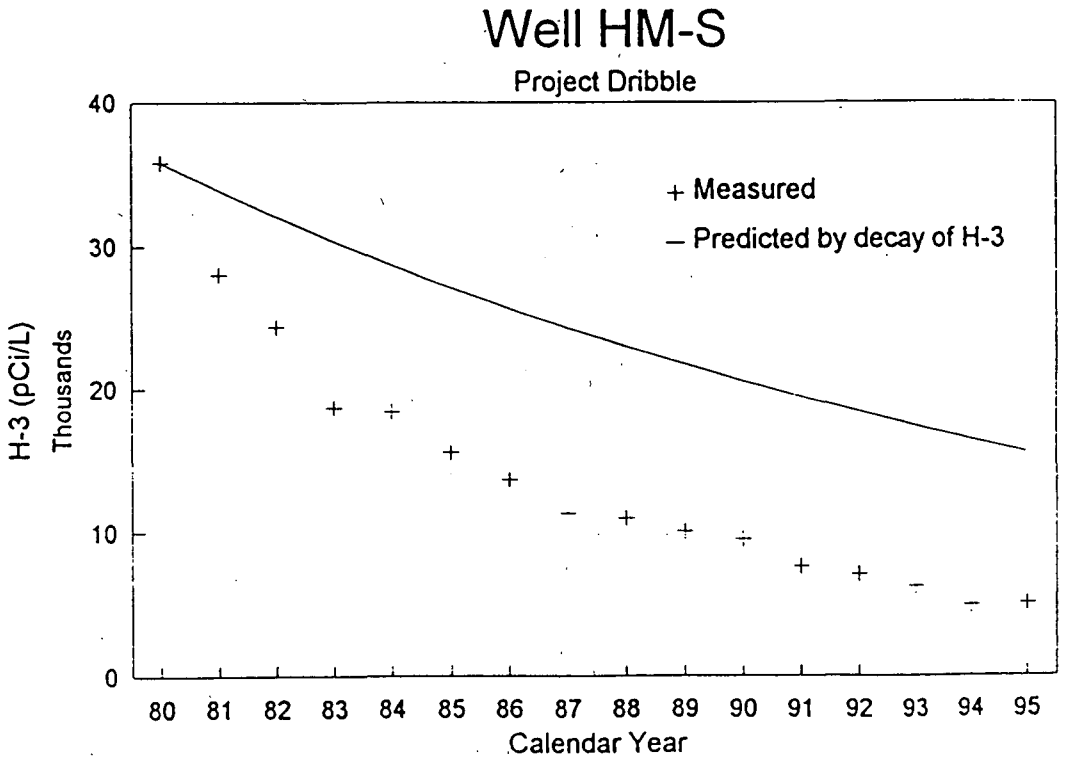


Figure 7. Tritium concentration vs. sampling year for HM-S (depth = 30 ft).

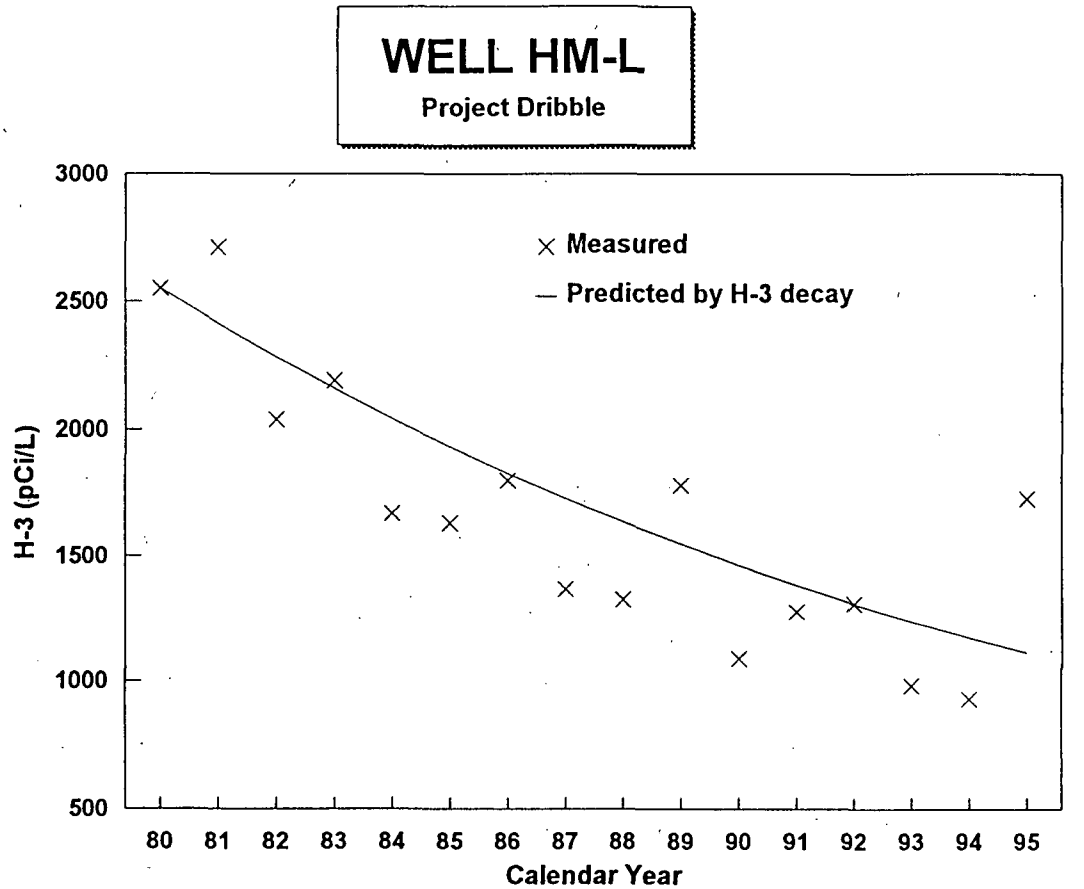


Figure 8. Tritium concentration vs. sampling year for HM-L (depth = 200 ft).

Sample Analysis Procedures

The procedures for the analysis of samples collected for this report were described by Johns et al. (1979) and are summarized in Appendix A. These include gamma spectral analysis and radiochemical analysis of tritium. The procedures are based on standard methodology for given analytical procedures. Two methods for tritium analysis are performed: conventional and electrolytic enrichment. The samples are initially analyzed by the conventional method. If the tritium result is less than 700 pCi/L, the sample is then analyzed by the electrolytic enrichment method which lowers the minimum detectable concentration (MDC) from approximately 300 pCi/L to 10 pCi/L. Sample results are corrected for the background radioactivity in the laboratory.

Water Analysis Results

Gamma-ray spectral analysis results indicated that no man-made gamma-emitting radionuclides were present in any onsite or offsite samples above the MDC. The highest tritium concentration (which is a beta emitter only) above the MDC in water collected from the offsite area was 33 pCi/L. This is typical of background tritium levels and is 0.16 percent of the National Interim Primary Drinking Water Regulations (40CFR141), which places the maximum level of tritium in drinking water at 20,000 pCi/L. The onsite water sample from Well HM-S had the highest tritium concentration, 5110 pCi/L, which is 25.5 percent of the drinking water regulation. The well HM-S is less than 30 feet in depth and is located approximately 5 feet west of SGZ. The water is not accessible to the public nor suitable for drinking due to its brackishness.

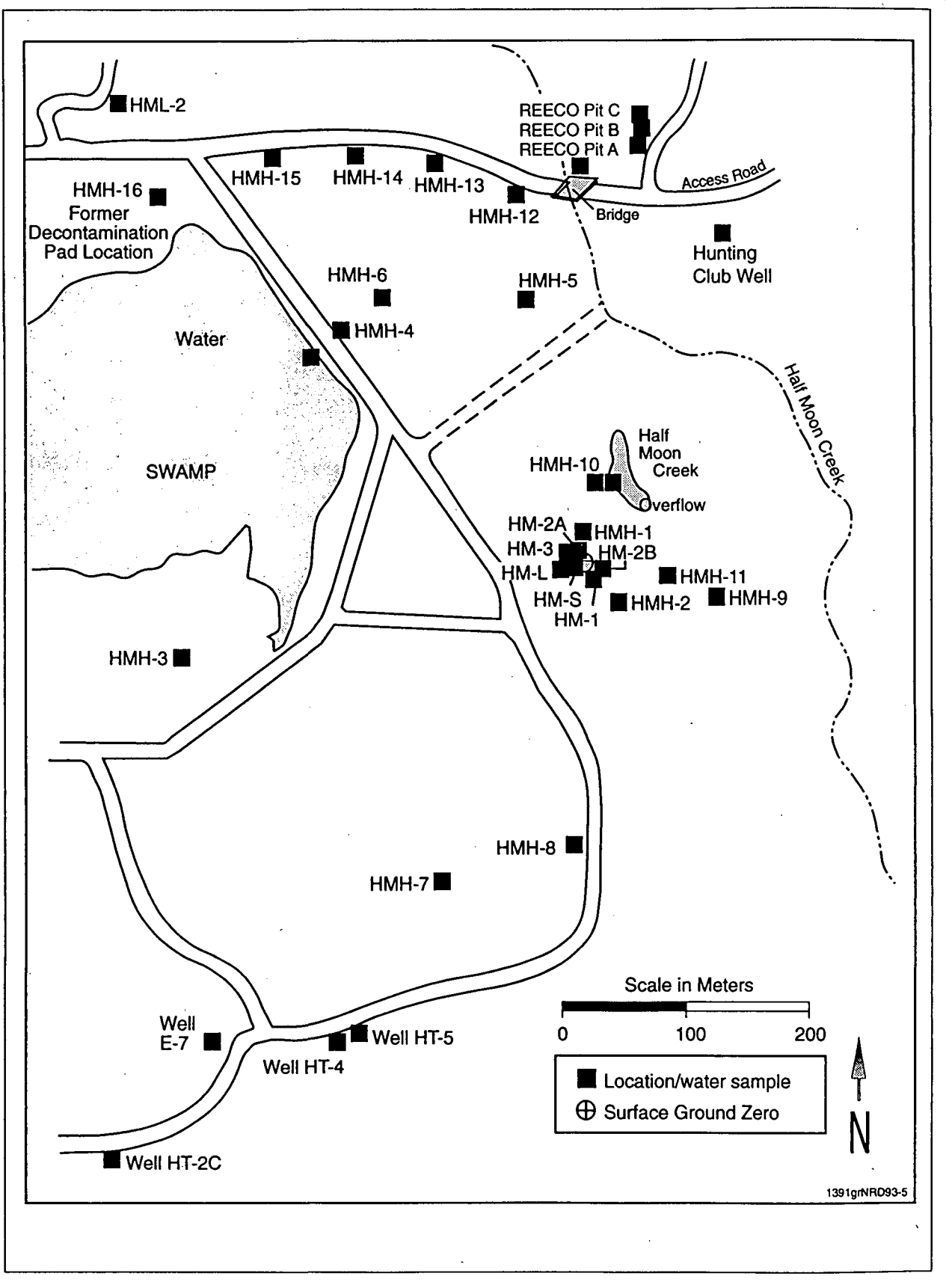


Figure 9. Locations on the Salmon Test Site Area sampled in 1995.

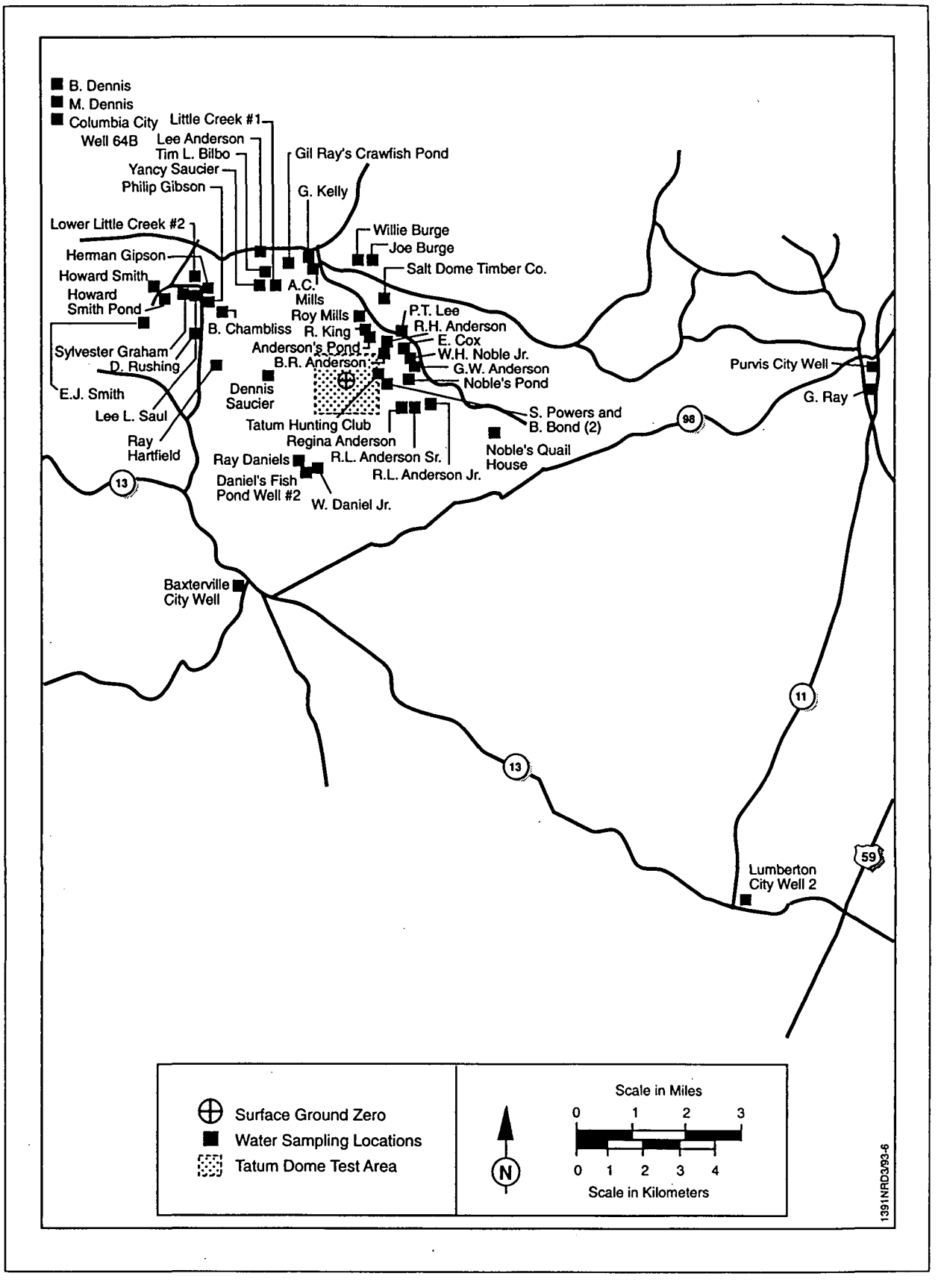


Figure 10. Offsite locations sampled in 1995.

CONCLUSION

No radioactive materials attributable to the Salmon Test Site Area were detected in samples collected in the offsite areas. Tritium was the only radioactive contaminant detected onsite and was found in brackish water collected from shallow wells located near SGZ. This water is not available to the public nor is it fit for human consumption. The tritium concentrations are well below 20,000 pCi/L level defined in the EPA National Interim Primary Drinking Water Regulations (40CFR141).

REFERENCES

Code of Federal Regulations, Vol. 41, title 40, Part 141, July 9, 1976, National Interim Primary Drinking Water Regulations.

A Guide for Environmental Radiological Surveillance at U.S. Dept. of Energy Installations, July 1981, Office of Operational Safety Report. Las Vegas, NV: U.S. Department of Energy; DOE/EP-0023.

Fenske, P. R.; Humphrey, T. M., Jr. The Tatum Dome Project, Lamar County, Mississippi. Las Vegas, NV: U.S. Department of Energy, Nevada Operations Office; NVO-225; 1980.

Fordham, J. W.; Fenske, P. R. Tatum Dome Field Study Report and Monitoring Data Analysis. Las Vegas, NV: U.S. Department of Energy, Nevada Operations Office; DOE/NV/10384-03; 1985.

Johns, F., et al. 1979. Radiochemical and Analytical Procedures for Analysis of Environmental Samples. Las Vegas, NV: U.S. Environmental Protection Agency; EMSL-LV-0539-17-1979.

GLOSSARY OF TERMS

Background Radiation

The radiation in man's environment, including cosmic rays and radiation from naturally-occurring and man-made radioactive elements, both outside and inside the bodies of humans and animals. The usually quoted average individual exposure from background radiation is 125 millirem per year in mid-latitudes at sea level (Shein & Terplak, 1984).

Curie (Ci)

The basic unit used to describe the rate of radioactive disintegration. The curie is equal to 37 billion disintegrations per second, which is the equivalent of 1 gram of radium. Named for Marie and Pierre Curie who discovered radium in 1898. One microcurie (μCi) is 0.000001 Ci.

Isotope

Atoms of the same element with different numbers of neutrons in the nuclei. Thus ^{12}C, ^{13}C, and ^{14}C are isotopes of the element carbon, the numbers denoting the approximate atomic weights. Isotopes have very nearly the same chemical properties, but often different physical properties (for example ^{12}C and ^{13}C are stable, ^{14}C is radioactive).

Enrichment Method

A method of electrolytic concentration that increases the sensitivity of the analysis of tritium in water. This method is used if the tritium concentration is less than 700 pCi/L.

Minimum Detectable Concentration (MDC)

The smallest amount of radioactivity that can be reliably detected with a probability of Type I and Type II errors at 5 percent each (DOE 1981).

Offsite

Areas exclusive of the immediate Salmon Test Site Area.

Onsite

Refers to the immediate vicinity of the Salmon Test Site Area.

Shallow ground water

Water found near the soil surface, caused by precipitation infiltration of the soil. This shallow ground water is not an aquifer.

Surficial Aquifer

The ground water layer located closest to the surface, generally at a depth of approximately 30 feet at SGZ.

Tritium

A radioactive isotope of hydrogen that decays by beta emission. Its half-life is about 12.5 years.

Pre Sample

First sample taken from wells onsite (before pumping).

Post Sample

Last sample taken from wells onsite (after recharge).

Type I Error

The statistical error of accepting the presence of radioactivity when none is present. Sometimes called alpha error.

Type II Error

The statistical error of failing to recognize the presence of radioactivity when it is present. Sometimes called beta error.

APPENDIX A

SUMMARY OF ANALYTICAL PROCEDURES

TYPE OF ANALYSIS	ANALYTICAL EQUIPMENT	COUNTING PERIOD (MIN)	ANALYTICAL PROCEDURES	SAMPLE SIZE	APPROXIMATE DETECTION LIMIT[a]
HpGe Gamma[b]	HpGe detector-calibrated at 0.5 keV/ channel (0.04 to 2 MeV range) individual detector efficiencies ranging from 15 to 35%.	100 min	Radionuclide concentration quantified from gamma spectral data by online computer program.	3.5 L	Varies with radionuclides.
^{3}H	Automatic liquid scintillation counter with output printer.	300	Sample prepared by distillation.	5 to 10 mL	300 to 700 x 10^{-9} pCi/L (11-26 Bq/L)
^{3}H+ Enrichment (LTHMP samples)	Automatic liquid scintillation counter with output printer.	300	Sample concentrated by electrolysis followed by distillation.	250 mL	10 x 10^{-9} pCi/L (3.7 x 10^{-1} Bq/L)

[a] *The detection limit is defined as the smallest amount of radioactivity that can be reliably detected, i.e., probability of Type I and Type II error at 5 percent each (DOE 1981).*

[b] *Gamma spectrometry using a high purity intrinsic germanium (HpGe) detector.*

APPENDIX B

TRITIUM RESULTS FOR WATER SAMPLES COLLECTED IN APRIL, 1995

SAMPLE LOCATION	COLLECTION DATE 1995		ENRICHED TRITIUM pCi/L ± 1 SD	MDC	TRITIUM pCi/L ± 1 SD	MDC	COMMENT
Baxterville, MS							
Anderson, Billy Ray		4-25	11 ± 2.1	6.6			
Anderson Pond		4-25	13 ± 1.6	5.0			
Anderson, Regina		4-25	13 ± 1.8	5.4			
Anderson, Robert Harvey		4-25	11 ± 1.8	5.7			
Anderson, Robert Lowell, Jr.		4-25	14 ± 2.0	6.1			
Anderson, Robert Lee		4-25	19 ± 2.5	7.8			
Anderson, Tony		4-24	13 ± 1.5	4.6			
Bibo, Timothy L.		4-25	20 ± 1.9	5.7			
Burge, Joe		4-25	11 ± 1.7	5.2			
Daniels, Webster, Jr.		4-24	19 ± 1.9	5.7			
Daniels - Well #2 Fish Pond		4-24	9.3 ± 1.2	3.9			
Half Moon Creek	Pre	4-23	11 ± 1.4	4.4			
	Post	4-25	19 ± 1.7	5.0			
Half Moon Creek Overflow	Pre	4-23	13 ± 2.0	4.4			
	Pre Dup	4-23	13 ± 2	6.4			
	Post	4-25	186 ± 2.9	4.9			
	Post Dup	4-25	197 ± 3.1	5.6			
Hilby, Billy*		4-24					
Kelly, Gertrude*		4-24					
Napien, Denice		4-25	12 ± 1.8	5.6			
Lee, P. T.		4-25	33 ± 2.0	5.7			
Little Creek #1		4-25	18 ± 1.7	5.3			
Lower Little Creek #2		4-24	10 ± 1.9	6.0			
McGinnis, Gloria		4-27	14 ± 1.7	5.2			
Mills, A. C.*		4-25					
Mills, Roy		4-25	10 ± 2.3	4.2			
Nobles Pond		4-25	16 ± 1.9	5.9			

*Indicates results are less than MDC

(Continued)

APPENDIX B Continued

TRITIUM RESULTS FOR WATER SAMPLES COLLECTED IN APRIL, 1995

SAMPLE LOCATION	COLLECTION DATE 1995	ENRICHED TRITIUM pCi/L ± 1 SD	ENRICHED TRITIUM MDC	TRITIUM pCi/L ± 1 SD	TRITIUM MDC	COMMENT
Baxterville, MS (Cont.)						
Noble, W. H., Jr.	4-25	31 ± 1.8	5.2			
Pond West of GZ	Pre 4-23	10 ± 1.4	4.4			
	Post 4-25	8.5 ± 1.6	4.9			
REECo Pit Drainage-A	4-23	12 ± 1.5	4.7			
REECo Pit Drainage-B	4-23	12 ± 1.5	4.6			
REECo Pit Drainage-C	4-23	13 ± 1.6	4.9			
Salt Dome Hunting Club	4-25	22 ± 2.0	6.0			
Salt Dome Timber Co.	4-25	21 ± 1.9	5.5			
Saucier, Dennis	4-24	26 ± 2.1	6.3			
Saucier, Wilma & Yancy*	4-24					
Well Ascot 2	4-26	28 ± 1.6	4.3			
Baxterville Well City	4-26	21 ± 2.0	5.8			
Well E-7	4-26	8.8 ± 2.1	6.7			
Well HM-1*	Pre 4-24					
	1st 30 min 4-24					
	2nd 30 min 4-24					
	Post 4-24					
Well HM-2A*	Pre 4-24					
	1st 30 min 4-24					
	2nd 30 min 4-24					
	3rd 30 min 4-24					
	4th 30 min 4-24					
	Post 4-24					
Well HM-2B*	Pre 4-24					
	1st 30 min 4-24					
	2nd 30 min 4-24					
	3rd 30 min 4-24					
	4th 30 min 4-24					
	Post 4-24					
Well HM-3*	Pre 4-24					
	1st 30 min 4-24					
	2nd 30 min 4-24					
	3rd 30 min 4-24					
	4th 30 min 4-24					
	Post 4-24					

*Indicates results are less than MDC

(Continued)

APPENDIX B Continued

TRITIUM RESULTS FOR WATER SAMPLES COLLECTED IN APRIL, 1995

SAMPLE LOCATION	COLLECTION DATE 1995		ENRICHED TRITIUM pCi/L ± 1 SD	MDC	TRITIUM pCi/L ± 1 SD	MDC	COMMENT
Baxterville, MS (Cont.)							
Well HM-L	Pre	4-24	875 ± 6	4.7			
	1st hour	4-24	900 ± 5	5.4			
	2nd hour	4-24	950 ± 6	4.8			
	3rd hour	4-24			1120 ± 134	425	
	4th hour	4-24	1090 ± 6	5.4			
	5th hour	4-24			1290 ± 134	425	
	6th hour	4-24			1260 ± 134	425	
	7th hour	4-24			1080 ± 133	425	
	8th hour	4-24			1250 ± 134	425	
	9th hour	4-24			1460 ± 135	425	
	10th hour	4-24			1310 ± 134	425	
	11th hour	4-24			1380 ± 135	425	
	12th hour	4-24	1330 ± 6.0	5.0			
	13th hour	4-24			1730 ± 136	425	
	14th hour	4-24			1400 ± 135	425	
	15th hour	4-25			1680 ± 136	425	
	16th hour	4-25			1600 ± 136	425	
	17th hour	4-25			1450 ± 135	425	
	18th hour	4-25			1570 ± 136	425	
	19th hour	4-25			1230 ± 134	425	
	20th hour	4-25			1720 ± 136	425	
	21st hour	4-25			1390 ± 135	425	
	22nd hour	4-25			1530 ± 135	425	
	23rd hour	4-25			1600 ± 136	425	
Well HM-L2*	Pre	4-25					
	Post	4-25					
Well HM-S	Pre	4-23			4700 ± 150	425	
	Pre Dup				5110 ± 150	425	
	Post	4-25			4570 ± 150	425	
	Post Dup				5110 ± 150	425	
Well HMH-1	Pre	4-23	404 ± 3.7	5.5			
	Pre Dup		466 ± 5.0	8.2			
	Post	4-24	458 ± 4.0	4.9			
	Dup Post	4-24	444 ± 4.0	4.8			
Well HMH-2	Pre	4-23			2380 ± 139	425	
	Post	4-24			3560 ± 144	425	
Well HMH-3	Pre	4-23	12 ± 2	6.0			
	Pre Dup		12 ± 1.9	6.0			
	Post	4-24	16 ± 1.7	5.3			
	Dup Post		12 ± 1.5	4.8			
Well HMH-4	Pre	4-23	14 ± 1.5	4.7			
	Post	4-24	11 ± 1.6	4.9			
Well HMH-5	Pre	4-23			2400 ± 137	425	
	Pre Dup				2000 ± 140	425	
	Post	4-24			1310 ± 134	425	
	Dup Post				1310 ± 134	425	

*Indicates results are less than MDC

(Continued)

APPENDIX B Continued

TRITIUM RESULTS FOR WATER SAMPLES COLLECTED IN APRIL, 1995

SAMPLE LOCATION	COLLECTION DATE 1995		ENRICHED TRITIUM pCi/L ± 1 SD	MDC	TRITIUM pCi/L ± 1 SD	MDC	COMMENT
Baxterville, MS (Cont.)							
Well HMH-6	Pre	4-23	44 ± 2	5.1			
	Post	4-24	52 ± 2	4.2			
Well HMH-7	Pre	4-23	9 ± 2	5.4			
	Pre Dup		6.0 ± 2				
	Post	4-24	10 ± 2	5.7			
	Post Dup		10 ± 1.8				
Well HMH-8	Pre	4-23	12 ± 2	5.1			
	Post	4-24	14 ± 2	5.9			
Well HMH-9	Pre	4-23	25 ± 2	6.1			
	Post	4-24	24 ± 2	6.0			
Well HMH-10	Pre	4-23	21 ± 2	5.9			
	Post	4-24	23 ± 2	4.9			
Well HMH-11	Pre	4-23	18 ± 2	5.9			
	Pre Dup		16 ± 1.7	5.1			
	Post	4-24	28 ± 2	5.0			
	Pre Dup	4-24	24 ± 1.7	5.2			
Well HMH-12	Pre	4-23	9 ± 2	5.7			
	Post	4-24	12 ± 2	4.8			
Well HMH-13	Pre	4-23	16 ± 2	6.8			
	Post	4-24	11 ± 2	5.0			
Well HMH-14	Pre	4-23	10 ± 2	6.8			
	Post	4-24	8.6 ± 1.6	5.0			
Well HMH-15	Pre	4-23	12 ± 2	5.0			
	Post	4-24	12 ± 2	6.0			
Well HMH-16	Pre	4-23	44 ± 2	5.8			
	Post	4-24	44 ± 2	5.3			
Well HT-2C		4-26	12 ± 1	4.4			
Well HT-4		4-26	8.4 ± 2	6.7			
Well HT-5*		4-26					
Columbia, MS							
Dennis, Buddy*		4-26					
Dennis, Marvin		4-26	11 ± 2	6.4			
Well 64B City		4-26	6.5 ± 1.9	6.1			

*Indicates results are less than MDC

(Continued)

APPENDIX B Continued

TRITIUM RESULTS FOR WATER SAMPLES COLLECTED IN APRIL, 1995

SAMPLE LOCATION	COLLECTION DATE 1995	ENRICHED TRITIUM pCi/L ± 1 SD	ENRICHED TRITIUM MDC	TRITIUM pCi/L ± 1 SD	TRITIUM MDC	COMMENT
Lumberton, MS						
Anderson, Arleene	4-25	14 ± 2	4.8			
Anderson, Lee L.	4-24	20 ± 2	4.9			
Bond, Bradley K.	4-24					Moved, Trailer Gone
Robert Rogers	4-25	16 ± 1	3.9			
Gil Ray's Crawfish Pond	4-24	11 ± 2	5.0			
Gipson, Herman*	4-24					
Gipson, Hewie	4-24					No Longer Sampled
Gipson, Michael D.	4-24	16 ± 1.8	5.4			
Gipson, Philip[a]	4-24	19 ± 1.9	5.7			
Graham, Sylvester*	4-24					
Hartfield, Ray*	4-24					
Powell, Shannon	4-24	15 ± 2	4.9			
	Dup 4-24	14 ± 1.4	4.4			
Saul, Rushing, Debra	4-24	24 ± 2	6.6			
Saul, Lee L.*	4-24					
Saul, Ola	4-24	25 ± 2	5.4			
Smith, E. J.	4-24	12 ± 2	4.2			
Smith, Howard*	4-24					
Smith, Howard - Pond	4-24	11 ± 2	4.8			
Thompson, Roswell	4-24	19 ± 2	5.4			
Well 2 City*	4-26					
Purvis, MS						
Burge, Willie Ray & Cirace	4-25	15 ± 3	8.8			
City Supply*	4-26					
Gil, Ray - House Well*	4-24					
Rain Sample						
IT Compound	4-23	8.5 ± 1.7	5.5			

*Indicates results are less than MDC