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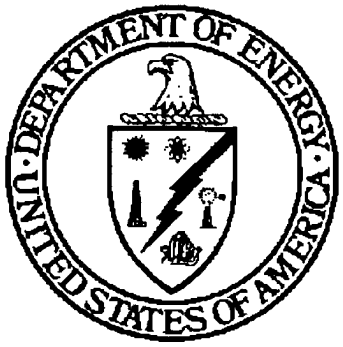
QUARTERLY ENVIRONMENTAL DATA SUMMARY - 2ND QUARTER 1992

Weldon Spring Site Remedial Action Project
Weldon Spring, Missouri

SEPTEMBER 1992 **REV. 0**



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DOE/OR/21548-337

Weldon Spring Site Remedial Action Project

Quarterly Environmental Data Summary - Second Quarter 1992

Revision 0

September 1992

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ABSTRACT

The purpose of this *Quarterly Environmental Data Summary* is to provide to the public preliminary data acquired as part of the Weldon Spring Site Remedial Action Project (WSSRAP) environmental monitoring program. The document summarizes the preliminary environmental data, highlights any potentially significant findings, and offers tentative interpretations. Validated data and final interpretations will appear in the 1992 annual site environmental report.

This report includes preliminary data from environmental monitoring activities at the Weldon Spring site (WSS) during the second quarter of 1992. Groundwater, surface water, and air samples were collected in order to monitor potential exposure pathways. Analytical parameters included radionuclides, nitroaromatic compounds, inorganic anions, and direct gamma exposure. The results are used to evaluate possible exposure scenarios and assess the impact of the contaminants at the site on potentially exposed populations.

In summary, off-site exposures during the second quarter of 1992 did not differ significantly from exposures calculated in previous quarters. Contaminated groundwater did not affect the St. Charles County well field.

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1 INTRODUCTION

This quarterly report summarizes the findings from the routine environmental monitoring programs at the Weldon Spring Site Remedial Action Project (WSSRAP). These reports supplement the annual site environmental report (ASER) by providing interested outside agencies and organizations with more frequent access to WSSRAP data. They provide data resulting from routine environmental sampling as described in the WSSRAP *Environmental Monitoring Plan* (EMP) (MKF and JEG 1992a) and a brief interpretation of that data.

It is the goal of this document to summarize and briefly discuss the data, highlighting data that differ significantly from historical observations. The full interpretation of these data (as well as data in other quarterly summaries) will be undertaken in the 1992 ASER. It is recommended that interested readers refer to previous EMPs, ASERs, and project documents for more information on existing site conditions, site history, transport mechanisms, and quantified contaminant levels. The monitoring scheme for every calendar year is established prior to that year in the annual EMP. Each sampling location to be monitored during the upcoming year is identified in the EMP and the schedule of analytical parameters is tabulated for easy reference. These reports may be obtained by visiting the WSSRAP reading room or contacting the WSSRAP Community Relations Manager at (314) 441-8086.

These quarterly reports are intended to include data from all quarterly environmental monitoring programs conducted at the WSSRAP including groundwater, surface water, National Pollutant Discharge Elimination System (NPDES), radon gas, gamma radiation, and air particulates (including asbestos and radioactive particulates). This document summarizes the preliminary environmental data, highlights any potentially significant findings, and offers tentative interpretations. Validated data and final interpretations will appear in the 1992 annual site environmental report. Because standard turnaround time to receive data from the laboratories is 45 days, not all second quarter data are available for reporting. These data will be reported in the 1992 ASER. Sludges and soils are not sampled on a routine basis; therefore, analytical results for these parameters are not included in this report. Trend analyses are being prepared from historical data for surface water, groundwater, and air pathways. These analyses will be presented in the 1992 ASER. Quality control (QC) data for the second quarter, and all other quarters, will also be presented in the 1992 ASER.

2 GROUNDWATER MONITORING

The groundwater is sampled regularly at both the Weldon Spring Chemical Plant/raffinate pits/vicinity properties (WSCP/RP/VP) and the Weldon Spring Quarry (WSQ). Due to differences in the environmental settings and sources of contaminants, separate monitoring schedules are followed. Therefore, results of groundwater monitoring at the WSCP/RP/VP and WSQ will be discussed separately.

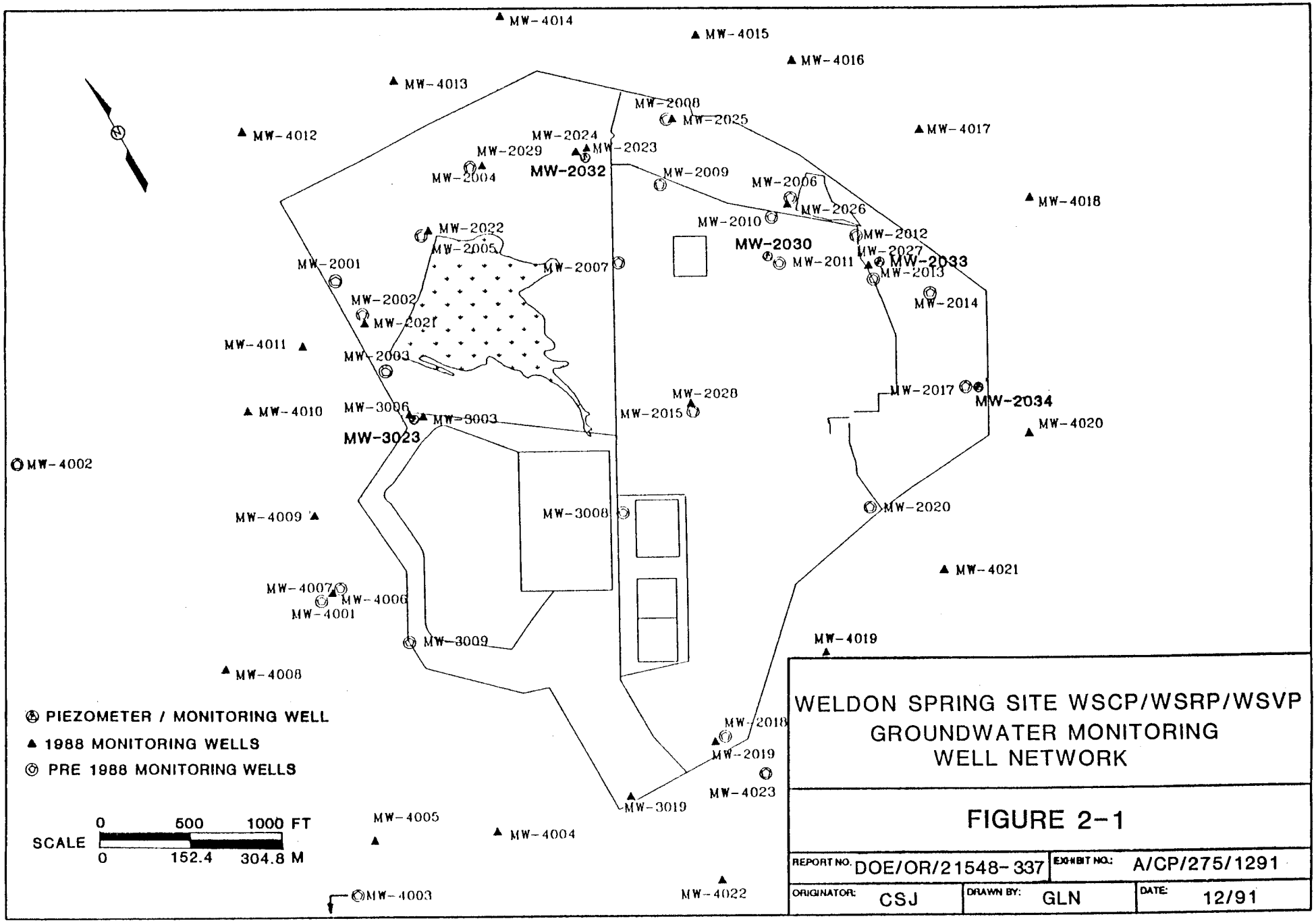
2.1 Chemical Plant/Raffinate Pits/Vicinity Properties

Groundwater at the chemical plant/raffinate pits/vicinity properties area is monitored on a quarterly or semiannual basis (specific to each well as prescribed in the 1992 EMP). Locations are given in Figure 2-1. The number of quarterly sampled wells has increased substantially; a complete list of wells scheduled for quarterly and semiannual sampling is given in the 1992 *Environmental Monitoring Plan* (EMP) (MKF and JEG 1992a). Total uranium, inorganic anions, and nitroaromatic compounds are measured during each monitoring period for both quarterly and semiannual wells. Other radiological parameters are measured annually during the first period for all wells. Geochemical parameters (metals and inorganic anions) are measured each period for the quarterly wells only.

2.1.1 Nitroaromatic Results

Table 2-1 contains nitroaromatic data from samples collected from the quarterly monitored groundwater wells. Nitroaromatic compounds were detected in 16 of the 32 locations for which data are currently available. Concentration levels for these compounds are within their historical range.

Table 2-2 contains nitroaromatic data from samples collected from the semiannually monitored groundwater wells. Nitroaromatic compounds were detected in 10 of the 19 wells for which data are available. Concentrations for these compounds are within their historical range.



WELDON SPRING SITE WSCP/WSRP/WSVP GROUNDWATER MONITORING WELL NETWORK

FIGURE 2-1

REPORT NO.	DOE/OR/21548-337	EXHIBIT NO.:	A/CP/275/1291		
ORIGINATOR:	CSJ	DRAWN BY:	GLN	DATE:	12/91

TABLE 2-1 Second Quarter Nitroaromatic Results for Groundwater at the WSCP/RP/VP

Sample ID	NB (µg/l)	1,3-DNB (µg/l)	2,4-DNT (µg/l)	2,6-DNT (µg/l)	2,4,6-TNT (µg/l)	1,3,5-TNB (µg/l)
GW-2001-Q292	ND	ND	0.080	0.044	ND	0.040
GW-2002-Q292	ND	ND	0.052	0.30	ND	ND
GW-2003-Q292	ND	ND	0.18	0.66	ND	ND
GW-2030-Q292	ND	ND	0.13	5.5	8.1	4.2
GW-2032-Q292	ND	ND	0.12	4.0	2.2	0.30
GW-2033-Q292	ND	ND	0.16	10	1.1	2.8
GW-3003-Q292	ND	ND	0.031	0.079	ND	ND
GW-3006-Q292	ND	ND	ND	ND	ND	ND
GW-3008-Q292	ND	ND	0.097	0.24	ND	ND
GW-3009-Q292	ND	ND	0.19	0.091	ND	0.17
GW-3023-Q292	ND	ND	8.0	7.5	0.033	ND
GW-4001-Q292	ND	0.098	3.0	5.0	1.6	65
GW-4002-Q292	ND	ND	ND	0.034	0.044	ND
GW-4003-Q292	ND	ND	ND	ND	ND	ND
GW-4004-Q292	ND	ND	ND	ND	ND	ND
GW-4005-Q292	ND	ND	ND	ND	ND	ND
GW-4006-Q292	ND	ND	0.10	3.60	ND	17
GW-4007-Q292	NA	NA	NA	NA	NA	NA
GW-4008-Q292	ND	ND	ND	ND	ND	ND
GW-4009-Q292	ND	ND	ND	ND	ND	ND
GW-4010-Q292	ND	ND	ND	ND	ND	ND
GW-4011-Q292	ND	ND	ND	ND	ND	ND
GW-4012-Q292	ND	ND	ND	ND	ND	ND
GW-4013-Q292	ND	ND	0.065	0.90	0.048	46
GW-4014-Q292	ND	ND	ND	0.031	ND	0.23
GW-4015-Q292	NA	NA	NA	NA	NA	NA
GW-4016-Q292	ND	ND	ND	ND	ND	ND
GW-4017-Q292	ND	ND	ND	ND	ND	ND
GW-4018-Q292	ND	ND	ND	ND	ND	ND

TABLE 2-1 Second Quarter Nitroaromatic Results for Groundwater at the WSCP/RP/VP (Continued)

Sample ID	NB (µg/l)	1,3-DNB (µg/l)	2,4-DNT (µg/l)	2,6-DNT (µg/l)	2,4,6-TNT (µg/l)	1,3,5-TNB (µg/l)
GW-4019-Q292	ND	ND	ND	ND	ND	ND
GW-4020-Q292	ND	ND	ND	ND	ND	ND
GW-4021-Q292	ND	ND	ND	ND	ND	ND
GW-4022-Q292	ND	ND	ND	ND	ND	ND
GW-4023-Q292	ND	ND	0.067	0.052	ND	0.17

NA - Not Available
ND - Not Detected

TABLE 2-2 Semiannual Nitroaromatic Results for Groundwater at the WSCP/RP/VP

Sample ID	NB (µg/l)	1,3-DNB (µg/l)	2,4-DNT (µg/l)	2,6-DNT (µg/l)	2,4,6-TNT (µg/l)	1,3,5-TNB (µg/l)
GW-2004-042392	ND	ND	ND	ND	ND	ND
GW-2005-012392	ND	ND	0.076	0.12	ND	ND
GW-2006-011692	ND	ND	0.14	1.20	ND	10.0
GW-2007-011392	ND	ND	ND	ND	ND	ND
GW-2008-S192	ND	ND	0.071	0.86	ND	0.41
GW-2009-S192	ND	ND	0.070	0.270	ND	ND
GW-2010-011692	ND	ND	0.080	0.47	0.28	0.14
GW-2011-042292	0.040	ND	0.092	2.3	ND	0.76
GW-2012-042292	ND	ND	0.081	1.1	0.64	2.0
GW-2013-012392	ND	ND	0.26	5.80	0.58	3.80
GW-2014-S192	ND	ND	0.13	0.98	ND	3.6
GW-2015-011392	ND	ND	ND	ND	ND	ND
GW-2017-S192	ND	ND	ND	ND	ND	ND
GW-2018-S192	ND	ND	ND	ND	ND	ND
GW-2019-S192	ND	ND	ND	ND	ND	ND
GW-2020-S192	ND	ND	0.038	ND	ND	ND
GW-2021-062392	NA	NA	NA	NA	NA	NA
GW-2022-062392	NA	NA	NA	NA	NA	NA
GW-2023-062392	NA	NA	NA	NA	NA	NA
GW-2024-062392	NA	NA	NA	NA	NA	NA
GW-2025-062992	NA	NA	NA	NA	NA	NA
GW-2026-062292	NA	NA	NA	NA	NA	NA
GW-2027-062292	NA	NA	NA	NA	NA	NA
GW-2028-062292	NA	NA	NA	NA	NA	NA
GW-2029-S192	ND	ND	ND	ND	ND	ND
GW-2034-S192	ND	ND	ND	ND	ND	ND
GW-3019-012392	ND	ND	ND	ND	ND	ND

NA - Not Available
ND - Not Detected

2.1.2 Radiological Results

Total uranium results for samples from the quarterly monitored wells at the WSCP/RP/VP are presented in Table 2-3. The upper bound for natural uranium background concentration in groundwater at the WSCP/RP/VP has been determined to be 3.4 pCi/l (0.13 Bq/l) (MKF and JEG 1989). The U.S. Environmental Protection Agency (EPA) has not yet established a drinking water standard for uranium; however, the proposed maximum contaminant level (MCL) is 20 μg/l, which converts to 13.6 pCi/l (0.50 Bq/l) using a new site-specific conversion factor of 0.68 pCi/μg (assuming isotopic equilibrum). The increase to 13.6 pCi/l (0.50 Bq/l) from the previously reported value of 12 pCi/l (0.44 Bq/l) reflects improved quantification of the average U-234/U-238 activity ratios for uranium present at the Weldon Spring Site Remedial Action Project (WSSRAP). The U.S. Department of Energy (DOE) has a health-based, derived concentration guideline (DCG) of 600 pCi/l (22.2 Bq/l) in surface water effluent.

Uranium concentrations remained within historical ranges at most locations for which data are presently available. A higher than previously detected value was recorded for MW-2030. This higher value was only slightly elevated above previously high levels, and may be related to higher values for certain metals (see discussion in Section 2.1.4). At present, insufficient data are available to determine whether this value is part of an upward trend or merely an extreme within the normal range of variation for this well.

Table 2-4 contains uranium data from samples collected from the semiannually monitored groundwater wells. Uranium concentrations in these wells are within their historical range.

Additional radiological parameters are measured for groundwater at all WSCP/RP/VP wells during the second quarter. The results of these analyses are given in Table 2-5. Historically, concentration levels for these parameters have been below the detection limits. In general, the increase in detectable values for 1992 predominantly reflects improved analytical sensitivity rather than high concentration levels for these parameters; exceptions are Th-230 and both radium isotopes. The elevated Th-230 values are thought to be an artifact of analytical interferences. The source of the slightly higher radium concentrations is unclear and is currently under investigation. All locations having apparently elevated Th-230, Ra-226, or Ra-228 values have been scheduled for resampling during the third quarter to confirm these results.

TABLE 2-3 Second Quarter Uranium and Inorganic Anion Results for Groundwater at the WSCP/RP/VP

Sample ID	Nitrate (mg/l)	Sulfate (mg/l)	Uranium (pCi/l)
GW-2001-Q292	22.0	8.09	0.82
GW-2002-Q292	181	89.8	ND
GW-2003-Q292	266	106	1.2
GW-2030-Q292	1.20	41.6	16
GW-2032-Q292	86.0	53.2	9.9
GW-2033-Q292	0.96	24.2	1.0
GW-3003-Q292	252	181	2.3
GW-3006-Q292	0.44	22.0	1.4
GW-3008-Q292	644	77.2	3.40
GW-3009-Q292	3250	85.3	59.0
GW-3023-Q292	316	343	NA
GW-4001-Q292	ND	67.3	1.4
GW-4002-Q292	0.98	15.4	1.4
GW-4003-Q292	0.60	33.6	NA
GW-4004-Q292	1.00	19.7	NA
GW-4005-Q292	2.00	24.7	NA
GW-4006-Q292	4.20	28.0	ND
GW-4007-Q292	0.98	12.9	1.5
GW-4008-Q292	0.17	14.0	1.10
GW-4009-Q292	0.19	13.9	3.30
GW-4010-Q292	0.13	22.0	3.40
GW-4011-Q292	37.1	53.8	4.50
GW-4012-Q292	1180	47.9	2.90
GW-4013-Q292	85.6	45.1	1.10
GW-4014-Q292	1.10	25.5	ND
GW-4015-Q292	2.90	16.9	NA
GW-4016-Q292	ND	14.9	NA
GW-4017-Q292	0.45	6.20	NA

TABLE 2-3 Second Quarter Uranium and Inorganic Anion Results for Groundwater at the WSCP/RP/VP (Continued)

Sample ID	Nitrate (mg/l)	Sulfate (mg/l)	Uranium (pCi/l)
GW-4018-Q292	2.00	6.70	ND
GW-4019-Q292	0.40	6.40	NA
GW-4020-Q292	0.34	134	14.0
GW-4021-Q292	ND	255	4.10
GW-4022-Q292	0.41	29.0	NA
GW-4023-Q292	3.60	68.5	1.10

ND - Not Detected
NA - Not Available

TABLE 2-4 Semiannual Uranium and Inorganic Anion Results for Groundwater at the WSCP/RP/VP

Sample ID	Nitrate (mg/l)	Sulfate (mg/l)	Uranium (pCi/l)
GW-2004-042392	0.78	1.80	0.3
GW-2005-012392	69.8	26.4	ND
GW-2006-011692	6.20	34.8	ND
GW-2007-011392	0.20	15.3	0.605
GW-2008-S192	3.29	40.0	ND
GW-2009-S192	1.60	105	2.10
GW-2010-011692	1.30	32.5	ND
GW-2011-042292	5.50	12.8	0.4
GW-2012-042292	0.71	78.1	0.3
GW-2013-012392	1.10	15.3	ND
GW-2014-S192	1.00	33.6	0.2
GW-2015-011392	0.52	96.2	1.30
GW-2017-S192	0.11	754	5.3
GW-2018-S192	0.24	9.19	NA
GW-2019-S192	ND	42.4	NA
GW-2020-S192	0.52	130	NA
GW-2021-S192	0.20	13.0	ND
GW-2022-S192	0.25	14.2	ND
GW-2023-S192	0.46	15.5	ND
GW-2024-S192	0.22	30.0	ND
GW-2025-062992	NA	NA	NA
GW-2026-S192	ND	14.4	ND
GW-2027-S192	ND	7.40	2.5
GW-2028-S192	ND	121	ND
GW-2029-S192	0.12	23.4	2.2
GW-2034-S192	0.18	623	9.6
GW-3019-012392	ND	7.00	ND

ND - Not Detected
NA - Not Available

TABLE 2-5 Semiannual Radiological Results for Groundwater at the WSCP/RP/VP

Sample ID	Th-228 (pCi/l)	Th-230 (pCi/l)	Th-232 (pCi/l)	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Po-210 (pCi/l)	Pb-210 (pCi/l)	Ac-227 (pCi/l)
GW-2004-042392	ND	0.6	ND	0.2	ND	NS	NS	NS
GW-2005-012392	NA	NA	NA	NA	NA	NA	NA	NA
GW-2006-011692	ND	3.07	ND	ND	17.1	ND	ND	ND
GW-2007-011392	ND	4.87	ND	ND	ND	ND	ND	ND
GW-2008-S192	ND	ND	ND	ND	ND	NS	NS	NS
GW-2009-S192	ND	ND	ND	ND	ND	NS	NS	NS
GW-2010-011692	ND	4.90	ND	ND	ND	5.17	ND	ND
GW-2011-042292	ND	ND	ND	ND	ND	NS	NS	NS
GW-2012-042292	ND	0.2	ND	ND	ND	NS	NS	NS
GW-2013-012392	ND	2.89	ND	ND	ND	ND	ND	ND
GW-2014-S192	ND	ND	ND	ND	ND	NS	NS	NS
GW-2015-011392	ND	1.75	ND	ND	ND	ND	ND	ND
GW-2017-S192	ND	ND	ND	0.2	ND	NS	NS	NS
GW-2018-S192	NA	NA	NA	NA	NA	NA	NA	NA
GW-2019-S192	NA	NA	NA	NA	NA	NA	NA	NA
GW-2020-S192	NA	NA	NA	NA	NA	NA	NA	NA
GW-2021-S192	ND	1.15	ND	ND	ND	NS	NS	NS
GW-2022-S192	ND	ND	ND	ND	ND	NS	NS	NS
GW-2023-S192	ND	1.99	0.302	ND	ND	NS	NS	NS
GW-2024-S192	ND	ND	0.666	ND	ND	NS	NS	NS
GW-2025-062992	NA	NA	NA	NA	NA	NA	NA	NA
GW-2026-S192	0.819	2.18	1.23	ND	ND	NS	NS	NS
GW-2027-S192	0.297	0.779	0.223	ND	ND	NS	NS	NS
GW-2028-S192	ND	ND	ND	ND	ND	NS	NS	NS
GW-2029-S192	ND	ND	ND	ND	ND	NS	NS	NS
GW-2034-051192	ND	ND	ND	ND	ND	NS	NS	NS
GW-3019-012392	ND	3.50	ND	ND	ND	ND	ND	ND

ND - Not Detected
NA - Not Available
NS - Not Sampled

2.1.3 Sulfate and Nitrate Results

Sulfate and nitrate concentrations are measured during each monitoring period. Results from the quarterly monitored wells are shown in Table 2-3. Second quarter results are within historical ranges with the exception of the nitrate value for MW-4012. The source of this elevation is being investigated. Sulfate and nitrate results from semiannually monitored wells are shown in Table 2-4. These concentrations are within their historical range.

2.1.4 Geochemical Results: Metals and Inorganic Anions

Table 2-6 contains the second quarter geochemical data (metals and inorganic anions) for quarterly monitored wells at the WSCP/RP/VP area. In 1992, the WSSRAP increased both the number of wells and the frequency of sampling for geochemical parameters. For the majority of the wells, concentrations for the second quarter of 1992 are consistent with previously measured values. However, notable exceptions were observed for the MW-203X wells, MW-3023, MW-4017, and MW-4022; which contained high levels of aluminum, iron, manganese, and moderately elevated lead. These wells were filtered before preservation and analysis. The failure to filter these samples resulted in metals being leached from the suspended solid material upon preservation. This leaching may also be responsible for the high uranium observed in MW-2030. Future samples from these wells will be filtered prior to preservation.

2.2 Weldon Spring Quarry

Groundwater at the WSQ has become radiologically and chemically contaminated as a result of contact with, or migration from, wastes present in the WSQ. Monitoring of the groundwater at, and near, the WSQ is of particular concern because of the proximity of the St. Charles County well field. The well field is located approximately 0.8 km (0.5 mi) to the south of the WSQ. Monitoring of contaminants in groundwater and the protection of the well field is a top priority at the WSSRAP.

Groundwater is currently being monitored at 48 wells located in and around the quarry area. Thirty-six monitoring wells installed by the DOE are currently utilized in or near the quarry. Four monitoring wells were installed by St. Charles County in 1986 and are currently included in the DOE's monitoring program. Eight St. Charles County municipal wells, and the treated and untreated water from the St. Charles County water treatment plant, are also

TABLE 2-6 Quarterly Geochemical Results for Groundwater at the WSCP/RP/VP

Sample ID	Arsenic (µg/l)	Barium (µg/l)	Calcium (µg/l)	Chromium (µg/l)	Iron (µg/l)	Lithium (µg/l)	Magnesium (µg/l)	Manganese (µg/l)	Nickel (µg/l)	Lead (µg/l)	Silver (µg/l)
GW-2001-Q292	ND	233	93800	ND	ND	ND	45400	ND	ND	ND	ND
GW-2002-Q292	ND	148	218000	ND	ND	303	63100	ND	ND	ND	ND
GW-2003-Q292	ND	175	279000	ND	ND	480	107000	ND	ND	ND	ND
GW-2030-Q292	ND	187	123000	ND	1420	ND	20100	47.4	ND	8.59	ND
GW-2032-Q292	ND	440	188000	11.1	13500	35.4	54200	814	27.6	18.8	ND
GW-2033-Q292	ND	172	238000	ND	3830	ND	18900	304	ND	26.0	ND
GW-3003-Q292	ND	140	221000	ND	ND	465	130000	3.29	ND	ND	ND
GW-3006-Q292	2.60	134	61100	ND	123	ND	49400	34.4	ND	ND	ND
GW-3008-Q292	ND	214	503000	ND	ND	246	145000	ND	ND	3.20	ND
GW-3009-Q292	ND	856	104000	ND	19.4	ND	62500	8.90	44.8	ND	ND
GW-3023-Q292	ND	86.5	329000	ND	1530	794	75100	32.0	ND	12.0	ND
GW-4001-Q292	ND	90.4	90600	ND	ND	ND	33700	2.29	ND	ND	ND
GW-4002-Q292	ND	118	45600	ND	42.5	ND	31800	3.39	ND	ND	ND
GW-4003-Q292	ND	163	50700	ND	ND	ND	30700	2.00	ND	2.50	ND
GW-4004-Q292	ND	83.3	30200	ND	ND	ND	28000	ND	ND	ND	ND
GW-4005-Q292	ND	130	64600	ND	ND	30.5	40200	ND	ND	ND	ND
GW-4006-Q292	ND	161	46300	ND	ND	ND	20600	ND	ND	ND	ND
GW-4007-Q292	ND	91.0	32000	ND	ND	ND	22200	52.3	ND	3.70	ND
GW-4008-Q292	ND	105	37800	ND	ND	ND	31800	16.9	ND	ND	ND

TABLE 2-6 Quarterly Geochemical Results for Groundwater at the WSCP/RP/VP (Continued)

Sample ID	Arsenic (µg/l)	Barium (µg/l)	Calcium (µg/l)	Chromium (µg/l)	Iron (µg/l)	Lithium (µg/l)	Magnesium (µg/l)	Manganese (µg/l)	Nickel (µg/l)	Lead (µg/l)	Silver (µg/l)
GW-4009-Q292	ND	53.5	32400	ND	ND	38.2	21100	ND	ND	ND	ND
GW-4010-Q292	ND	74.1	50900	ND	40.5	ND	37000	ND	ND	12.8	ND
GW-4011-Q292	2.00	88.5	46600	ND	ND	ND	27100	2.00	ND	ND	ND
GW-4012-Q292	ND	53.9	32100	54.4	22.2	42.4	33800	ND	ND	ND	ND
GW-4013-Q292	ND	136	134000	ND	ND	51.4	48600	ND	ND	ND	ND
GW-4014-Q292	ND	102	57700	ND	66.3	ND	40900	39.8	ND	ND	ND
GW-4015-Q292	ND	221	55900	ND	ND	35.4	28500	ND	ND	ND	ND
GW-4016-Q292	ND	269	46000	ND	ND	ND	31100	75.8	ND	ND	ND
GW-4017-Q292	ND	179	58800	13.2	1200	ND	38100	93.6	ND	18.3	ND
GW-4018-Q292	ND	225	106000	ND	ND	ND	58800	ND	ND	6.79	ND
GW-4019-Q292	ND	206	36800	ND	ND	ND	42600	ND	ND	ND	ND
GW-4020-Q292	ND	89.1	94000	15.8	ND	ND	58400	110	ND	2.50	ND
GW-4021-Q292	ND	38.3	121000	ND	21.7	ND	117000	10.6	ND	ND	ND
GW-4022-Q292	4.00	344	96400	87.8	42400	32.9	46400	1540	151	40.0	9.10
GW-4023-Q292	ND	82.4	86500	ND	ND	ND	35800	ND	ND	ND	ND

TABLE 2-6 Quarterly Geochemical Results for Groundwater at the WSCP/RP/VP (Continued)

Sample ID	Potassium (µg/l)	Sodium (µg/l)	Strontium (µg/l)	Nitrite (mg/l)	Bromide (mg/l)	Chloride (mg/l)	Phosphorus Total (mg/l)	Silica, Dissolved (mg/l)	Alkalinity (mg/l)	Aluminum (µg/l)
GW-2001-Q292	1080	9370	1080	ND	ND	5.50	0.07	7.70	280	ND
GW-2002-Q292	6000	81800	287	ND	ND	7.90	0.05	16.0	310	ND
GW-2003-Q292	6710	121000	533	ND	ND	9.19	0.03	11.0	265	ND
GW-2030-Q292	4040	46000	172	ND	ND	30.7	0.10	10.7	470	650
GW-2032-Q292	3640	62700	352	0.12	ND	16.2	0.46	11.1	410	6050
GW-2033-Q292	2510	83300	178	ND	0.42	5.40	0.36	14.0	540	1130
GW-3003-Q292	9060	145000	575	ND	ND	10.1	0.10	10.3	334	ND
GW-3006-Q292	ND	17500	219	ND	ND	1.30	0.14	11.9	392	ND
GW-3008-Q292	2680	210000	1400	ND	ND	17.6	ND	10.1	200	ND
GW-3009-Q292	1870	24800	214	0.34	ND	4.50	0.04	10.0	190	ND
GW-3023-Q292	3510	214000	615	0.89	ND	17.7	0.13	11.8	260	674
GW-4001-Q292	ND	23300	90.1	ND	2.50	7.09	0.08	11.6	220	ND
GW-4002-Q292	ND	4890	82.9	ND	ND	1.30	0.17	9.00	226	ND
GW-4003-Q292	941	7950	94.2	ND	ND	6.09	0.10	10.1	270	ND
GW-4004-Q292	ND	6670	79.0	ND	ND	3.39	0.11	4.40	180	ND
GW-4005-Q292	6430	62200	308	ND	1.60	7.70	0.08	7.30	210	ND
GW-4006-Q292	ND	6990	60.9	ND	0.57	2.00	0.23	9.50	170	ND
GW-4007-Q292	1500	15200	91.5	0.01	ND	0.88	0.11	9.80	200	ND
GW-4008-Q292	ND	3330	104	ND	ND	0.98	0.05	8.30	225	ND

TABLE 2-6 Quarterly Geochemical Results for Groundwater at the WSCP/RP/VP (Continued)

Sample ID	Potassium (µg/l)	Sodium (µg/l)	Strontium (µg/l)	Nitrite (mg/l)	Bromide (mg/l)	Chloride (mg/l)	Phosphorus Total (mg/l)	Silica, Dissolved (mg/l)	Alkalinity (mg/l)	Aluminum (µg/l)
GW-4009-Q292	27300	18400	146	ND	ND	0.84	0.16	9.50	230	ND
GW-4010-Q292	1510	11400	137	ND	0.98	2.40	0.07	10.6	295	ND
GW-4011-Q292	1290	7490	139	ND	ND	5.90	0.30	12.8	270	ND
GW-4012-Q292	41300	44600	107	ND	ND	10.0	0.08	10.7	300	ND
GW-4013-Q292	6630	33000	145	ND	ND	6.50	0.06	10.8	300	ND
GW-4014-Q292	1620	6050	150	ND	ND	2.60	ND	10.0	285	ND
GW-4015-Q292	1470	7680	64.6	ND	ND	ND	0.06	10.0	250	ND
GW-4016-Q292	1500	8680	96.5	ND	ND	1.10	0.05	10.4	230	ND
GW-4017-Q292	3210	10300	119	ND	ND	1.60	0.14	10.9	340	235
GW-4018-Q292	3280	8870	119	ND	ND	16.7	0.03	9.50	430	ND
GW-4019-Q292	947	8770	180	ND	1.39	2.50	ND	9.09	280	ND
GW-4020-Q292	5780	23600	217	ND	1.39	15.9	0.07	10.3	390	ND
GW-4021-Q292	1130	15300	219	ND	ND	1.20	0.04	9.00	510	ND
GW-4022-Q292	3120	11800	284	ND	ND	5.29	0.89	13.3	380	26000
GW-4023-Q292	ND	55300	153	ND	0.64	12.4	0.02	15.7	400	ND

ND - Not Detected

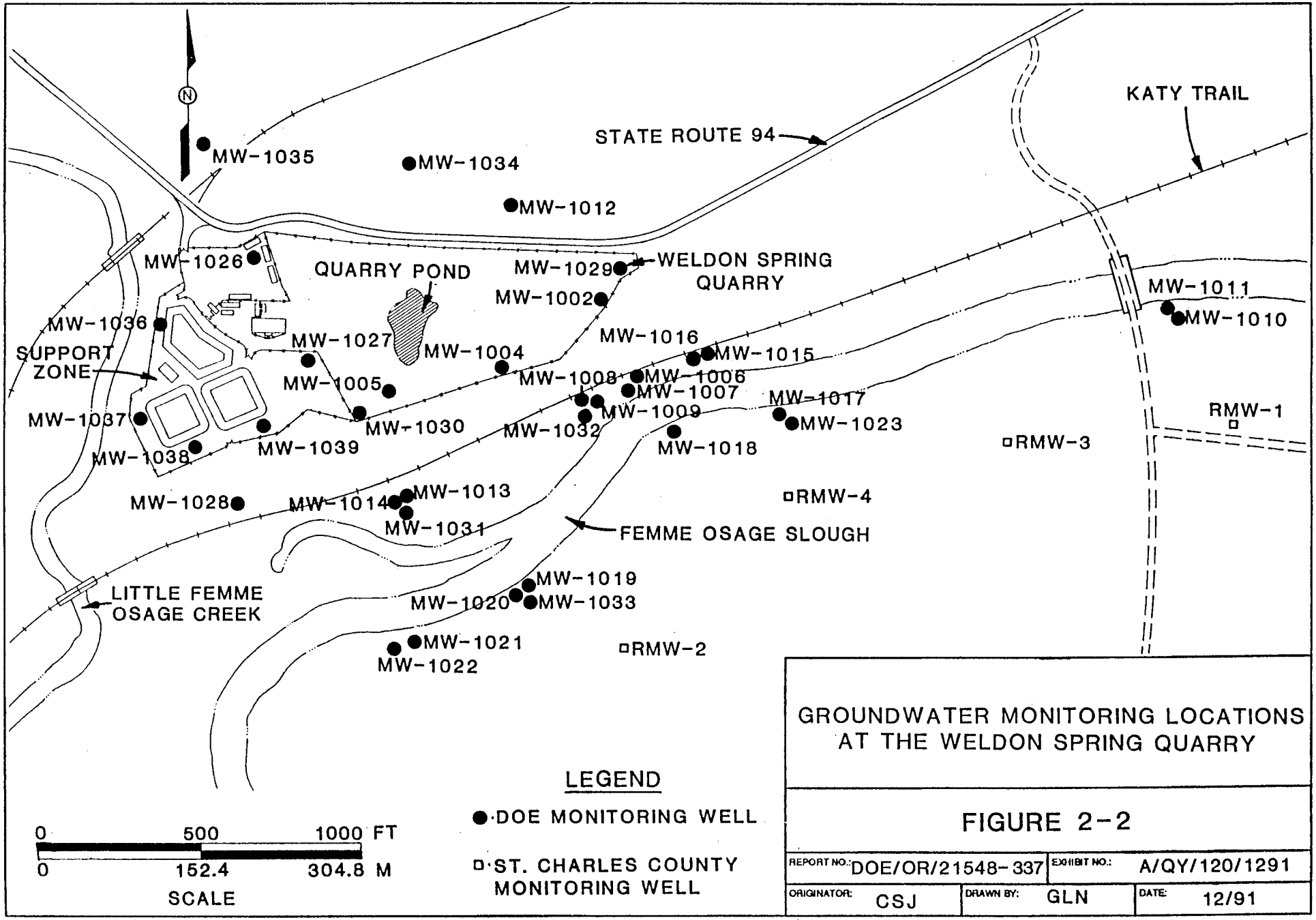
monitored for the presence of these contaminants. All monitoring well locations are shown in Figures 2-2 and 2-3. These wells monitor groundwater in both the bedrock and alluvial aquifers associated with the WSQ.

Two separate groundwater monitoring programs have been developed for the WSQ area. The first program is a bimonthly sampling of all wells north of the Femme Osage Slough and MW-1010 and MW-1011 located south of the slough. In addition, wells MW-1035, MW-1036, MW-1037, MW-1038, and MW-1039 will be sampled bimonthly until operation of the Weldon Spring Quarry water treatment plant is initiated. The second program is the quarterly sampling of all wells south of the Femme Osage Slough, excluding MW-1010 and MW-1011, but including the St. Charles County well field. Both the raw and treated waters from the St. Charles County water treatment plant are sampled quarterly.

2.2.1 Radiological Results

Radiological data are presented in Tables 2-7 through 2-9 for samples collected for the second and third bimonthly periods and second quarter. The results show typical fluctuations near the average levels in the WSQ area with the exception of MW-1007 and MW-1032. The uranium concentrations in MW-1007 exceeded the historic average and validation has been requested to determine whether this is a real value for uranium at this location. Results for the third bimonthly period returned to within historic ranges for this sampling location. The uranium concentration in MW-1032 exceeded the historic average and continued monitoring will be performed to determine whether this is a trend. Detectable concentrations of uranium were indicated from RMW-series wells and the St. Charles County production wells. These levels are within historic averages and representative of background levels.

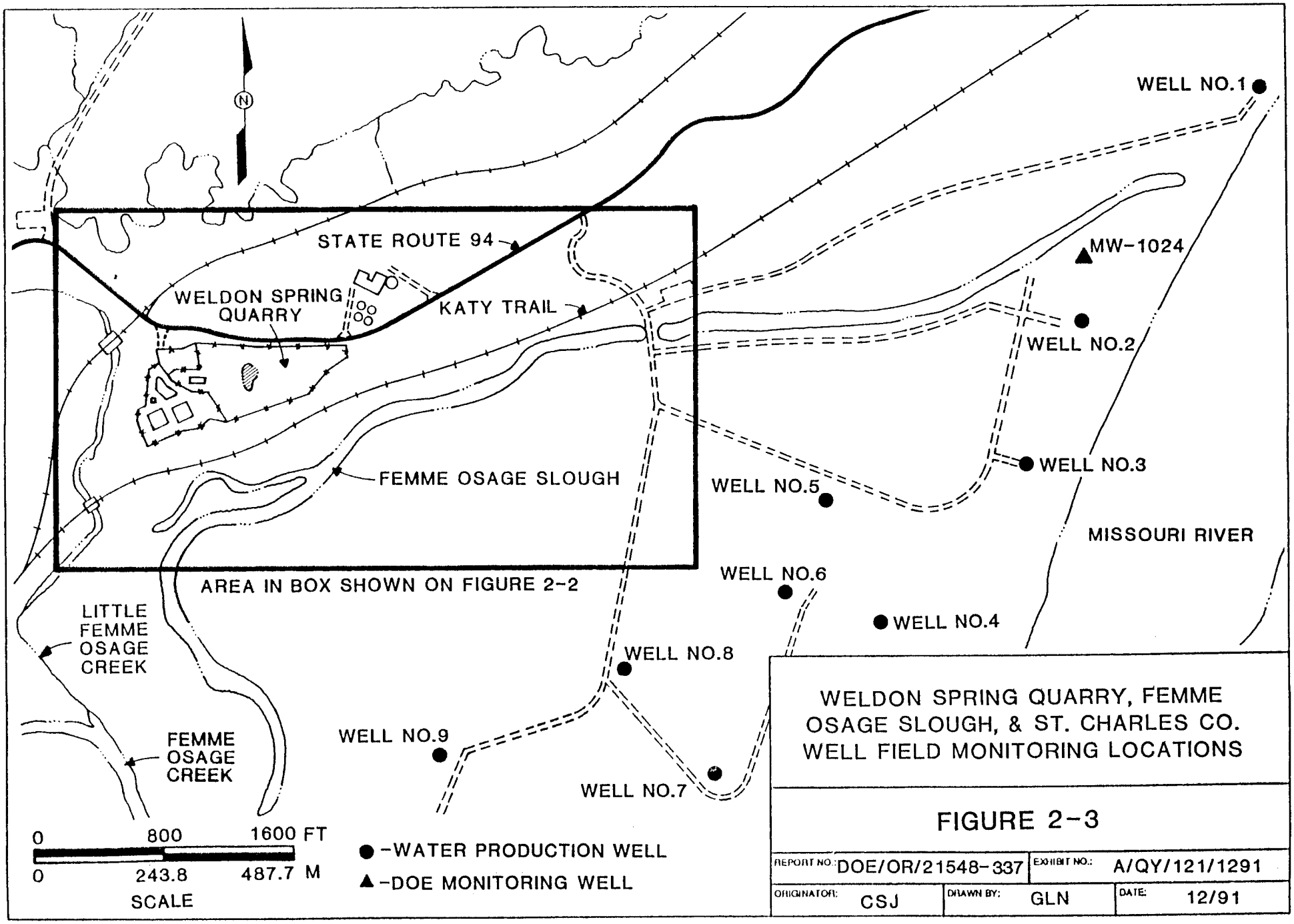
The monitoring wells north of the Femme Osage Slough are sampled annually for the radiological species of radium, thorium, gross alpha, and gross beta. The results of these samples analyses are presented in Table 2-10. Calendar year 1992 is the first routine sampling of these wells for radiological species other than urnaium since 1989. Wells within the WSQ boundary show elevated levels of both gross alpha and gross beta, and are consistent with the quarry pond (SW-1008) concentrations which are the source of impact. Monitoring wells MW-1013 through MW-1016, located south of the quarry, also show elevated levels. The concentrations in the remainder of the wells are consistent with background values of waters in or near the WSQ.



GROUNDWATER MONITORING LOCATIONS AT THE WELDON SPRING QUARRY

FIGURE 2-2

REPORT NO.: DOE/OR/21548-337		EXHIBIT NO.:	A/QY/120/1291		
ORIGINATOR: CSJ	DRAWN BY: GLN	DATE: 12/91			



WELDON SPRING QUARRY, FEMME OSAGE SLOUGH, & ST. CHARLES CO. WELL FIELD MONITORING LOCATIONS

FIGURE 2-3

REPORT NO.:	DOE/OR/21548-337	EXHIBIT NO.:	A/QY/121/1291		
ORIGINATOR:	CSJ	DRAWN BY:	GLN	DATE:	12/91

TABLE 2-7 Second Bimonthly (March/April) Uranium and Inorganic Anion Results for Groundwater at the WSQ

Sample ID	Nitrate (mg/l)	Sulfate (mg/l)	Uranium (pCi/l)
GW-1002-B292	1.60	67.4	1.2
GW-1004-B292	0.11	296	5300
GW-1005-B292	ND	140	1900
GW-1006-B292	0.28	146	3200
GW-1007-B292	ND	307	1700
GW-1008-B292	0.310	216	5600
GW-1009-B292	ND	288	4.4
GW-1010-B292	0.010	ND	3.54
GW-1011-B292	ND	30.6	11
GW-1012-B292	0.68	179	2.7
GW-1013-B292	0.14	103	800
GW-1014-B292	ND	114	920
GW-1015-B292	1.50	313	1400
GW-1016-B292	0.93	266	640
GW-1026-B292	0.140	0.670	0.68
GW-1027-B292	0.280	89.3	619
GW-1028-B292	ND	70.4	0.3
GW-1029-B292	ND	77.4	2.2
GW-1030-B292	ND	96.9	11
GW-1031-B292	ND	41.5	17
GW-1032-B292	ND	258	1300
GW-1034-B292	ND	86.9	1.6
GW-1035-B292	0.27	38.8	2.4
GW-1036-B292	0.10	58.6	8.5
GW-1037-B292	0.14	10.5	2.8
GW-1038-B292	ND	47.1	2.8
GW-1039-B292	ND	61.5	4.3

ND - Not Detected
NA - Not Available

TABLE 2-8 Third Bimonthly (May/June) Uranium and Inorganic Anion Results for Groundwater at the WSQ

Sample ID	Nitrate (mg/l)	Sulfate (mg/l)	Uranium (pCi/l)
GW-1002-B392	2.10	77.2	2.0
GW-1004-B392	0.38	430	5900
GW-1005-B392	ND	143	1600
GW-1006-B392	NA	NA	3500
GW-1007-B392	NA	NA	400
GW-1008-B392	ND	252	4100
GW-1009-B392	ND	289	4.7
GW-1010-B392	ND	ND	ND
GW-1011-B392	ND	39	17.0
GW-1012-B392	0.84	58.4	3.1
GW-1013-B392	NA	NA	880
GW-1014-B392	NA	NA	1100
GW-1015-B392	1.00	346	1500
GW-1016-B392	0.57	246	670
GW-1026-B392	ND	1.00	0.5
GW-1027-B392	0.31	99.4	640
GW-1028-B392	NA	NA	ND
GW-1029-B392	0.42	75.7	2.1
GW-1030-B392	8.19	98.7	6.0
GW-1031-B392	NA	NA	28
GW-1032-B392	ND	272	1700
GW-1034-B392	1.10	79.1	1.6
GW-1035-B392	0.10	39.1	0.3
GW-1036-B392	0.17	52.6	5.1
GW-1037-B392	0.10	9.80	0.68
GW-1038-B392	ND	45.6	2.7
GW-1039-B392	0.13	49.0	0.68

ND - Not Detected
NA - Not Available

TABLE 2-9 Second Quarter Uranium, Gross Alpha and Inorganic Anion Results for Groundwater at the WSQ

Sample ID	Nitrate (mg/l)	Sulfate (mg/l)	Uranium (pCi/l)	Gross Alpha (pCi/l)
GW-1017-Q292	ND	0.60	ND	NR
GW-1018-Q292	ND	50.7	0.2	NR
GW-1019-Q292	ND	1.10	ND	NR
GW-1020-Q292	ND	43.9	0.2	NR
GW-1021-Q292	ND	ND	1.4	NR
GW-1022-Q292	ND	ND	1.2	NR
GW-1023-Q292	ND	9.30	0.3	NR
GW-1024-Q292	ND	ND	ND	18
GW-1033-Q292	ND	10.0	2.1	NR
GW-RMW1-Q292	ND	23.0	0.68	3.3
GW-RMW2-Q292	ND	58.4	5.6	4.9
GW-RMW3-Q292	ND	7.29	0.4	2.3
GW-RMW4-Q292	0.79	34.8	2.4	ND
GW-PW02-Q292	NA	NA	0.95	ND
GW-PW03-Q292	NA	NA	0.68	ND
GW-PW04-Q292	NA	NA	0.2	ND
GW-PW05-Q292	NA	NA	0.4	ND
GW-PW06-Q292	NA	NA	ND	ND
GW-PW07-Q292	NA	NA	ND	3.7
GW-PW08-Q292	NA	NA	0.5	ND
GW-PW09-Q292	NA	NA	1.2	4.8
GW-RAWW-Q292	NA	NA	0.4	ND
GW-FINW-Q292	NA	NA	0.4	1.1

ND - Not Detected
NA - Not Available
NR - Not Required

TABLE 2-10 Second Bimonthly (March/April) Radiological Results for Groundwater at the WSQ

Sample ID	Th-228 (pCi/l)	Th-230 (pCi/l)	Th-232 (pCi/l)	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)
GW-1002-B292	ND	0.2	ND	ND	ND	7	12
GW-1004-B292	ND	ND	ND	0.3	ND	3700	2840
GW-1005-B292	ND	1.0	ND	ND	ND	1480	1070
GW-1006-B292	ND	ND	ND	0.4	ND	4300	2230
GW-1007-B292	ND	0.3	ND	0.6	ND	2300	1320
GW-1008-B292	ND	ND	ND	ND	ND	6000	3400
GW-1009-B292	ND	ND	ND	0.2	ND	15	11
GW-1010-B292	ND	ND	ND	0.4	2.1	ND	6.4
GW-1011-B292	ND	ND	ND	0.2	ND	22	22
GW-1012-B292	ND	0.3	ND	0.3	ND	23	13
GW-1013-B292	ND	ND	ND	0.7	ND	1100	610
GW-1014-B292	ND	ND	ND	ND	ND	600	510
GW-1015-B292	ND	1.5	ND	0.3	ND	1400	810
GW-1016-B292	ND	ND	ND	ND	ND	480	300
GW-1026-B292	ND	ND	ND	0.20	ND	25	18
GW-1027-B292	ND	ND	ND	ND	1.10	680	280
GW-1028-B292	ND	ND	ND	0.3	ND	6.8	13
GW-1029-B292	ND	ND	ND	ND	ND	13	12
GW-1030-B292	1.2	2.2	0.8	4.8	2.7	98	190
GW-1031-B292	ND	ND	ND	0.2	ND	22	13
GW-1032-B292	ND	ND	ND	0.5	1.1	860	780
GW-1034-B292	ND	1.6	ND	0.2	ND	3.1	5.8
GW-1035-B292	ND	ND	ND	0.4	ND	ND	5.9
GW-1036-B292	ND	ND	ND	0.2	ND	8.5	9.6
GW-1037-B292	ND	0.2	ND	0.3	ND	3.9	5.9
GW-1038-B292	ND	ND	ND	0.2	ND	ND	8.1
GW-1039-B292	ND	ND	ND	ND	0.9	5.0	8.7

ND - Not Detected
NA - Not Available

2.2.2 Nitroaromatic Compounds Results

Analytical results for the second and third bimonthly period, and the second quarter for nitroaromatic compounds, are presented in Tables 2-11 through 2-13. No monitoring wells south of the Femme Osage Slough showed detectable concentrations of nitroaromatic compounds during the second quarter of 1992. Elevated levels of nitroaromatic compounds were detected in rim wells MW-1002 and MW-1004 and alluvial monitoring well MW-1007. The distribution and magnitude of nitroaromatic contamination in the remainder of the wells near the quarry remain consistent with historical levels.

2.2.3 Inorganic Anions Results

Two inorganic anions, nitrate and sulfate, are sampled in all of the wells monitored at the WSQ. The analytical results for the second and third bimonthly period, and for the first quarter, are presented in Tables 2-7 through 2-9. An elevated level of sulfate was detected in alluvial monitoring well MW-1007 and an elevated level of nitrate was detected in rim well MW-1030. The results for the remainder of the monitoring wells are consistent with data reported in the previous environmental monitoring reports. The WSQ groundwater samples continue to indicate no significant nitrate contamination of the groundwater. The results indicate that elevated sulfate levels are present in groundwater within the WSQ and north of the Femme Osage Slough.

2.2.4 Metals Results

All wells in the WSQ monitoring program are sampled for arsenic and barium. The results for the second and third bimonthly periods, and the second quarter, are presented in Tables 2-14 through 2-16. Arsenic levels were consistent with historical values for groundwater in the vicinity of the WSQ. Elevated arsenic levels were reported for bedrock monitoring well MW-1028. Barium levels have remained elevated in the wells in the vicinity of the Femme Osage Slough. Elevated barium levels were indicated for rim monitoring wells MW-1002 and MW-1004.

TABLE 2-11 Second Bimonthly (March/April) Nitroaromatic Results for Groundwater at the WSQ

Sample ID	NB (µg/l)	1,3-DNB (µg/l)	2,4-DNT (µg/l)	2,6-DNT (µg/l)	2,4,6-TNT (µg/l)	1,3,5-TNB (µg/l)
GW-1002-B292	ND	0.36	0.13	27.0	85.0	480
GW-1004-B292	ND	ND	3.20	6.60	22.0	6.00
GW-1005-B292	ND	ND	0.10	0.040	ND	ND
GW-1006-B292	ND	ND	0.30	3.20	10.0	62.0
GW-1007-B292	ND	ND	ND	0.21	0.56	0.18
GW-1008-B292	ND	ND	ND	0.24	0.80	0.15
GW-1009-B292	ND	ND	ND	ND	ND	ND
GW-1010-B292	ND	ND	ND	ND	ND	ND
GW-1011-B292	ND	ND	ND	ND	ND	ND
GW-1012-B292	ND	ND	ND	ND	ND	ND
GW-1013-B292	ND	ND	0.063	0.024	ND	ND
GW-1014-B292	ND	ND	ND	ND	ND	ND
GW-1015-B292	ND	ND	0.054	0.75	27.0	240
GW-1016-B292	ND	ND	ND	0.22	5.40	32.0
GW-1026-B292	ND	ND	ND	ND	ND	ND
GW-1027-B292	ND	ND	0.42	3.10	9.00	0.066
GW-1028-B292	ND	ND	ND	ND	ND	ND
GW-1029-B292	ND	ND	ND	ND	ND	ND
GW-1030-B292	ND	ND	0.044	ND	ND	ND
GW-1031-B292	ND	ND	ND	ND	ND	ND
GW-1032-B292	ND	ND	0.088	0.088	ND	ND
GW-1034-B292	ND	ND	ND	ND	ND	ND
GW-1035-B292	ND	ND	ND	ND	ND	ND
GW-1036-B292	ND	ND	ND	ND	ND	ND
GW-1037-B292	ND	ND	ND	ND	ND	ND
GW-1038-B292	ND	ND	ND	ND	ND	ND
GW-1039-B292	ND	ND	ND	ND	ND	ND

NA - Not Available
ND - Not Detected

TABLE 2-12 Third Bimonthly (May/June) Nitroaromatic Results for Groundwater at the WSQ

Sample ID	NB (µg/l)	1,3-DNB (µg/l)	2,4-DNT (µg/l)	2,6-DNT (µg/l)	2,4,6-TNT (µg/l)	1,3,5-TNB (µg/l)
GW-1002-B392	ND	0.35	0.12	23	90	600
GW-1004-B392	ND	ND	3.8	7.4	25	8.5
GW-1005-B392	ND	ND	0.086	0.031	ND	ND
GW-1006-B392	ND	ND	0.17	3.6	12	70
GW-1007-B392	ND	ND	ND	ND	ND	ND
GW-1008-B392	ND	ND	ND	0.078	ND	ND
GW-1009-B392	ND	ND	ND	ND	ND	ND
GW-1010-B392	ND	ND	ND	ND	ND	ND
GW-1011-B392	ND	ND	ND	ND	ND	ND
GW-1012-B392	ND	ND	ND	ND	ND	ND
GW-1013-B392	ND	ND	0.053	0.016	ND	ND
GW-1014-B392	ND	ND	ND	ND	ND	ND
GW-1015-B392	ND	ND	0.055	0.80	24	190
GW-1016-B392	ND	ND	ND	0.21	4.5	24
GW-1026-B392	ND	ND	ND	ND	ND	ND
GW-1027-B392	ND	ND	0.62	2.4	17	0.065
GW-1028-B392	ND	ND	ND	ND	ND	ND
GW-1029-B392	ND	ND	ND	ND	ND	ND
GW-1030-B392	ND	ND	0.049	ND	ND	ND
GW-1031-B392	ND	ND	ND	ND	ND	ND
GW-1032-B392	ND	ND	0.20	0.12	ND	ND
GW-1034-B392	ND	ND	ND	ND	ND	ND
GW-1035-B392	ND	ND	ND	ND	ND	ND
GW-1036-B392	ND	ND	ND	ND	ND	ND
GW-1037-B392	ND	ND	ND	ND	ND	ND
GW-1038-B392	ND	ND	ND	ND	ND	ND
GW-1039-B392	ND	ND	ND	ND	ND	ND

NA - Not Available
ND - Not Detected

TABLE 2-13 Second Quarter Nitroaromatic Results for Groundwater at the WSQ

Sample ID	NB (µg/l)	1,3-DNB (µg/l)	2,4-DNT (µg/l)	2,6-DNT (µg/l)	2,4,6-TNT (µg/l)	1,3,5-TNB (µg/l)
GW-1017-Q292	ND	ND	ND	ND	ND	ND
GW-1018-Q292	ND	ND	ND	ND	ND	ND
GW-1019-Q292	ND	ND	ND	ND	ND	ND
GW-1020-Q292	ND	ND	ND	ND	ND	ND
GW-1021-Q292	ND	ND	ND	ND	ND	ND
GW-1022-Q292	ND	ND	ND	ND	ND	ND
GW-1023-Q292	ND	ND	ND	ND	ND	ND
GW-1024-Q292	ND	ND	ND	ND	ND	ND
GW-1033-Q292	ND	ND	ND	ND	ND	ND
GW-RMW1-Q292	ND	ND	ND	ND	ND	ND
GW-RMW2-Q292	ND	ND	ND	ND	ND	ND
GW-RMW3-Q292	ND	ND	ND	ND	ND	ND
GW-RMW4-Q292	ND	ND	ND	ND	ND	ND
GW-PW02-Q292	ND	ND	ND	ND	ND	ND
GW-PW03-Q292	ND	ND	ND	ND	ND	ND
GW-PW04-Q292	ND	ND	ND	ND	ND	ND
GW-PW05-Q292	ND	ND	ND	ND	ND	ND
GW-PW06-Q292	ND	ND	ND	ND	ND	ND
GW-PW07-Q292	ND	ND	ND	ND	ND	ND
GW-PW08-Q292	ND	ND	ND	ND	ND	ND
GW-PW09-Q292	ND	ND	ND	ND	ND	ND
GW-RAWW-Q292	ND	ND	ND	ND	ND	ND
GW-FINW-Q292	ND	ND	ND	ND	ND	ND

NA - Not Available
ND - Not Detected

TABLE 2-14 Second Bimonthly (March/April) Metal Results for Groundwater at the WSQ

Sample ID	Arsenic (µg/l)	Barium (µg/l)
GW-1002-B292	ND	37.8
GW-1004-B292	ND	140
GW-1005-B292	ND	56.7
GW-1006-B292	ND	42.5
GW-1007-B292	10.6	249
GW-1008-B292	ND	48.8
GW-1009-B292	3.89	364
GW-1010-B292	88.0	110
GW-1011-B292	ND	288
GW-1012-B292	ND	122
GW-1013-B292	3.39	140
GW-1014-B292	ND	194
GW-1015-B292	ND	105
GW-1016-B292	ND	127
GW-1026-B292	22.3	409
GW-1027-B292	ND	107
GW-1028-B292	6.29	300
GW-1029-B292	ND	109
GW-1030-B292	4.40	340
GW-1031-B292	ND	95.5
GW-1032-B292	ND	96.8
GW-1034-B292	ND	167
GW-1035-B292	ND	225
GW-1036-B292	ND	300
GW-1037-B292	ND	626
GW-1038-B292	ND	242
GW-1039-B292	ND	479

ND - Not Detected
NA - Not Available

TABLE 2-15 Third Bimonthly (May/June) Metal Results for Groundwater at the WSQ

Sample ID	Arsenic (µg/l)	Barium (µg/l)
GW-1002-B392	ND	142
GW-1004-B392	ND	44.8
GW-1005-B392	ND	51.8
GW-1006-B392	NA	NA
GW-1007-B392	NA	NA
GW-1008-B392	ND	49.1
GW-1009-B392	ND	344
GW-1010-B392	88.5	362
GW-1011-B392	ND	188
GW-1012-B392	ND	123
GW-1013-B392	NA	NA
GW-1014-B392	NA	NA
GW-1015-B392	ND	117
GW-1016-B392	ND	139
GW-1026-B392	22.1	381
GW-1027-B392	ND	98.1
GW-1028-B392	NA	NA
GW-1029-B392	ND	119
GW-1030-B392	5.20	353
GW-1031-B392	NA	NA
GW-1032-B392	ND	89.9
GW-1034-B392	ND	169
GW-1035-B392	ND	223
GW-1036-B392	ND	281
GW-1037-B392	ND	615
GW-1038-B392	2.39	222
GW-1039-B392	ND	461

ND - Not Detected
NA - Not Available

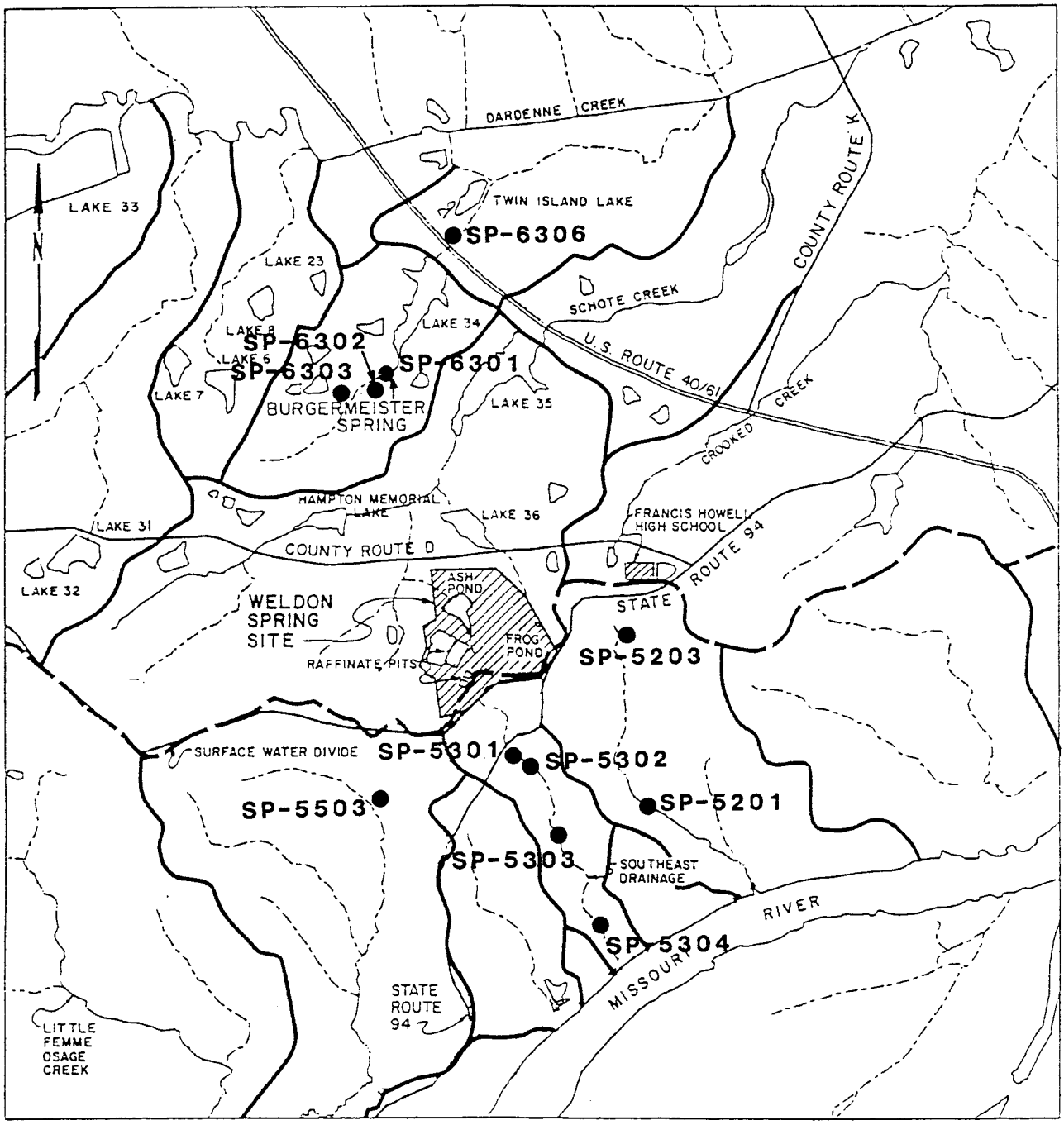
TABLE 2-16 Second Quarter Metal Results for Groundwater at the WSQ

Sample ID	Arsenic (µg/l)	Barium (µg/l)
GW-1017-Q292	128	996
GW-1018-Q292	102	633
GW-1019-Q292	71.5	818
GW-1020-Q292	32.5	412
GW-1021-Q292	71.2	849
GW-1022-Q292	146	531
GW-1023-Q292	55.3	293
GW-1024-Q292	10.5	134
GW-1033-Q292	ND	320
GW-RMW1-Q292	7.00	481
GW-RMW2-Q292	13.0	237
GW-RMW3-Q292	34.3	646
GW-RMW4-Q292	6.79	165
GW-PW02-Q292	ND	335
GW-PW03-Q292	ND	313
GW-PW04-Q292	ND	287
GW-PW05-Q292	ND	355
GW-PW06-Q292	ND	334
GW-PW07-Q292	2.29	476
GW-PW08-Q292	3.39	446
GW-PW09-Q292	3.50	485
GW-RAWW-Q292	ND	369
GW-FINW-Q292	ND	103

ND - Not Detected
NA - Not Available

2.3 Springs

Five springs around the Weldon Spring site (WSS) were sampled during the first quarter (see Figure 2-4). Previous spring monitoring indicated that waters from six perennial springs and one wet-weather spring are measurably influenced by site-related contaminants. These springs include SP-5301 through SP-5304, SP-6301, SP-6302, and SP-6306. SP-6301 and SP-6306 were to be sampled during high and low flow periods. High flow samples were not attained during second quarter, but will be collected during 3rd quarter. Unavailable analytical results will be reported in the 1992 annual site environmental report (ASER). During second quarter, spring samples were analyzed for radiological, inorganic anions, and nitroaromatics (see Table 2-17).



● SPRING

0 3200 6400 FT

0 975.4 1950.7 M

SCALE

SPRINGS IN THE VICINITY OF THE WSS

FIGURE 2-4

REPORT NO.:	DOE/OR/21548-337	EXHIBIT NO.:	A/VP/040/0592		
ORIGINATOR:	MGT	DRAWN BY:	GLN	DATE:	5/92

TABLE 2-17 Second Quarter Results in Springs Near the Weldon Spring Site

Sample ID	NB (µg/l)	1,3-DNB (µg/l)	2,4-DNT (µg/l)	2,6-DNT (µg/l)	2,4,6-TNT (µg/l)	1,3,5-TNB (µg/l)
SP-6301-Q292-H	NS	NS	NS	NS	NS	NS
SP-6301-Q292-L	ND	ND	0.042	0.61	0.27	0.045
8SP-6306-Q292-H	NS	NS	NS	NS	NS	NS
SP-6306-Q292-L	ND	ND	ND	ND	ND	ND
SP-5303-Q292	NA	NA	NA	NA	NA	NA
SP-5304-Q292	DRY					
SP-5201-Q292	NA	NA	NA	NA	NA	NA

Sample ID	Th-228 (pCi/l)	Th-230 (pCi/l)	Th-232 (pCi/l)	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Uranium (pCi/l)
SP-6301-Q292-H	NS	NS	NS	NS	NS	NS
SP-6301-Q292-L	ND	ND	ND	ND	ND	90
SP-6306-Q292-H	NS	NS	NS	NS	NS	NS
SP-6306-Q292-L	NA	NA	NA	NA	NA	NA
SP-5303-Q292	NA	NA	NA	NA	NA	NA
SP-5304-Q292	DRY					
SP-5201-Q292	NA	NA	NA	NA	NA	NA

Sample ID	Nitrate (mg/l)	Sulfate (mg/l)
SP-6301-Q292	NS	NS
SP-6301-Q292-L	47.6	51.3
SP-6306-Q292	NS	NS
SP-6306-Q292-L	0.18	8.90
SP-5303-Q292	NA	NA
SP-5304-Q292	DRY	
SP-5201-Q292	NA	NA

ND - Not Detected
NA - Not Available
NS - Not Sampled

3 SURFACE WATER MONITORING

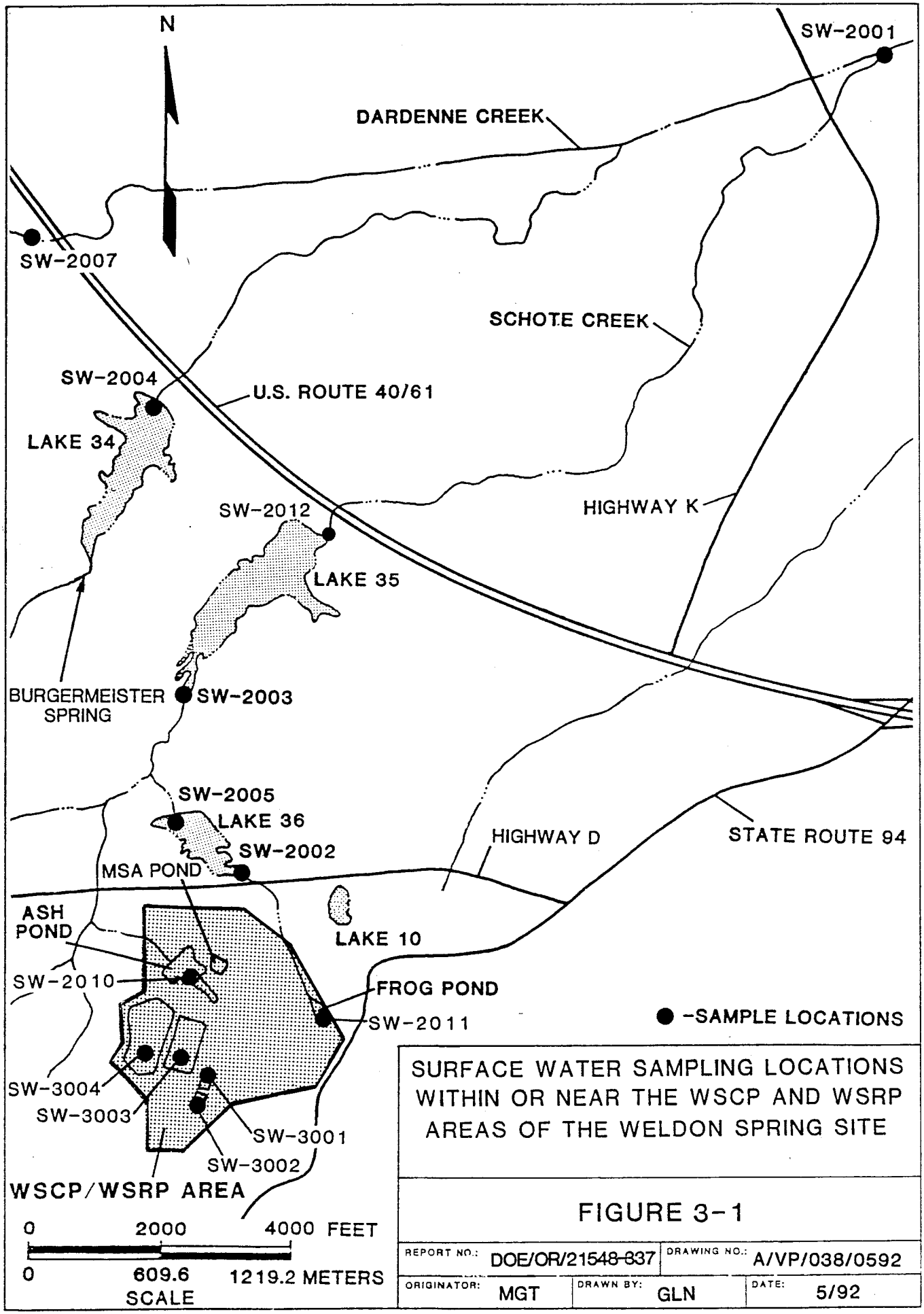
Routine samples were collected during the second quarter of 1992 from both on-site and off-site surface water locations. All surface water samples were analyzed without filtering, unless a specific comparison of dissolved versus total contaminant concentrations was desired. Some analytical results are not available at this time; however, they will be presented in the 1992 annual site environmental report (ASER).

3.1 Chemical Plant/Raffinate Pits/Vicinity Properties

During the first quarter, surface water samples were collected from 14 of the 15 surface water sampling locations shown in Figure 3-1 and analyzed for uranium and metals. Monitoring point SW-2016, not shown in Figure 3-1, is located at the intersection of Dardenne Creek and County Highway N. This is now the furthest location downstream at which to measure contaminant levels in Dardenne Creek after it has received the Schote Creek contribution. The results, presented in Tables 3-1 and 3-2, indicated that conditions at sampling locations remain consistent with historical values. The nitrate value for SW-2005 is considered suspect and full validation has been requested.

3.2 Weldon Spring Quarry

Monitoring locations SW-1001, SW-1002, and SW-1014 (Figure 3-2) monitor the Little Femme Osage Creek at points upstream and downstream of the Weldon Spring quarry (WSQ). Six sampling locations, SW-1003 through SW-1005, SW1007, SW-1009, and SW-1010, are distributed along the Femme Osage Slough in the vicinity of the WSQ. These locations within the slough were chosen to provide the most representative data of potentially impacted areas from the quarry contamination. Location SW-1008 monitors the ponded water within the WSQ and provides a rough deterination of the concentrations of the various contaminants in the WSQ pond, which may migrate to groundwater. Locations SW-1011 through SW-1013 (Figure 3-3) and SW-1015 (Howard Bend) were added to the monitoring program to provide baseline water quality data for the Missouri River at points both upstream and downstream from the WSQ and the Southeast Drainage (5300) easement.



SURFACE WATER SAMPLING LOCATIONS WITHIN OR NEAR THE WSCP AND WSRP AREAS OF THE WELDON SPRING SITE

FIGURE 3-1

REPORT NO.: DOE/OR/21548-837	DRAWING NO.: A/VP/038/0592	
ORIGINATOR: MGT	DRAWN BY: GLN	DATE: 5/92

TABLE 3-1 Second Quarter Uranium and Inorganic Anion Results for Surface Water at the WSCP/RP/VP

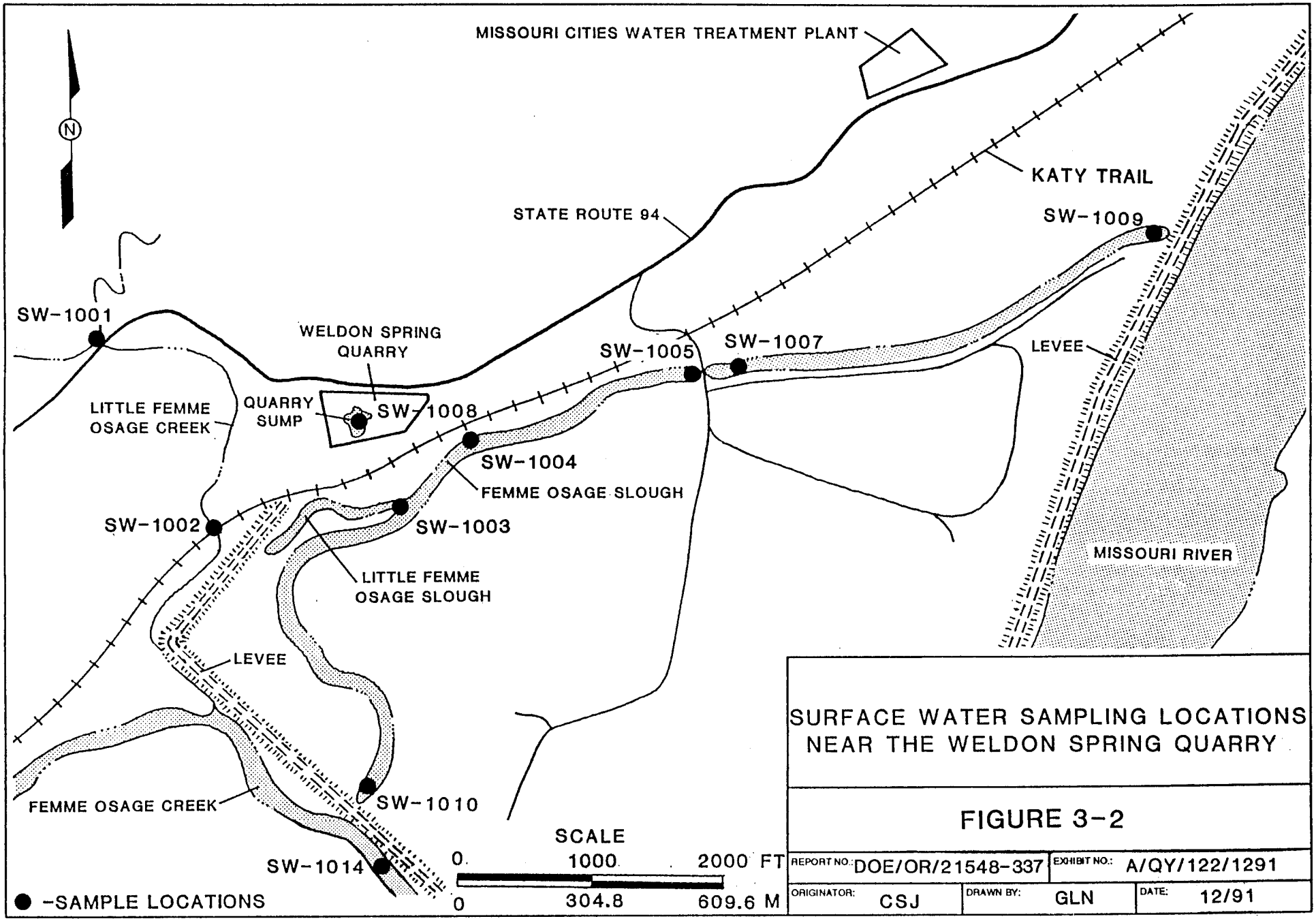
Sample ID	Nitrate (mg/l)	Sulfate (mg/l)	Uranium (pCi/l)
SW-2001-Q292	0.76	40.6	1.70
SW-2002-Q292	0.17	34.4	56.0
SW-2003-Q292	0.50	17.4	13.0
SW-2004-Q292	1.20	22.4	11.0
SW-2005-Q292	1300	28.9	35
SW-2007-Q292	NA	NA	2.0
SW-2010-Q292	NA	NA	NA
SW-2011-Q292	0.38	57.1	280
SW-2012-Q292	Dry		
SW-2016-Q292	1.00	48.6	1.80
SW-3001-Q292	NA	NA	NA
SW-3002-Q292	NA	NA	NA
SW-3003-Q292	NA	NA	NA
SW-3004-Q292	NA	NA	NA
SW-5311-Q292	NA	NA	NA

ND - Not Detected
NA - Not Available

TABLE 3-2 Second Quarter Results for Metals in Surface Water at the WSCP/RP/VP

Sample ID	Arsenic (µg/l)	Barium (mg/l)	Beryllium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Lead (µg/l)	Mercury (µg/l)	Antimony (µg/l)	Selenium (µg/l)	Silver (µg/l)	Thallium (µg/l)
SW-2001-Q292	ND	110	ND	ND	ND	ND	ND	ND	ND	ND	ND
SW-2002-Q292	ND	76.4	1.39	ND	ND	ND	ND	ND	ND	ND	ND
SW-2003-Q292	ND	60.7	1.39	ND	ND	ND	ND	ND	ND	ND	ND
SW-2004-Q292	ND	78.0	1.39	ND	ND	ND	ND	ND	ND	ND	ND
SW-2005-Q292	ND	72.4	2.39	ND	ND	ND	ND	ND	ND	ND	ND
SW-2007-Q292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-2010-Q292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-2011-Q292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-2012-Q292	Dry										
SW-2016-Q292	ND	134	ND	ND	ND	ND	ND	ND	ND	ND	ND
SW-3001-Q292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-3002-Q292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-3003-Q292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-3004-Q292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-5311-Q292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

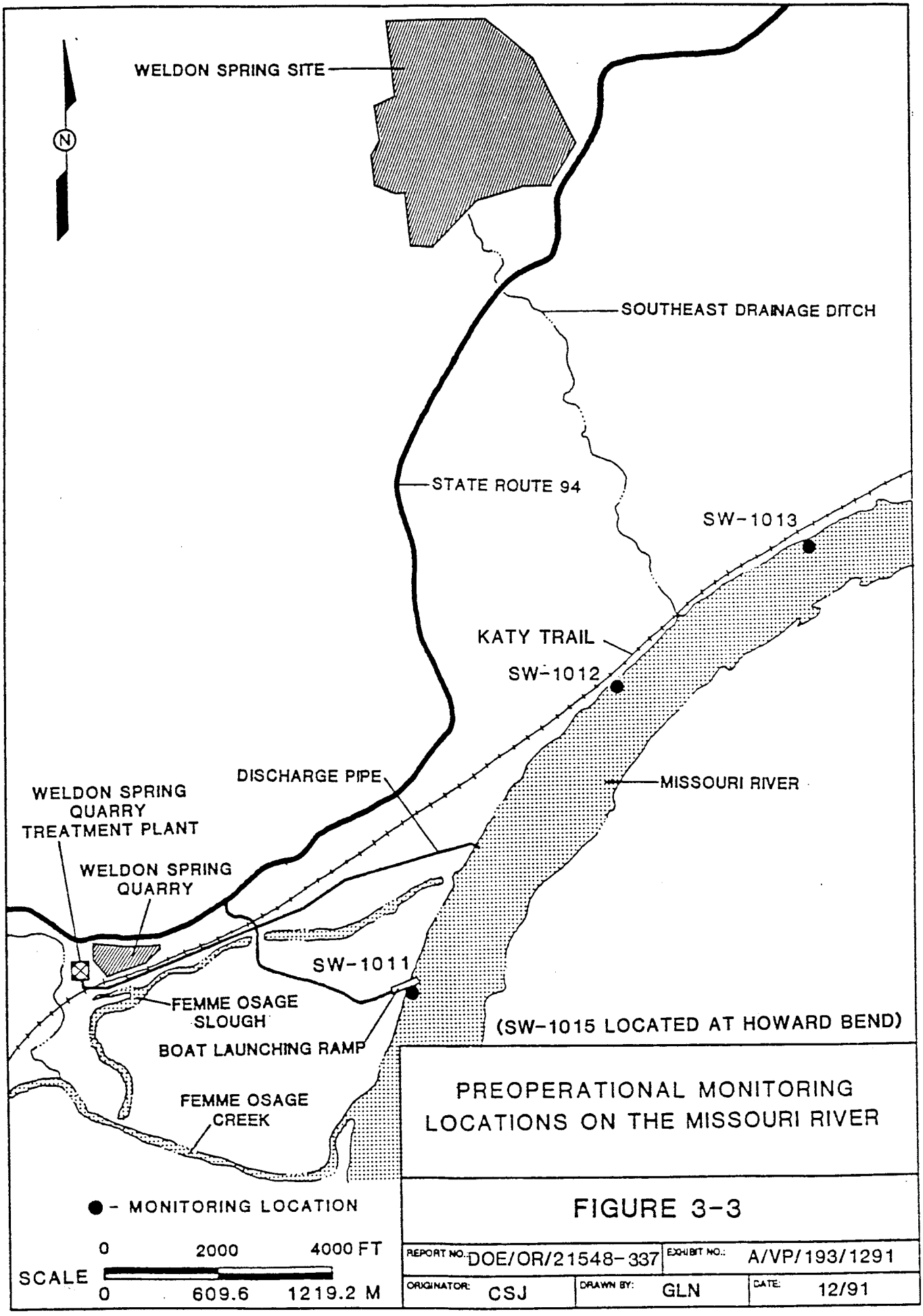
ND - Not Detected
NA - Not Available



SURFACE WATER SAMPLING LOCATIONS NEAR THE WELDON SPRING QUARRY

FIGURE 3-2

REPORT NO:	DOE/OR/21548-337	EXHIBIT NO.:	A/QY/122/1291		
ORIGINATOR:	CSJ	DRAWN BY:	GLN	DATE:	12/91



PREOPERATIONAL MONITORING LOCATIONS ON THE MISSOURI RIVER

FIGURE 3-3

REPORT NO.: DOE/OR/21548-337	EXHIBIT NO.: A/VP/193/1291	
ORIGINATOR: CSJ	DRAWN BY: GLN	DATE: 12/91

3.2.1 Radiological Results

Surface water samples were collected for radiological analyses from the 13 locations shown in Figures 3-2 and 3-3. The uranium results for the second and third bimonthly periods are presented in Tables 3-4 and 3-5. Second and third bimonthly uranium concentrations for the sampling locations in the Femme Osage Slough and Little Femme Osage Creek remain within historical ranges. The highest measured uranium concentration of 1200 pCi/l (44.4 Bq/l) was detected at the quarry pond (SW-1008) and is within the historical range. In addition, the surface water locations were sampled for the radiological species of radium and thorium, gross alpha, and gross beta during the second bimonthly period. The results are presented in Table 3-3.

3.2.2 Nitroaromatic Compounds Results

Analytical results for nitroaromatic compounds during the second bimonthly period, are presented in Table 3-6. No nitroaromatic analyses have been performed at these sampling locations since 1989. Elevated levels of 2,4-dinitrotoluene (DNT), 2,6-DNT, and 2,4,6-trinitrotoluene (TNT) have been detected at the SW-1001 location. This location has been established as background for the WSQ. Additional sampling will be performed to determine the presence of a trend and the possible upstream source of impact.

3.2.3 Inorganic Anion Results

Surface water samples were collected from the sampling locations in the second bimonthly period for nitrate and sulfate analysis. Inorganic anions have not been analyzed at these locations since 1988 except for SW-1008 and SW-1011 through SW-1013. The results for this bimonthly period are within or below historic levels and background for nitrate and sulfate.

3.2.4 Weldon Spring Quarry Pond Results

A summary of the analytical results for the third bimonthly sampling period is presented in Table 3-7. This sampling location is summarized separately to characterize the surface waters in the WSQ which may migrate and effect groundwater. The results for this bimonthly period are within historic ranges for all parameters analyzed.

TABLE 3-3 Second Bimonthly (March/April) Radiological Results in Surface Water at the WSQ

Sample ID	Th-228 (pCi/l)	Th-230 (pCi/l)	Th-232 (pCi/l)	Ra-226 (pCi/l)	Ra-228 (pCi/l)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)
SW-1001-B292	ND	4.8	ND	0.2	ND	ND	8.9
SW-1002-B292	ND	ND	ND	ND	ND	ND	ND
SW-1003-B292	ND	2.2	ND	ND	ND	77	72
SW-1004-B292	ND	2.1	ND	0.4	1.4	180	140
SW-1005-B292	ND	1.5	ND	0.2	ND	30	28
SW-1007-B292	ND	0.3	ND	ND	1.3	17	14
SW-1008-B292	NA	NA	NA	NA	NA	NA	NA
SW-1009-B292	ND	ND	ND	0.6	ND	12	19
SW-1010-B292	ND	ND	ND	ND	ND	ND	ND
SW-1011-B292	0.6	1.6	0.6	1.1	2.6	10	14
SW-1012-B292	ND	ND	ND	ND	ND	ND	ND
SW-1013-B292	ND	ND	ND	ND	ND	ND	ND
SW-1014-B292	ND	ND	ND	ND	ND	ND	ND

ND - Not Detected
NA - Not Available

TABLE 3-4 Second Bimonthly (March/April) Uranium and Inorganic Anion Results in Surface Water at the WSQ

Sample ID	Nitrate (mg/l)	Sulfate (mg/l)	Uranium (pCi/l)
SW-1001-B292	0.590	27.0	0.82
SW-1002-B292	0.170	50.1	5.03
SW-1003-B292	ND	86.2	110
SW-1004-B292	ND	70.7	300
SW-1005-B292	ND	63.1	42
SW-1007-B292	ND	44.5	16
SW-1008-050192	ND	76.9	NA
SW-1009-B292	ND	47.0	18
SW-1010-B292	0.140	39.3	54.5
SW-1011-B292	1.39	80.1	8.5
SW-1012-B292	2.00	85.9	5.85
SW-1013-B292	1.70	87.5	5.51
SW-1014-B292	0.800	30.6	4.08

ND - Not Detected
NA - Not Available

TABLE 3-5 Third Bimonthly (May/June) Uranium Results in Surface Water at the WSQ

Sample ID	Uranium (pCi/l)
SW-1001-B392	ND
SW-1002-B392	ND
SW-1003-B392	46.0
SW-1004-B392	73.0
SW-1005-B392	26
SW-1007-B392	7.6
SW-1008-B392	1200
SW-1009-B392	6.1
SW-1010-B392	43
SW-1011-B392	3.30
SW-1012-B392	1.8
SW-1013-B392	5.0
SW-1014-B392	3.8

ND - Not Detected

TABLE 3-6 Second Bimonthly (March/April) Nitroaromatic Results in Surface Water at the WSQ

Sample ID	NB (µg/l)	1,3-DNB (µg/l)	2,4-DNT (µg/l)	2,6-DNT (µg/l)	2,4,6-TNT (µg/l)	1,3,5-TNB (µg/l)
SW-1001-B292	ND	ND	0.37	0.014	0.067	ND
SW-1002-B292	ND	ND	ND	ND	ND	ND
SW-1003-B292	ND	ND	ND	ND	ND	ND
SW-1004-B292	ND	ND	ND	ND	ND	ND
SW-1005-B292	ND	ND	ND	ND	ND	ND
SW-1007-B292	ND	ND	ND	ND	ND	ND
SW-1008-B292	NA	NA	NA	NA	NA	NA
SW-1009-B292	ND	ND	ND	ND	ND	ND
SW-1010-B292	ND	ND	ND	ND	ND	ND
SW-1011-B292	ND	ND	ND	ND	ND	ND
SW-1012-B292	ND	ND	ND	ND	ND	ND
SW-1013-B292	ND	ND	ND	ND	ND	ND
SW-1014-B292	ND	ND	ND	ND	ND	ND

NA - Not Available
ND - Not Detected

TABLE 3-7 Third Bimonthly (May/June) Results for SW-1008

Parameter	Concentration	Units
Ra-226	0.8	pCi/l
Ra-228	ND	pCi/l
Th-230	0.2	pCi/l
Th-232	ND	pCi/l
Gross Alpha	1650	pCi/l
Gross Beta	690	pCi/l
Uranium	1200	pCi/l
Nitrate	ND	mg/l
Sulfate	71.5	mg/l
Nitrobenzene	ND	µg/l
1,3-DNB	ND	µg/l
2,4-DNT	0.30	µg/l
2,6-DNT	0.016	µg/l
2,4,6-TNT	ND	µg/l
1,3,5-TNB	ND	µg/l

4 EFFLUENT MONITORING

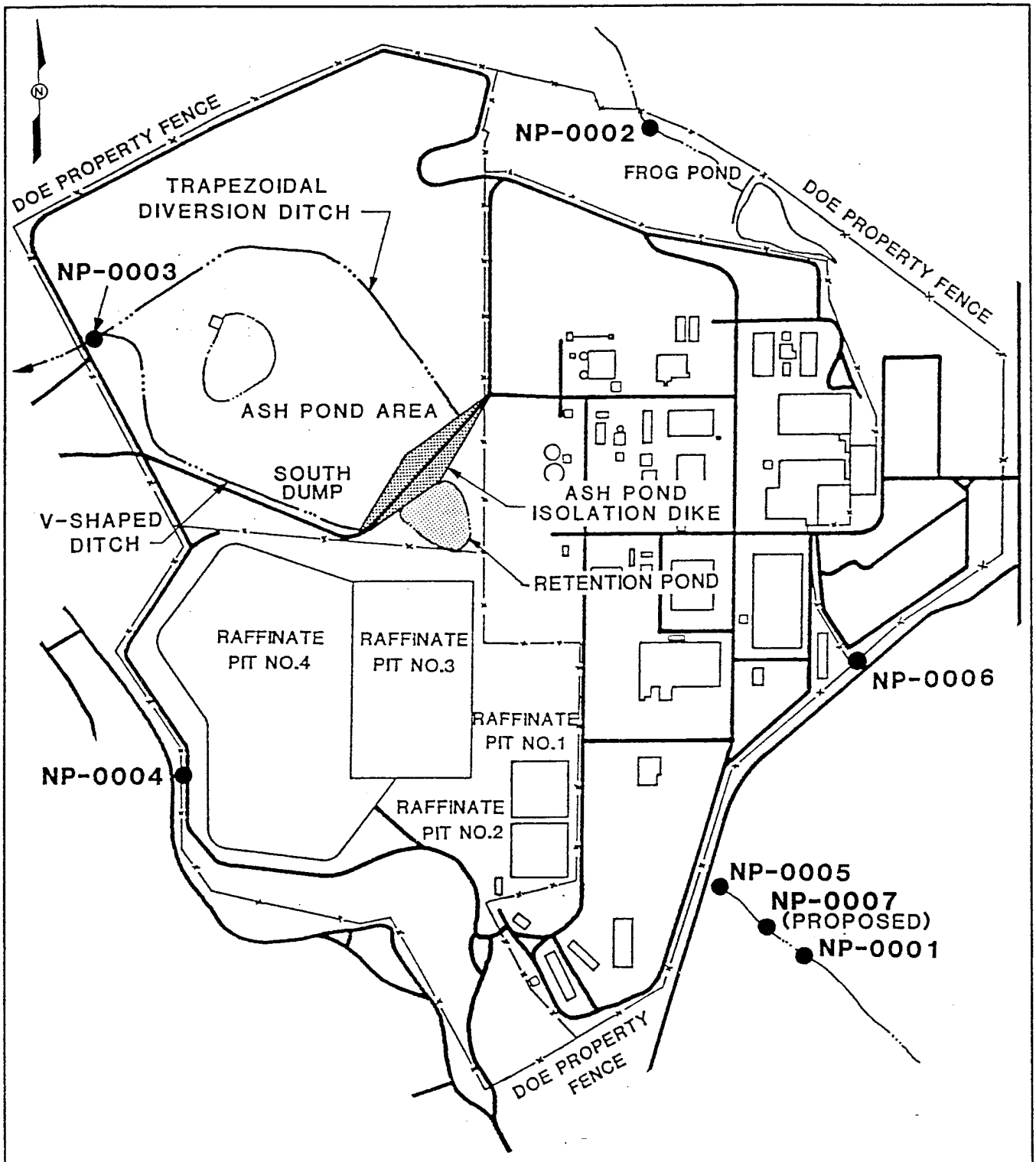
The National Pollutant Discharge Elimination System (NPDES) permit process is authorized by Section 402(a)(1) of the *Clean Water Act of 1977.* The authority to issue permits is delegated to the State of Missouri by the U.S. Environmental Protection Agency (EPA). The State of Missouri has issued four NPDES permits to the U.S. Department of Energy (DOE) allowing the discharge of stormwater hydrostatic test water, and treated wastewater to waters of the state. The permits require that samples of the wastewater be collected periodically and the results reported to the Missouri Department of Natural Resources. The following sections contain the analytical results for samples collected during April, May, and June of 1992.

4.1 National Pollutant Discharge Elimination System Data Review

Effluent samples were collected and analyzed in compliance with the Weldon Spring site NPDES permits. Permit No. MO-0107701 was issued on October 1, 1990, and currently addresses the five storm water and two wastewater discharges shown in Figure 4-1. Outfalls NP-0001 through NP-0005 represent storm water discharges; Outfall NP–0006 represents the treated wastewater discharge associated with the administration building sanitary wastewater treatment plant; and Outfall NP-0007 represents the site water treatment plant, which is under construction, but not yet completed. There was no discharge from Outfall NP-0007. Outfalls NP-0006 and NP-0007 have effluent limitations. The five storm water outfalls have "monitoring only" requirements. A lack of flow due to inadequate precipitation prevented the collection of samples from outfalls NP-0003 and NP-0005 during the month of June. NP-0004 also had no discharge during the second quarter, and therefore was not sampled. Second quarter 1992 analytical data for each outfall are presented in Table 4-1.

A lack of flow due to inadequate precipitation prevented the collection of samples from outfalls NP-0003 and NP-0005 during the month of June. NP-0004 also had no discharge during the second quarter, and therfore was not sampled.

Permit No. MO-0108987 was issued on May 5, 1989, for Outfall NP-1001 of the Weldon Spring Quarry water treatment plant. The plant construction is not complete and no discharge took place during the second quarter of 1992.



NPDES SURFACE WATER SAMPLING LOCATIONS AT THE WSCP/RP

FIGURE 4-1

SCALE 0 500 1000 FT
0 152.4 304.8 M

REPORT NO.:	DOE/OR/21548-337	EXHIBIT NO.:	A/CP/050/0592		
ORIGINATOR:	TW	DRAWN BY:	GLN	DATE:	5/92

TABLE 4-1 Results of Monthly NPDES Monitoring for NP-0001 through NP-0006

Outfall NP-0001 NPDES data for Q2 1992

DATE SAMPLED	FLOW	SUSP. SOLIDS	SET. SOLIDS	NITRATE	pH	LITHIUM	GROSS ALPHA	TOTAL URANIUM	
UNITS	GPD**	mg/l	ml/l/hr	mg/l	pH units	mg/l	pCi/l	mg/l	pCi/l
April 20	99,500	15.0	ND (0.1)	0.50	6.01	ND (0.1)	410	0.663	450

Outfall NP-0002 NPDES data for Q2 1992

DATE SAMPLED	FLOW	SUSP. SOLIDS	SET. SOLIDS	NITRATE	pH	LITHIUM	GROSS ALPHA	TOTAL URANIUM	
UNITS	GPD**	mg/l	ml/l/hr	mg/l	pH units	mg/l	pCi/l	mg/l	pCi/l
April 20	787,000	38.0	ND (0.1)	1.10	6.0	ND (0.1)	140	0.151	103
May 13	73,200	48.0	ND (0.1)	0.41	7.28	ND (0.1)	220	0.222	151
June 4	25,400	16.0	ND (0.1)	0.47	7.54	ND (0.023)	190	0.255	173

Outfall NP-0003 NPDES data for Q2 1992

DATE SAMPLED	FLOW	SUSP. SOLIDS	SET. SOLIDS	NITRATE	pH	LITHIUM	GROSS ALPHA	TOTAL URANIUM	
UNITS	GPD**	mg/l	ml/l/hr	mg/l	pH units	mg/l	pCi/l	mg/l	pCi/l
April 20	740,600*	40.0	ND (0.1)	3.39	6.04	ND (0.1)	540	0.799	543
May 13	17,568*	10.0	ND (0.1)	0.21	7.61	ND (0.1)	280	0.392	267

TABLE 4-1 Results of Monthly NPDES Monitoring for NP-0001 through NP-0006 (Continued)

Outfall NP-0004 NPDES data for Q2 1992

DATE SAMPLED	FLOW	SUSP. SOLIDS	SET. SOLIDS	NITRATE	pH	LITHIUM	GROSS ALPHA	TOTAL URANIUM	
UNITS	GPD**	mg/l	ml/l/hr	mg/l	pH units	mg/l	pCi/l	mg/l	pCi/l
No Discharge	--	--	--	--	--	--	--	--	--

Outfall NP-0005 NPDES data for Q2 1992

DATE SAMPLED	FLOW	SUSP. SOLIDS	SET. SOLIDS	NITRATE	pH	LITHIUM	GROSS ALPHA	TOTAL URANIUM	
UNITS	GPD**	mg/l	ml/l/hr	mg/l	pH units	mg/l	pCi/l	mg/l	pCi/l
April 20	174,500*	129	ND (0.1)	18.6	6.08	ND (0.1)	350	0.526	358
May 13	3,312*	35	ND (0.1)	0.31	8.01	ND (0.1)	460	0.749	509

Outfall NP-0006 NPDES data for Q2 1992

DATE SAMPLED	FLOW	SUSP. SOLIDS	BOD	FECAL COLIFORMS	pH
UNITS	GPD**	mg/l	mg/l	Colonies/100 ml	pH units
April 3	5400	8.0	1.0	ND (1.0)	6.5
May 7	3,000	7.0	1.0	ND (1.0)	7.0
June 5	5,000	7.0	1.0	ND (1.0)	7.0

* Indicates an updated flow value which differs from that found in the second quarter 1992 Discharge Monitoring Report.
** Indicates flow rate at time of sample collection.
ND Not detected, detection limit is in parentheses.
-- Indicates analysis not done on this parameter.

Table 4-2 Results of NPDES Monitoring for Permit MO-G680001

Date Sampled	Flow*	Oil and Grease	Susp. Solids	pH
Units	Gallons	mg/l	mg/l	
April 24	66,500	ND (5.0)	ND (5.0)	6.74
April 28	178,500	ND (5.0)	28.0	6.14
April 29	178,500	ND (5.0)	16.0	6.82
April 30	178,500	ND (5.0)	5.0	6.97
June 17	*	ND (5.0)	8.0	6.71
June 19	*	ND (5.0)	10.0	8.67
June 22	500,000	ND (5.0)	9.0	6.99
June 26	750,000	6.29	5.0	8.84
June 29	4,000	ND (5.0)	ND (5.0)	7.92

* The June 22 flow value represents the total amount of water discharged from June 17 through June 22, 1992.

NPDES permit No. MO-G680001 was issued on December 19, 1991. This permit is for discharge of uncontaminated water used for new tank and hydrostatic basin testing at the quarry water treatment plant. Second quarter 1992 analytical data are presented in Table 4-2.

NPDES permit No. MO-G680002 was issued on February 7, 1992. This permit is for discharge of uncontaminated water used for new tank and hydrostatic basin testing at the site water treatment plant. There was no discharge under this permit for the second quarter of 1992.

4.1.1 Radiological Analysis

Gross alpha and uranium analyses corresponded well with past data. The storm water outfalls had the following ranges of uranium concentrations. The process sewer outfall NP-0001, had only one sample value of 450 pCi/l (0.663 mg/l). Frog Pond outfall, NP-0002, had values from 103 pCi/l (0.151 mg/l) to 173 pCi/l (0.255 mg/l). The Ash Pond outfall, NP-0003, had values of 543 pCi/l (0.799 mg/l) and 267 pCi/l (0.392 mg/l). There was no discharge from NP-0004 during the second quarter. The Southeast Drainage outfall, NP-0005, had values of 358 pCi/l (0.526 mg/l) and 509 pCi/l (0.749 mg/l).

In addition to the required radiological monitoring, gross beta was quantified for most samples. The one sample collected from NP-0001 had a gross beta count of 150 pCi/l (5.55 Bq/l). Two samples from NP-0002 were analyzed for gross beta. The sample collected on April 20 had a gross beta count of 29 pCi/l (1.07 Bq/l), and the sample collected on May 13 had a gross beta count of 61 pCi/l (2.26 Bq/l). The gross beta concentrations for NP-0003 were 190 pCi/l (7.03 Bq/l) for the April 20 sample, and 49 pCi/l (1.81 Bq/l) for the May 13 sample. The gross beta concentrations for NP-0005 were 160 pCi/l (5.92 Bq/l) for the April 20 sample, and 55 pCi/l (2.04 Bq/l) for the May 13 sample.

4.1.2 Other Analysis

Other analyses for NP-0001 through NP-0005 include physical analyses (settleable solids and total suspended solids) and chemical analyses (nitrate, pH, and lithium). Second quarter 1992 values correspond well with past values for all parameters.

The permit for the discharge from the administration building treatment plant at outfall NP-0006 has effluent limitations and a requirement to monitor once per quarter. Flow must be

measured once a month. The Subcontractor monitors the effluent once a month to assess plant performance, thus generating two additional sample analyses a quarter. The NPDES permit specifies effluent limitations for biochemical oxygen demand (BOD), total suspended solids (TSS), pH, and fecal coliform at this outfall. The limits for BOD are 10 mg/l monthly average and 15 mg/l weekly average; for TSS, 15 mg/l monthly average and 20 mg/l weekly average; for fecal coliform, 400 colonies per 100 ml monthly average and 1,000 colonies per 100 ml daily maximum. The Subcontractor is continuing to make operational changes to improve plant performance. In addition, the plans to add a flow equalization system are complete. The equalization of flow should greatly improve the operation of the plant. An application for a construction permit, as well as the plans and specifications, were submitted to the Missouri Department of Natural Resources. When the construction permit is issued, construction will begin. Until the flow equalization is added, the treatment plant will be monitored more frequently than would normally be required.

Hydrostatic test water pumped from the quarry water treatment plant basins was in compliance with permitted limits (Table 4-2). Analytical data are shown in Table 4-2.

5 AIR MONITORING

5.1 Radon Gas

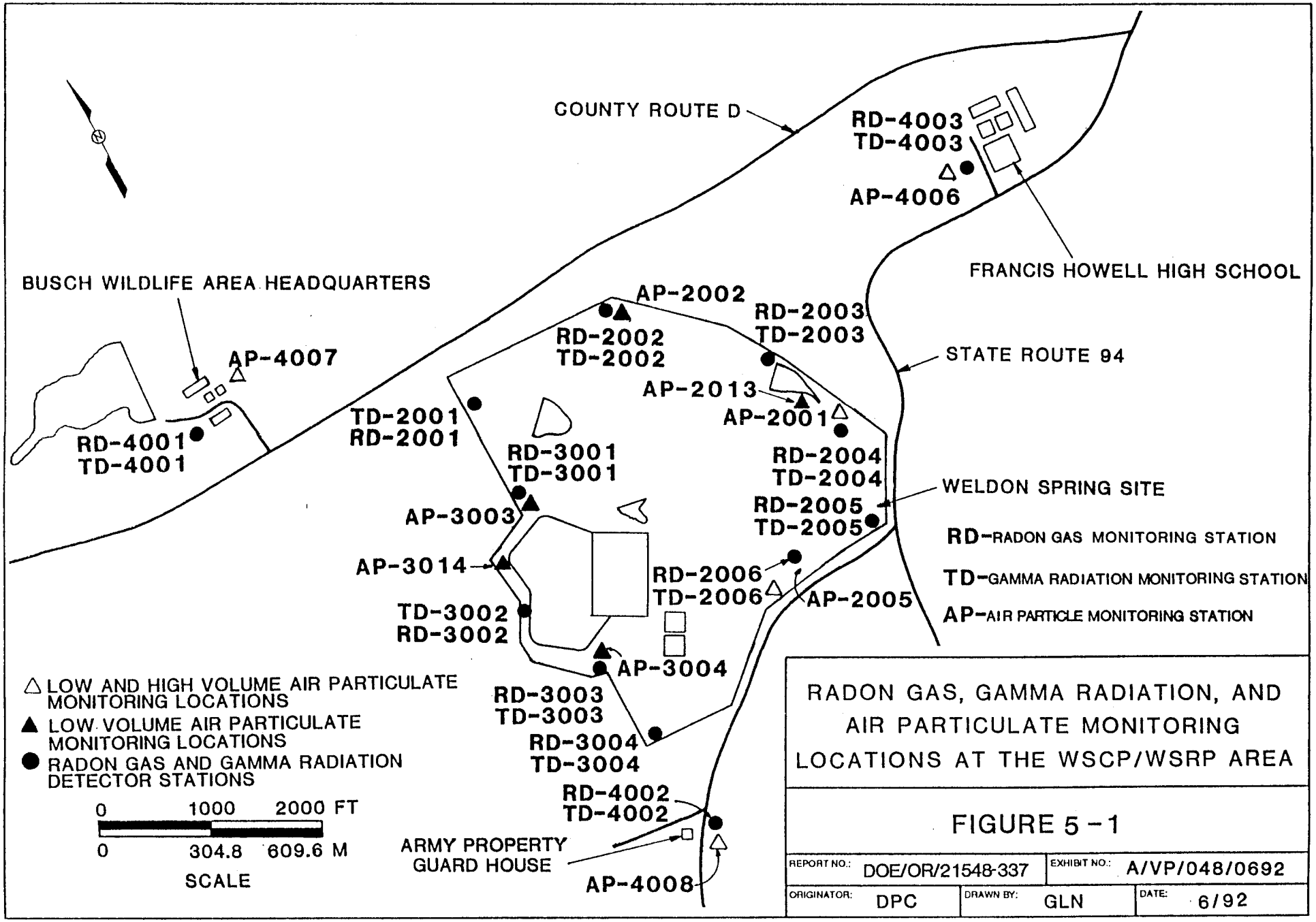
The radon gas monitoring program utilizes a pair of alpha track radon detectors at each of the 25 permanent locations; each detector is exchanged quarterly. These detectors are deployed at six locations at the Weldon Spring Chemical Plant, eight locations at the Weldon Spring Quarry, four locations at the Weldon Spring raffinate pits, and at seven off-site locations. Radon monitoring locations are shown in Figures 5-1, 5-2, and 5-3. On-site detectors are distributed around the perimeter fences to ensure adequate detection of radon dispersing from the properties under various atmospheric conditions. Locations RD-4001, RD-4004, RD-4005, RD-4006, and RD-4007 monitor background levels near the site.

Beginning this quarter, a new type of alpha track monitor was used for radon monitoring. The new detector is the new Type F track etch detector. This replaces the Radtrack monitor used for radon monitoring during the first quarter of 1992. The change was made because the Radtrack monitor is designed for indoor monitoring, while the Type F is better suited for outdoor monitoring. The detection mechanism in both these monitors is identical, consisting of a track etch detector.

Table 5-1 summarizes the second quarter 1992 radon concentrations detected at all site perimeter and off-site monitoring locations. Also contained in the third column of Table 5-1 is a comparison of the measured concentration with the Federally permitted radon concentration (for unrestricted areas) of 3 pCi/l (111 Bq/m^3) above background as authorized by U.S. Department of Energy (DOE) Order 5400.5.

An average ambient background concentration was determined by calculating the arithmetic average for the five background locations. This data yielded an average ambient background radon concentration of 0.25 pCi/l (9.25 Bq/m^3) for the first quarter of 1992. This concentration was then subtracted from the concentration for each monitoring station, and compared to the DOE guideline of 3 pCi/l (111 Bq/m^3) above background.

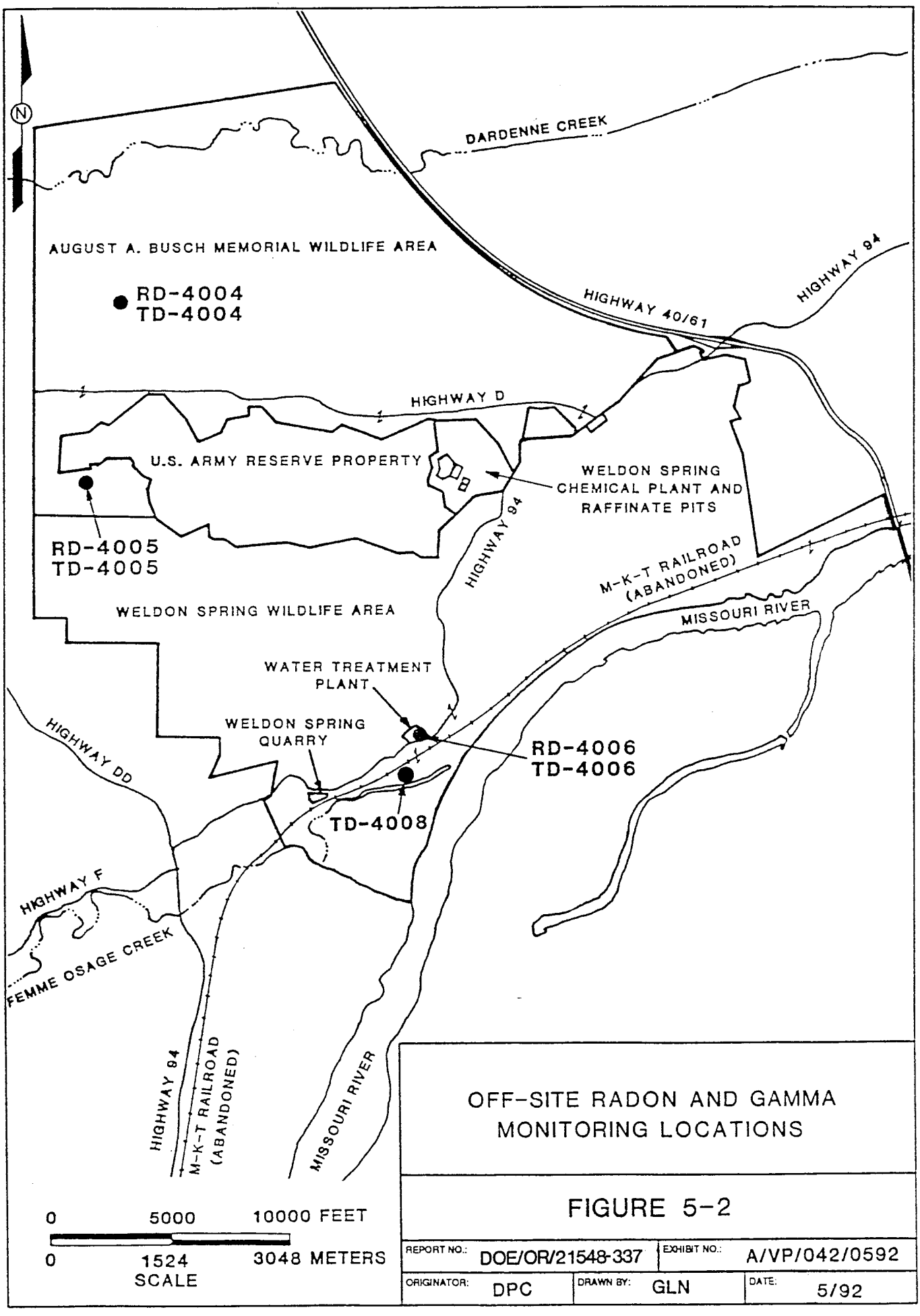
Radon concentrations at the site and quarry perimeters and at off-site locations for the first quarter of 1992 were within the typical range expected during periods of normal precipitation. During the second quarter, the radon concentrations measured with the new type



RADON GAS, GAMMA RADIATION, AND AIR PARTICULATE MONITORING LOCATIONS AT THE WSCP/WSRP AREA

FIGURE 5-1

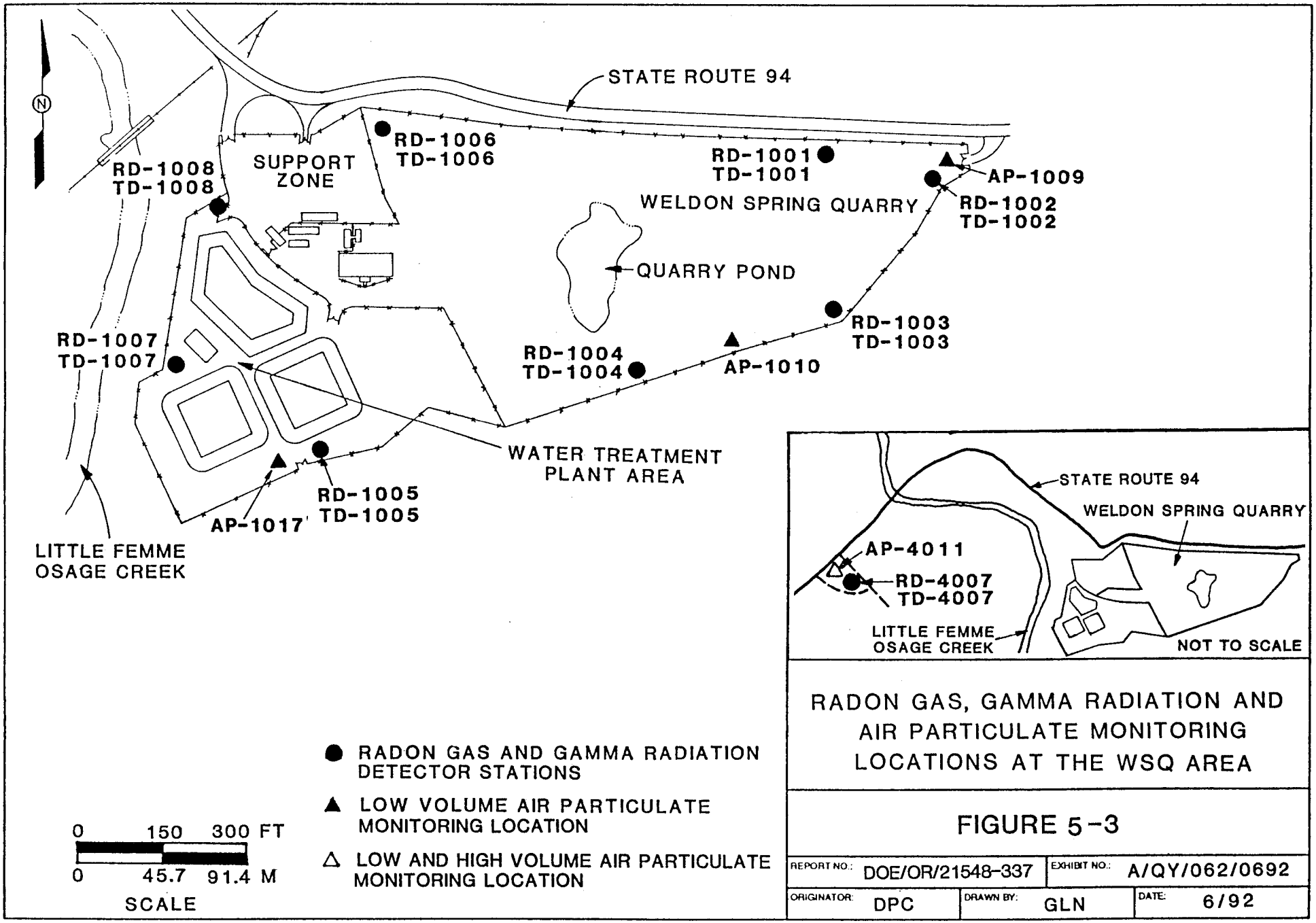
REPORT NO.:	DOE/OR/21548-337	EXHIBIT NO.:	A/VP/048/0692		
ORIGINATOR:	DPC	DRAWN BY:	GLN	DATE:	6/92



OFF-SITE RADON AND GAMMA MONITORING LOCATIONS

FIGURE 5-2

REPORT NO.:	DOE/OR/21548-337	EXHIBIT NO.:	A/VP/042/0592
ORIGINATOR:	DPC	DRAWN BY:	GLN
DATE:	5/92		



RADON GAS, GAMMA RADIATION AND AIR PARTICULATE MONITORING LOCATIONS AT THE WSQ AREA

FIGURE 5-3

REPORT NO.:	DOE/OR/21548-337	EXHIBIT NO.:	A/QY/062/0692		
ORIGINATOR:	DPC	DRAWN BY:	GLN	DATE:	6/92

TABLE 5-1 Second Quarter 1992 Track Etch Radon Monitoring Results[a]

Location ID	2nd Quarter pCi/l	Percent of Guideline [b]
WSQ		
RD-1001	1.31	33
RD-1002	1.4	38
RD-1003	0.5	7
RD-1004	0.3	2
RD-1005	0.4	3
RD-1006	0.3	2
RD-1007	0.3	0
RD-1008	0.3	0
WSCP		
RD-2001	0.4	3
RD-2002	0.2	0
RD-2003	0.3	2
RD-2004	0.3	2
RD-2005	0.2	0
RD-2006	0.2	0
WSRP		
RD-3001	0.3	1
RD-3002	0.4	5
RD-3003	0.5	7
RD-3004	0.4	3

TABLE 5-1 Second Quarter 1992 Track Etch Radon Monitoring Results[a] (Continued)

Location ID	2nd Quarter pCi/l	Percent of Guideline [b]
OFF-SITE		
RD-4001*	0.2	
RD-4002	0.2	0
RD-4003	0.2	0
RD-4004*	0.3	
RD-4005*	0.3	
RD-4006*	0.3	
RD-4007*	0.2	

(a) Results include natural background.

(b) Percent of guideline calculated by taking the quarterly average minus the average of the background stations divided by the DOE concentration guideline for Rn-222 which is 3 pCi/l (111 Bq/m^3)(Annual average above background) for uncontrolled areas.

* Denotes Background Station.

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of detectors were also within the typical range expected during periods of normal precipitation. The quarterly radon concentrations at the Weldon Spring Chemical Plant/raffinate pit (WSCP/RP) area averaged 0.3 pCi/l (11.8 Bq/m^3), while the quarterly radon concentrations at the Weldon Spring Quarry (WSQ) averaged 0.6 pCi/l (22.2 Bq/m^3). The quarterly radon concentrations (background included) ranged from 0.03 pCi/l (1.11 Bq/m^3) to 1.2 pCi/l (44.4 Bq/m^3).

Radon concentrations found at the quarry are higher than concentrations measured at other locations, because the radium concentrations in quarry wastes are typically much higher than in other areas. Also, the quarry is a large depression with side walls ranging from 3 m to 15 m (10 ft to 50 ft) high, which tends to trap emanating radon within the quarry and raise the concentrations along the quarry perimeter.

5.2 Gamma Radiation Exposure

To monitor exposure from gamma radiation, environmental thermoluminescent dosimeters (TLDs) were deployed at 26 locations. The gamma monitoring station locations are identified in Figures 5-1, 5-2, and 5-3 with a prefix TD-.

Table 5-2 summarizes the second quarter results of total gamma radiation monitoring at the 18 Weldon Spring site (WSS) perimeter monitoring stations, Francis Howell High School, the Weldon Spring Army Reserve Training Area, and at the six background monitoring stations.

The Weldon Spring Site Remedial Action Project (WSSRAP) is in the process of changing TLD vendors. To facilitate this change, duplicate TLDs, one from the existing vendor and one from the new vendor, were deployed at four monitoring locations during this quarter. This changeover will be effective starting with the third quarter 1992.

The average gamma radiation measured at the 26 locations during the second quarter of 1992 (30.2 mrem) was about twice that measured in the second quarter of 1991 (15.5 mrem). Based upon the readings of the control TLD (which read 14.8 mrem for the second quarter 1991, and 37 mrem for the second quarter 1992), we believe that the elevated TLD results were due either to irradiation of dosimeters after shipment to the vendor or to vendor processing problems. Also, the results of the new dosimeters that were deployed as duplicates at four locations were comparable with historical data. This further supports the contention that the elevated readings were not attributable to actual increases in environmental gamma radiation levels in the second quarter 1992. The arithmetic average of the dose measured at the five background locations is 31 mrem. This dose is not significantly different than what was seen at other locations monitored. Thus it may be concluded that the elevated readings measured at the site and quarry were not the result of work activities performed at the site. The cause of the elevated results is still under investigation. The final results will be reported in the 1992 ASER.

5.3 Radioactive Air Particulates

Fourteen low volume air particulate samplers monitor the Weldon Spring site continuously. Five of these (AP-2001, AP-2002, AP-3003, AP-3004, and AP-2005) are located around the Weldon Spring Chemical Plant (WSCP) perimeter and two are located around the quarry perimeter. There are three sensitive monitoring stations, AP-4006, AP-4008, and

TABLE 5-2 Second Quarter 1992 Environmental TLD Monitoring Results[a]

Location ID	2nd Quarter mrem
WSQ	
TD-1001	34
TD-1002	29
TD-1003	35
TD-1004	29
TD-1005	28
TD-1006	30
TD-1007	30
TD-1008	33
WSCP	
TD-2001	30
TD-2002	30
TD-2003	30
TD-2004	32
TD-2005	29
TD-2006	30
WSRP	
TD-3001	37
TD-3002	25
TD-3003	31
TD-3004	29
OFF-SITE	
TD-4001*	32
TD-4002	23
TD-4003	25
TD-4004*	32

TABLE 5-2 Second Quarter 1992 Environmental TLD Monitoring Results[a] (Continued)

Location ID	2nd Quarter mrem
TD-4005*	30
TD-4006*	29
TD-4007*	32
TD-4008*	32

(a) Results include natural background.
- Denotes loss of TLD.
* Denotes background station.

AP-4011, located off-site at the Francis Howell high School, the Army Reserve property, and near a residential site west of the quarry, respectively. Three new monitoring stations were added during the second quarter. Two monitoring stations, AP-2013 and AP-3014, were installed at the WSCP perimeter. The other new station, AP-1017, was installed at the WSQ perimeter. The monitoring station at the August A. Busch Wildlife Area (ABWA) (AP-4007) is used to monitor background levels in the vicinity of the WSCP. The air particulate monitoring stations are shown in Figure 5-1 and 5-3.

The background sampling station AP-4007, is approximately 0.8 km (0.5 mile) from the WSCP perimeter in a northwestern direction. The terrain between the WSCP and this sampling station is hilly and forested, providing a significant physical barrier to airborne particulates originating from the WSCP/RP area.

Table 5-3 summarizes the quarterly average concentrations and the standard deviations for the 11 air monitoring locations. The quarterly average concentration for each monitoring location was calculated by averaging all weekly air particulate analysis results including results lower than the instruments lower limit of detection (LLD). The corresponding standard deviation for each monitoring location was also calculated using all weekly air particulate analysis results. Due to maintenance and installation of new samplers, all samplers were not operating the entire 13 weeks, as indicated in the fourth column of Table 5-3. The WSSRAP has deployed high volume air samplers at critical receptor locations. The critical receptor locations include the Francis Howell High School, the Missouri Department of the Army

TABLE 5-3 Second Quarter 1992 Radiological Air Particulate Monitoring Results

Monitor Identification Number	Quarterly AVG. CONCENTRATION (μCi/ml)	STANDARD DEVIATION (μCi/ml)	NUMBER OF WEEKS COLLECTED	NUMBER OF VALUES ABOVE LLD
AP-2001	1.31E-15	2.57E-16	13	9
AP-2002	1.50E-15	6.47E-16	13	12
AP-3003	1.09E-15	4.54E-16	12	10
AP-3004	1.29E-15	7.75E-16	13	10
AP-2005	1.34E-15	5.39E-16	13	11
AP-4006	1.16E-15	4.08E-16	13	13
AP-4007	1.33E-15	4.87E-16	13	13
AP-4008	1.04E-15	4.25E-16	12	11
AP-1009	1.48E-15	6.57E-16	13	12
AP-1010	1.28E-15	7.66E-16	12	9
AP-4011	1.23E-15	3.75E-16	13	12
AP-2013	1.03E-15	4.45E-16	13	12
AP-3014	1.99E-15	4.86E-16	3	3
AP-1017	1.05E-15	1.35E-16	2	2

* Indicates background monitor station.
To convert μCi/ml to Bq/m^3, multiply by 3.7E10.

Reserve property, the WSSRAP administration building, and the residential area west of the quarry. These high volume samplers are used in accordance with the *Plan for Monitoring Radionuclide Emissions Other Than Radon at the Weldon Spring Site Critical Receptors* (MKF and JEG 1992b). The high volume monitoring results will be presented in the 1992 annual site environmental report.

The second quarter average long-lived gross alpha concentrations ranged from 1.03×10^{-15} μCi/ml to 1.99×10^{-15} μCi/ml for perimeter and off site locations. The average background concentration measured at AP-4007 was 1.33×10^{-15} μCi/ml.

5.4 Asbestos

No environmental asbestos monitoring was conducted during the second quarter of 1992. As outlined in the *Environmental Monitoring Plan* (MKF and JEG 1992a), environmental asbestos monitoring is required to be performed only during asbestos removal activities. Since there were no asbestos removal operations during the second quarter of 1992, there was no need to perform environmental asbestos monitoring.

6 REFERENCES

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