39058

ENGINEERS
AND
CONSTRUCTORS

MORRISON KNUDSEN CORPORATION
MK-FERGUSON GROUP
WELDON SPRING SITE REMEDIAL ACTION PROJECT
7295 HIGHWAY 94 SOUTH
ST. CHARLES, MISSOURI 63304
PHONE: (314) 441-8086

March 11, 1994

U. S. Department of Energy
Weldon Spring Site Remedial Action Project
Attn: Mr. Stephen H. McCracken
Project Manager
7295 Highway 94 South
St. Charles, MO 63304

SUBJECT: Contract No. DE-AC05-86OR21548
SAINT CHARLES COUNTY WELL FIELD RESULTS
FOURTH QUARTER, 1993

Dear Mr. McCracken:

Enclosed are the results of quarterly monitoring of the Saint Charles County Well Field for the fourth quarter of 1993. Parameters included for the production wells in the monitoring plan are total uranium, gross alpha, nitroaromatic compounds, and metals (As and Ba). Monitoring Locations GW-PW02 and GW-PW09 are also sampled for additional metals and inorganic anions as part of a geochemical study initiated in this calendar year's monitoring program. The analytical laboratory results for each well are contained in Attachment A of this letter. A copy of a draft letter is contained in Attachment B for your review. Both are ready for transmittal to the St. Charles County consultant.

Detectable concentrations of total uranium (less than or equal to 0.5 pCi/l) were observed for the fourth quarter but were within background for Missouri River alluvium. The detectable concentrations for gross alpha were within historic ranges and are representative of background levels in the Missouri River alluvium. No detectable concentrations of nitroaromatic compounds were observed in any of the production wells. The results for the remaining parameters were within expected ranges for this quarter.

m:\users\nylinj\document\q493.Rcj

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

Due to the 1993 flooding of the St. Charles County Well Field, four of the county's production wells (PW04, PW06, PW07, and PW08) have not been operational since the second quarter. Due to water damage to the pumps, these production wells could not be sampled. The county's RMW-series groundwater monitoring wells were also inundated during the flood in July and September and the wells have not been redeveloped due to minor damages to the permanent pumps. The RMW-series wells are presently being repaired and are to be sampled for the first quarter of 1994.

If you have any questions or comments regarding the well field results for the second and third quarters, please contact Rebecca Cato-Johnston of my staff.

Sincerely,

James R. Powers

James R. Powers
Project Director

JRP/rcj/jan

Enclosures: as stated

cc: Walker K. Love

m:\users\nylinj\document\q493.Rcj

ATTACHMENT A

Analytical Results

BARRINGER LABORATORIES INC.
15000 W. 6TH AVE., SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303) 277-1689

28-Dec-93

Brian L. Claytor
MK-FERGUSON (MO)
Weldon Spring Site
7295 Hwy 94 South
St. Charles, MO 63303

Attn:
Project: WSSRAP

Received: 10-Dec-93 09:05
PO #: 3589-0002-5881 #350

Job: 939223E

Status: Final

ANALYTICAL REPORT PACKAGE

CASE NARRATIVE.....i

ANALYTICAL RESULTS.....R-1

QUALITY CONTROL REPORT.....Q-1

M-K FERGUSON CO.
RECEIVED
DEC 30 1993
WSSRAP CONTRACT 3589

BARRINGER LABORATORIES INC.
15000 W. 6TH AVE., SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303).277-1689

28-Dec-93

Brian L. Claytor
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Weldon Spring Site
7295 Hwy 94 South
St. Charles, MO 63303

Attn:
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Received: 10-Dec-93 09:05
PO #: 3589-0002-5881 #350

Job: 939223E Status: Final

CASE NARRATIVE

A total of 9 Water samples were received on 10-Dec-93. All were properly preserved and in good condition. As stated in the chain of custody, the samples were run for the following analyses: Gross Alpha, Gross Beta and U. A table, to cross reference your sample ID to ours, is attached. Our procedures are summarized on the Quality Control Data Sheet. All samples were extracted and analyzed within the proper holding times.

Quality control standards for organic and inorganic analyses followed the appropriate SW-846 or EPA methodology. For radiochemistry, the acceptance criteria for spikes and laboratory control standards is fifteen percent, plus the counting error. Duplicates will pass if the Replicate Error Ratio (RER) is 1.00 or less. The RER is defined as follows:

$$RER = \frac{ABS(R2 - R1)}{SQRT(ERROR1^2 + ERROR2^2)}$$

where: R1/R2 = original/duplicate sample result
ERROR1/ERROR2 = total 2 sigma uncertainty of R1/R2

All QC checks, including duplicates, spikes, and blanks, passed.

This report is amended to reflect the reanalysis of sample GW-RAWW-Q493.

Signed: Steven L. Sincoff
Steven L. Sincoff, Ph.D.
Director of Operations

BARRINGER LABORATORIES INC.
15000 W. 6TH AVE., SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303) 277-1689

28-Dec-93

Brian L. Claytor
MK-FERGUSON (MO)
Weldon Spring Site
7295 Hwy 94 South
St. Charles, MO 63303

Page: ii
Copy: 1 of 2

Attn:
Project: WSSRAP

Received: 10-Dec-93 09:05
PO #: 3589-0002-5881 #350

Job: 939223E

Status: Final

Lab-ID	Matrix	Client Sample ID	Sampled
939223-1	Water	GW-1027-1293	8-Dec-93
939223-2	Water	GW-3024-120993	9-Dec-93
939223-3	Water	GW-3025-120993	9-Dec-93
939223-4	Water	GW-FINW-Q493	9-Dec-93
939223-5	Water	GW-PW02-Q493	9-Dec-93
939223-6	Water	GW-PW03-Q493 (MS/DU)	9-Dec-93
939223-7	Water	GW-PW05-Q493	9-Dec-93
939223-8	Water	GW-PW09-Q493	9-Dec-93
939223-9	Water	GW-RAWW-Q493	9-Dec-93

BARRINGER LABORATORIES INC.
15000 W. 6TH AVE., SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303) 277-1689

MK-FERGUSON (MO)

QUALITY CONTROL REPORT

Sample Id	Gross Alpha Total pCi/l	± 2σ	Gross Beta Total pCi/l	± 2σ
Duplicate	3.3	±2.2	8.2	±2.1
Duplicate	3.7	±2.2	7.6	±2.1
RPD	0.0		0.0	
Std (found value)	201	±6	106	±2
Std (true value)	208		101	
Std % rec.	96		105	
Blank	0.0	±0.1	0.0	±0.3
Spike % rec.	97		101	
LCS (found value)	259	±7	189	±3
LCS (true value)	312		202	
LCS % rec.	83		93	

Sample Id	U Total pCi/l
Duplicate	0.5
Duplicate	0.5
RPD	0.0
Std (found value)	31.7
Std (true value)	34.0
Std % rec.	93
Blank	<0.2
Spike % rec.	99
LCS (found value)	22.5
LCS (true value)	23.1
LCS % rec.	98

BARRINGER LABORATORIES INC.
15000 W. 6TH AVE., SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303) 277-1689

21-Dec-93

Brian L. Claytor
MK-FERGUSON (MO)
Weldon Spring Site
7295 Hwy 94 South
St. Charles, MO 63303

Page: Q-2
Copy: 1 of 2

Attn:
Project: WSSRAP

Received: 10-Dec-93 09:05
PO #: 3589-0002-5881 #350

Job: 939223E Status: Final

Abbreviations:

Parameters:
U : Uranium

Units:
pCi/l : picoCuries per liter

Quality codes:
NR : Not Requested

BARRINGER LABORATORIES INC.
15000 W. 6TH AVE., SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303) 277-1689

21-Dec-93

Brian L. Claytor
MK-FERGUSON (MO)
Weldon Spring Site
7295 Hwy 94 South
St. Charles, MO 63303

Page: Q-3
Copy: 1 of 2

Attn:
Project: WSSRAP

Received: 10-Dec-93 09:05
PO #: 3589-0002-5881 #350

Job: 939223E

Status: Final

QUALITY CONTROL REPORT

QUALITY CONTROL DATA SHEET

Received by: rc

Via: Fed Ex

Sample Container Type: 500ml pl, 1L pl
Additional Lab Preparation: None

Parameter	Method	Preservative	Analyst	Analysis Dates
Gross Alpha	900.0	HNO3	Knox	12/15-12/16
Gross Beta	900.0	HNO3	Knox	12/15-12/16
U	ASTM D2907	HNO3	Meyer	12/17-12/20

BARRINGER LABORATORIES INC.
15000 W. 6TH AVE., SUITE 300 GOLDEN, CO 80401 (303) 277-1687 FAX (303) 277-1689

21-Dec-93

Brian L. Claytor
MK-FERGUSON (MO)
Weldon Spring Site
7295 Hwy 94 South
St. Charles, MO 63303

Page: Q-4
Copy: 1 of 2

Attn:
Project: WSSRAP

Received: 10-Dec-93 09:05
PO #: 3589-0002-5881 #350

Job: 939223E

Status: Final

Signed: .....
Radiochemistry Manager

Barringer Laboratories, Inc. will return or dispose of your samples 30 days from the date your final report is mailed, unless otherwise specified by contract. Barringer Laboratories, Inc. reserves the right to return samples prior to the 30 days if radioactive levels exceed our license.

9223

ENVIRONMENTAL SAMPLE CHAIN-OF-CUSTODY / AUTHORIZATION FORM

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)

7295 HIGHWAY 94 SOUTH, ST. CHARLES, MO 63304

TELEPHONE (314)441-8086 TELEX (314)447-0803

Validation Documentation: [X]

EST/ES&H 4.1.2.1, Rev.7, Effective 02/18/93

WSSRAP Contact: BRIAN CLAYTOR
Phone Number: (314)441-8086 ext. 3703
Request Number: 350.0

Lab/PO#: BARRINGER / 3589-0002-5881
Shipped By: QUINONEZ, M
Turnaround Time: [ ] Standard [ ] Accelerated [X] Priority [ ] Urgent [ ] Emergency

WHB CAM

#	Sample ID	QC *	Date Sampled	WBS Code	Medium	Container Size	Container Type	Preserv.	Parameter	Arc
1	GW-1027-1293		12/08/93	EMP	WATER	500 ML-R	PLASTIC, BOTTLE	HNO3 PH < 2	URANIUM, TOTAL	No
2D	GW-3024-120993		12/09/93	EMP	WATER	500 ML-R	PLASTIC, BOTTLE	HNO3 PH < 2	URANIUM, TOTAL	No
3D	GW-3025-120993		12/09/93	EMP	WATER	500 ML-R	PLASTIC, BOTTLE	HNO3 PH < 2	URANIUM, TOTAL	No
4B	GW-FINW-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	GROSS ALPHA/BETA	No
B						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	URANIUM, TOTAL	No
5F	GW-PW02-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	GROSS ALPHA/BETA	No
F						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	URANIUM, TOTAL	No
6B	GW-PW03-Q493	*	12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	GROSS ALPHA/BETA	No
B						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	URANIUM, TOTAL	No
7B	GW-PW05-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	GROSS ALPHA/BETA	No
B						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	URANIUM, TOTAL	No
8E	GW-PW09-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	GROSS ALPHA/BETA	No
E						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	URANIUM, TOTAL	No
9B	GW-RAWW-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	GROSS ALPHA/BETA	No
B						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	URANIUM, TOTAL	No

Samplers Signature: [signature] Checked By: Terry Caldwell Technical Reviewer: Jean Pier Jim Meier

Relinquished By	Received By	Date	Time	Reason For Transfer	Seal Intact? (Y/N)	Cooler Temp
[signature]	[signature]	12/9/93	1740	Pick	n/a	n/a
[signature]	[signature]	12/9/93	1630	Ship	y	n/a
	R. Cantrell	12/10/93	0905		Y	14°C

AUTHORIZATION

Page 1 of 1

MK-F Procurement: [signature] Date: 12/9/93 ES&H: Wanda Buchanan Date: 12-9-93 Site Shipping Officer: [signature] Date: 12-9-93

LABORATORY ANALYTICAL ELECTRONIC DATA DELIVERABLE
FILE: K:\DATAVER\BA\BA350.DBF
PRINTED: 01/06/94 14:59

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-FINW-Q493	GROUNDWATER	12/09/93	9392234

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
RADIOCHEMICAL	GROSS ALPHA	(0.7)	1.2	PCI/L	2		12/15/93	EPA 900.0		N
	GROSS BETA	5.7	2.0	PCI/L	4		12/15/93	EPA 900.0		N
	URANIUM, TOTAL	0.5		PCI/L	0.2		12/17/93	ASTM D2907		N

LABORATORY ANALYTICAL ;TRONIC DATA DELIVERABLE
FILE: K:\DATAVER\BA\BA350.DBF
PRINTED: 01/06/94 14:59

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW02-Q493	GROUNDWATER	12/09/93	9392235

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
RADIOCHEMICAL	GROSS ALPHA	2.6	2.0	PCI/L	2		12/15/93	EPA 900.0		N
	GROSS BETA	5.5	2.1	PCI/L	4		12/15/93	EPA 900.0		N
	URANIUM, TOTAL	0.3		PCI/L	0.2		12/17/93	ASTM D2907		N

LABORATORY ANALYTICAL ELECTRONIC DATA DELIVERABLE
FILE: K:\DATAVER\BA\BA350.DBF
PRINTED: 01/06/94 14:59

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW03-Q493	GROUNDWATER	12/09/93	9392236

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
RADIOCHEMICAL	GROSS ALPHA	3.3	2.2	PCI/L	2		12/15/93	EPA 900.0		N
	GROSS BETA	8.2	2.1	PCI/L	4		12/15/93	EPA 900.0		N
	URANIUM, TOTAL	0.5		PCI/L	0.2		12/17/93	ASTM D2907		N

LABORATORY ANALYTICAL ; (RONIC DATA DELIVERABLE
FILE: K:\DATAVER\BA\BA350.DBF
PRINTED: 01/06/94 14:59

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW03-Q493-DU	GROUNDWATER	12/09/93	93922311

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
RADIOCHEMICAL	GROSS ALPHA	3.7	2.2	PCI/L	2		12/15/93	EPA 900.0	DU RPD=0.0%	N
	GROSS BETA	7.6	2.1	PCI/L	4		12/15/93	EPA 900.0	DU RPD=0.0%	N
	URANIUM, TOTAL	0.5		PCI/L	0.2		12/17/93	ASTM D2907	DU RPD=0.0%	N

LABORATORY ANALYTICAL ELECTRONIC DATA DELIVERABLE
FILE: K:\DATAVER\BA\BA350.DBF
PRINTED: 01/06/94 14:59

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW03-Q493-MS	GROUNDWATER	12/09/93	93922310

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
RADIOCHEMICAL	GROSS ALPHA	1010	28	PCI/L	2		12/15/93	EPA 900.0	MS % REC=97%	N
	GROSS BETA	516	9	PCI/L	4		12/15/93	EPA 900.0	MS % REC=101%	N
	URANIUM, TOTAL	19.6		PCI/L	0.2		12/17/93	ASTM D2907	MS % REC=99%	N

LABORATORY ANALYTICAL ... TRONIC DATA DELIVERABLE
FILE: K:\DATAVER\BA\BA350.DBF
PRINTED: 01/06/94 14:59

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW05-Q493	GROUNDWATER	12/09/93	9392237

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
RADIOCHEMICAL	GROSS ALPHA	7.1	3.5	PCI/L	2		12/15/93	EPA 900.0		N
	GROSS BETA	10	3	PCI/L	4		12/15/93	EPA 900.0		N
	URANIUM, TOTAL	0.6		PCI/L	0.2		12/17/93	ASTM D2907		N

LABORATORY ANALYTICAL ELECTRONIC DATA DELIVERABLE
FILE: K:\DATAVER\BA\BA350.DBF
PRINTED: 01/06/94 14:59

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW09-Q493	GROUNDWATER	12/09/93	9392238

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
RADIOCHEMICAL	GROSS ALPHA	5.3	3.0	PCI/L	2		12/15/93	EPA 900.0		N
	GROSS BETA	8.8	2.8	PCI/L	4		12/15/93	EPA 900.0		N
	URANIUM, TOTAL	0.3		PCI/L	0.2		12/17/93	ASTM D2907		N

LABORATORY ANALYTICAL L .RONIC DATA DELIVERABLE
FILE: K:\DATAVER\BA\BA350.DBF
PRINTED: 01/06/94 14:59

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-RAWW-Q493	GROUNDWATER	12/09/93	9392239

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
RADIOCHEMICAL	GROSS ALPHA	(0.9)	2.2	PCI/L	2	12/13/93	12/15/93	EPA 900.0	(B) (U)	N
	GROSS BETA	5.1	2.8	PCI/L	4	12/13/93	12/15/93	EPA 900.0	(B) (U)	N
	URANIUM, TOTAL	0.3		PCI/L	0.2	12/13/93	12/17/93	ASTM D2907	(B) (U)	N

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO
ATTENTION OF

JAN 24 1994

HSHB-ML-O 19 Jan 94

MEMORANDUM FOR Weldon Spring Remedial Action Project, 7295 Highway 94 South, St. Charles, Missouri 63304

SUBJECT: Analysis of Ground Water from Weldon Spring Site Remedial Action Project for Nitroaromatic Compounds

Results of water samples covered under requests #416 and #418 taken from the Weldon Spring Remedial Action Project are enclosed.

Encl

Rosemary J. Gaffney
ROSEMARY J. GAFFNEY
Chief, Chromatographic Analysis Branch
Organic Environmental Chemistry Division

SUBJECT: Analysis of Ground Water from Weldon Spring Site Remedial Action Project for Nitroaromatic Compounds

DATE: 19 January 1994

1. SUMMARY OF RESULTS:

a. Provided are the results obtained from the analyses of 9 water samples submitted under request #416. The samples were collected 8 and 9 December. Three of the samples had analytical results that were above the analytical detection limits listed below.

COMPOUND	DETECTION LIMIT
nitrobenzene (NB)	0.030 ug/L
1,3-dinitrobenzene (1,3-DNB)	0.090 ug/L
2,4-dinitrotoluene (2,4-DNT)	0.030 ug/L
2,6-dinitrotoluene (2,6-DNT)	0.010 ug/L
2,4,6-trinitrotoluene (TNT)	0.030 ug/L
1,3,5-trinitrobenzene (TNB)	0.030 ug/L

b. The sample and control results are tabulated in the Data Summary Sheet.

2. DISCUSSION OF RESULTS:

a. Procedure:

(1) All water samples were extracted within seven days of their collection date and analyzed using the same procedure employed for previous samples from Weldon Spring.

(2) The analytical procedure included the following steps:

(a) A 100 ml water sample was brought to volume in a 100 ml volumetric flask.
(b) A measured amount of 3,4-dinitrotoluene (12 ug) was added as an internal standard.
(c) 0.5 ml toluene was added to the flask.
(d) The flask was agitated on a rotary shaker 30 minutes.
(e) The toluene extract was then analyzed by gas

chromatography using an electron capture detector.

(3) The analysis was conducted using two different chromatographic columns. The "primary" column, a DB1, was used for the analysis of most samples and matrix spikes. A "confirmation" column, a DB210, was used to confirm those samples where interfering compounds co-elute with analytes on the primary column.

b. Quality Control

(1) A duplicate 100 ml portion of samples from locations not previously sampled was treated as described above except that a spike containing each of the six nitroaromatics at eight times the detection level, plus the internal standard, was added to the water sample prior to the toluene extraction. This sample was designated as the matrix spiked sample and the recovery data obtained for each of these samples are reported on the sample result sheets.

(2) Standards containing all the nitroaromatic compounds were extracted from a water matrix and analyzed in duplicate to establish calibration curves and response factors relative to the internal standard for each compound of interest. During sample analysis, one of these standards was reanalyzed after every fifth sample to monitor for shifts in the calibration.

(3) Blind controls were independently submitted by the quality control coordinator for the Chromatographic Analysis Branch to be analyzed along with actual samples. A laboratory water "blank" was also carried through the entire analytical procedure to compensate for spurious chromatographic peaks arising from impurities in reagents and or carrier gas etc.

c. Results.

(1) As stated before, three of the samples contained nitroaromatics above the reported detection limits.

(2) In an attempt to normalize matrix spike data, all calibration standards were extracted from a water matrix. These recoveries provide a indication of the true matrix effect of each sample. Mean values were achieved ranging from 103% for 1,3-DNB, NB and 2,6-DNT to 109% for 2,4,6-TNT.

(3) The results of the blind control samples submitted by the Chromatographic Analysis Branch quality control coordinator were acceptable for all analytes. Recoveries of the six analytes ranged from 87% for 2,6-DNT and 2,4-DNT to 103% for 1,3,5-TNB.

(4) A summary sheet of the sample results is included in this report, followed by the individual sample data sheets listed by increasing USAEHA sample number which contains any pertinent information or comments applicable to the individual sample. The summary of the matrix spike data is also included in this report. Pertinent chromatograms representing the sample and the sample matrix spikes run on both the primary and the confirmation columns are included.

Analyst:

CURTIS G. OLIVER
Chemist

Reviewed by:

BETH CURTIS
Chemist

ROSEMARY J. GAFFNEY
Branch Chief, CAB

MATRIX RECOVERY DATA SUMMARY SHEET

SAMPLE	NB	1,3-DNB	2,4-DNT	2,6-DNT	2,4,6-TNT	1,3,5-TNB
RS166	104	101	94	***	100	108
RS167	108	112	119	***	117	100
RS170	104	103	106	105	112	112
RS170MD	100	100	106	100	108	108
WS-3340	100	101	106	105	108	108
AVERAGE % RECOVERY	103	103	106	103	109	107

*** Data unavailable due to dilution.

ANALYSTS: CEC, JBS

REVIEWED: [illegible]

REVIEWED: [illegible]

USAEHA Form 14b, 29 Jun 90

ANALYSIS OF NITROAROMATICS IN WATER FROM WELDON SPRINGS
DEPARTMENT OF ENERGY, STATE OF MISSOURI SAMPLES

SAMPLE INFORMATION:
==========
USAEHA SAMPLE NUMBER: R5168
FIELD NUMBER: GW-FINW-Q493
REQUEST NUMBER: 416
COLLECTION DATE: 09 DEC 93

ANALYSIS INFORMATION:
==========
EXTRACTION DATE: 13 DEC 93
ANALYSIS DATE: 15 DEC 93

Analyzed by AEHA SOP 87.3

PRIMARY COLUMN ANALYSIS: (All results reported as ug/L)

	NB	1,3-DNB	2,4-DNT	2,6-DNT	2,4,6-TNT	1,3,5-TNB
AVG. RESULTS	< 0.03	< 0.09	< 0.03	< 0.01	< 0.03	< 0.03

Note: Location sampled previously, matrix monitor not necessary.

ANALYSTS: LGC, JBS

REVIEWED: GMC

REVIEWED: [illegible]

USAEHA Form 14a, 15 Mar 90

ANALYSIS OF NITROAROMATICS IN WATER FROM WELDON SPRINGS
DEPARTMENT OF ENERGY, STATE OF MISSOURI SAMPLES

SAMPLE INFORMATION:
==========
USAEHA SAMPLE NUMBER: R5169
FIELD NUMBER: GW-PW02-Q493
REQUEST NUMBER: 416
COLLECTION DATE: 09 DEC 93

ANALYSIS INFORMATION:
==========
EXTRACTION DATE: 13 DEC 93
ANALYSIS DATE: 16 DEC 93

Analyzed by AEHA SOP 87.3

PRIMARY COLUMN ANALYSIS: (All results reported as ug/L)

	NB	1,3-DNB	2,4-DNT	2,6-DNT	2,4,6-TNT	1,3,5-TNB
AVG. RESULTS	< 0.03	< 0.09	< 0.03	< 0.01	< 0.03	< 0.03

Note: Location sampled previously, matrix monitor not necessary.

ANALYSTS: GO, JBS

REVIEWED: GMC

REVIEWED: [illegible]

USAEHA Form 14a, 15 Mar 90

ANALYSIS OF NITROAROMATICS IN WATER FROM WELDON SPRINGS
DEPARTMENT OF ENERGY, STATE OF MISSOURI SAMPLES

SAMPLE INFORMATION:
==========
USAEHA SAMPLE NUMBER: R5170
FIELD NUMBER: GW-PW03-Q493
REQUEST NUMBER: 416
COLLECTION DATE: 09 DEC 93

ANALYSIS INFORMATION:
==========
EXTRACTION DATE: 13 DEC 93
ANALYSIS DATE: 16 DEC 93

Analyzed by AEHA SOP 87.3

PRIMARY COLUMN ANALYSIS: (All results reported as ug/L)

	NB	1,3-DNB	2,4-DNT	2,6-DNT	2,4,6-TNT	1,3,5-TNB
AVG. RESULTS	< 0.03	< 0.09	< 0.03	< 0.01	< 0.03	< 0.03

MATRIX SPIKE SAMPLE (All results reported as ug/L)

AMT ADDED	0.24	0.72	0.16	0.080	0.24	0.24
AVG. RESULTS	0.25	0.74	0.17	0.084	0.27	0.27
% RECOVERY	104	103	106	105	112	112

ANALYSTS: LC, JBS

REVIEWED: BMC

REVIEWED: [illegible]

USAEHA Form 14a, 15 Mar 90

ANALYSIS OF NITROAROMATICS IN WATER FROM WELDON SPRINGS
DEPARTMENT OF ENERGY, STATE OF MISSOURI SAMPLES

SAMPLE INFORMATION:
==========
USAEHA SAMPLE NUMBER: R5170MD
FIELD NUMBER: GW-PW03-Q493
REQUEST NUMBER: 416
COLLECTION DATE: 09 DEC 93

ANALYSIS INFORMATION:
==========
EXTRACTION DATE: 13 DEC 93
ANALYSIS DATE: 16 DEC 93

Analyzed by AEHA SOP 87.3

PRIMARY COLUMN ANALYSIS: (All results reported as ug/L)

	NB	1,3-DNB	2,4-DNT	2,6-DNT	2,4,6-TNT	1,3,5-TNB
AVG. RESULTS	< 0.03	< 0.09	< 0.03	< 0.01	< 0.03	< 0.03

MATRIX SPIKE SAMPLE (All results reported as ug/L)

AMT ADDED	0.24	0.72	0.16	0.080	0.24	0.24
AVG. RESULTS	0.24	0.72	0.17	0.080	0.26	0.26
% RECOVERY	100	100	106	100	108	108

ANALYSTS: LGO, JBS

REVIEWED: BMC

REVIEWED: [illegible]

USAEHA Form 14a, 15 Mar 90

ANALYSIS OF NITROAROMATICS IN WATER FROM WELDON SPRINGS
DEPARTMENT OF ENERGY, STATE OF MISSOURI SAMPLES

SAMPLE INFORMATION:
==========
USAEHA SAMPLE NUMBER: R5171
FIELD NUMBER: GW-PW05-Q493
REQUEST NUMBER: 416
COLLECTION DATE: 09 DEC 93

ANALYSIS INFORMATION:
==========
EXTRACTION DATE: 13 DEC 93
ANALYSIS DATE: 16 DEC 93

Analyzed by AEHA SOP 87.3

PRIMARY COLUMN ANALYSIS: (All results reported as ug/L)

	NB	1,3-DNB	2,4-DNT	2,6-DNT	2,4,6-TNT	1,3,5-TNB
AVG. RESULTS	< 0.03	< 0.09	< 0.03	< 0.01	< 0.03	< 0.03

Note: Location sampled previously, matrix monitor not necessary.

ANALYSTS: LGC, JBS

REVIEWED: BMC

REVIEWED: [illegible]

USAEHA Form 14a, 15 Mar 90

ANALYSIS OF NITROAROMATICS IN WATER FROM WELDON SPRINGS
DEPARTMENT OF ENERGY, STATE OF MISSOURI SAMPLES

SAMPLE INFORMATION:
==========
USAEHA SAMPLE NUMBER: R5172
FIELD NUMBER: GW-PW09-Q493
REQUEST NUMBER: 416
COLLECTION DATE: 09 DEC 93

ANALYSIS INFORMATION:
==========
EXTRACTION DATE: 13 DEC 93
ANALYSIS DATE: 16 DEC 93

Analyzed by AEHA SOP 87.3

PRIMARY COLUMN ANALYSIS: (All results reported as ug/L)

	NB	1,3-DNB	2,4-DNT	2,6-DNT	2,4,6-TNT	1,3,5-TNB
AVG. RESULTS	< 0.03	< 0.09	< 0.03	< 0.01	< 0.03	< 0.03

Note: Location sampled previously, matrix monitor not necessary.

ANALYSTS: LGO, JBS

REVIEWED: BMC

REVIEWED: [illegible]

USAEHA Form 14a, 15 Mar 90

ANALYSIS OF NITROAROMATICS IN WATER FROM WELDON SPRINGS
DEPARTMENT OF ENERGY, STATE OF MISSOURI SAMPLES

SAMPLE INFORMATION:
==========
USAEHA SAMPLE NUMBER: R5173
FIELD NUMBER: GW-RAWW-Q493
REQUEST NUMBER: 416
COLLECTION DATE: 09 DEC 93

ANALYSIS INFORMATION:
==========
EXTRACTION DATE: 13 DEC 93
ANALYSIS DATE: 16 DEC 93

Analyzed by AEHA SOP 87.3

PRIMARY COLUMN ANALYSIS: (All results reported as ug/L)

	NB	1,3-DNB	2,4-DNT	2,6-DNT	2,4,6-TNT	1,3,5-TNB
AVG. RESULTS	< 0.03	< 0.09	< 0.03	< 0.01	< 0.03	< 0.03

Note: Location sampled previously, matrix monitor not necessary.

ANALYSTS: LGO, JBS

REVIEWED: [illegible]

REVIEWED: [illegible]

USAEHA Form 14a, 15 Mar 90

ANALYSIS OF NITROAROMATICS IN WATER FROM WELDON SPRINGS
DEPARTMENT OF ENERGY, STATE OF MISSOURI SAMPLES

SAMPLE INFORMATION:
==========
USAEHA SAMPLE NUMBER: WS-3340
FIELD NUMBER: INTERNAL Q.C. CHECK
REQUEST NUMBER: 416
COLLECTION DATE: N/A

ANALYSIS INFORMATION:
==========
EXTRACTION DATE: 13 DEC 93
ANALYSIS DATE: 14 DEC 93

Analyzed by AEHA SOP 87.3

(All results reported as ug/L)

Sample Results:		Theoretical Amt. Added:	Percent Recovery:
NB	0.087	0.090	97 %
1,3-DNB	0.25	0.27	93 %
2,4-DNT	0.052	0.060	87 %
2,6-DNT	0.026	0.030	87 %
2,4,6-TNT	0.085	0.090	94 %
1,3,5-TNB	0.093	0.090	103 %

Matrix Spike Results:		Theoretical Amt. Added:	Percent Recovery:
NB	0.33	0.24	100 %
1,3-DNB	0.98	0.72	101 %
2,4-DNT	0.22	0.16	106 %
2,6-DNT	0.11	0.080	105 %
2,4,6-TNT	0.35	0.24	108 %
1,3,5-TNB	0.35	0.24	108 %

ANALYSTS: GC, JBS

REVIEWED: CMC

REVIEWED: [illegible]

USAEHA Form 14a, 15 Mar 90

ENVIRONMENTAL SAMPLE CHAIN-OF-CUSTODY / AUTHORIZATION FORM

WELDON SPRING SITE REMED. , ACTION PROJECT (WSSRAP)

7295 HIGHWAY 94 SOUTH, ST. CHARLES, MO 63304

TELEPHONE (314)441-8086 TELEX (314)447-0803

Validation Documentation: [X]

EST/ES&H 4.1.2.1,Rev.7,Effective 02/18/93

WSSRAP Contact: BRIAN CLAYTOR	Lab/PO#: USAEHA / AI05-900R21913
Phone Number: (314)441-8086 ext. 3703	Shipped By: QUINONEZ, M _____CAM
Request Number: 416.0	Turnaround Time: [X] Standard [ ] Accelerated [ ] Priority [ ] Urgent [ ] Emergency

#	Sample ID	QC *	Date Sampled	WBS Code	Medium	Container Size	Container Type	Preserv.	Parameter	Arc
1	GW-1027-1293		12/08/93	EMP	WATER	1 LITER	GLASS, AMBER NM	COOL (ICE)	NITROAROMATICS	No
2A	GW-3024-120993		12/09/93	EMP	WATER	1 LITER	GLASS, AMBER NM	COOL (ICE)	NITROAROMATICS	No
3A	GW-3025-120993		12/09/93	EMP	WATER	1 LITER	GLASS, AMBER NM	COOL (ICE)	NITROAROMATICS	No
4C	GW-FINW-Q493		12/09/93	EMP	WATER	1 LITER	GLASS, AMBER NM	COOL (ICE)	NITROAROMATICS	No
5A	GW-PW02-Q493		12/09/93	EMP	WATER	1 LITER	GLASS, AMBER NM	COOL (ICE)	NITROAROMATICS	No
6C	GW-PW03-Q493	*	12/09/93	EMP	WATER	1 LITER	GLASS, AMBER NM	COOL (ICE)	NITROAROMATICS	No
7C	GW-PW05-Q493		12/09/93	EMP	WATER	1 LITER	GLASS, AMBER NM	COOL (ICE)	NITROAROMATICS	No
8A	GW-PW09-Q493		12/09/93	EMP	WATER	1 LITER	GLASS, AMBER NM	COOL (ICE)	NITROAROMATICS	No
9C	GW-RAWW-Q493		12/09/93	EMP	WATER	1 LITER	GLASS, AMBER NM	COOL (ICE)	NITROAROMATICS	No

[signature] Samplers Signature

[signature] Checked By

Jean Pier, Jim Meier. Technical Reviewer

Relinquished By	Received By	Date	Time	Reason For Transfer	Seal Intact? (Y/N)	Cooler Temp
[signature]	[signature]	12/9/93	14:30	Pack	N/a	N/a
[signature]	[signature]	12/9/93	16:20	Ship	Y	4°C
	[signature]	12-10-93	1015			
[signature]	[signature]	[illegible]	[illegible]	Cab	Y	4°C

AUTHORIZATION

Page 1 of 1

[signature] 12/9/93 MK-F Procurement Date

[signature] 12/9/93 ES&H Date

[signature] 12-9-93 Site Shipping Officer Date

WESTON
MANAGERS DESIGNERS-CONSULTANTS
LIONVILLE ANALYTICAL LABORATORY
208 WELSH POOL ROAD
LIONVILLE, PA 19341-1313
215-524-6100 • FAX: 215-524-6141

January 6, 1994

Mr. Brian Claytor
MK Ferguson Company
Weldon Spring Site Remedial Action Project
7295 Highway 94 South
St. Charles, MO 63303

Re: **Order 3589-0002-5885**

Dear Mr. Claytor:

Enclosed is the diskette, two (2) hardcopy printouts and the data validation packages for the following requests:

Request #	Batch Number
534	9312L929
536	9312L956 → No DVP included
537	9312L999

Please call me at (215) 524-7360 if you have any questions.

Very truly yours,

ROY F. WESTON, INC.

Carol Schrenkel
Project Manager

M.K. FERGUSON CO.
RECEIVED
JAN 7 1994
WSSRAP CONTRACT 3589

/clk

Enclosure:

ENVIRONMENTAL SAMPLE CHAIN-OF-CUSTODY / AUTHORIZATION FORM

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)

7295 HIGHWAY 94 SOUTH, ST. CHARLES, MO 63304

TELEPHONE (314)441-8086 TELEX (314)447-0803

Validation Documentation: [X]

EST/ES&H 4.1.2.1,Rev.7,Effective 02/18/93

WSSRAP Contact: BRIAN CLAYTOR
Phone Number: (314)441-8086 ext. 3703
Request Number: 536.0

Lab/PO#: WESTON / 3589-0002-5885
Shipped By: QUINONEZ, M
Turnaround Time: [ ] Standard [ ] Accelerated [X] Priority [ ] Urgent [ ] Emergency

WAB CAM

#	Sample ID	QC *	Date Sampled	WBS Code	Medium	Container Size	Container Type	Preserv.	Parameter	Arc
1B	GW-3024-120993		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	METALS, HSL+LI+MO (CLP)	No
B						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	STRONTIUM (GEO)	No
C						500 ML	PLASTIC, BOTTLE	H2SO4 PH < 2	NITRATE-N	No
2B	GW-3025-120993		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	METALS, HSL+LI+MO (CLP)	No
B						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	STRONTIUM (GEO)	No
C						250 ML	PLASTIC, BOTTLE	H2SO4 PH < 2	NITRATE-N	No
3A	GW-FINW-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	ARSENIC (GEO)	No
A						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	BARIUM (GEO)	No
4B	GW-PW02-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	COOL (ICE)	BROMIDE	No
B						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	CHLORIDE	No
B						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	NITRATE-N	No
B						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	NITRITE-N	No
B						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	SULFATE	No
C						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	METALS, HSL+LI+MO (CLP)	No
C						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	STRONTIUM (GEO)	No

Samplers Signature: [signature] Checked By: Terry Caldwell Technical Reviewer: Jean Pier Jim Meier

Relinquished By	Received By	Date	Time	Reason For Transfer	Seal Intact? (Y/N)	Cooler Temp
[signature]	[signature] Fed Ex	12-9-93	1445	Pack	N/A	N/T
[signature]	[illegible]	12-9-93	1630	Ship	Yes	N/T
Fed Ex	B. Burnett	12-10-93	09:20	Ship.	N: outside Y: inside	4.3°C

AUTHORIZATION

MK-F Procurement: [signature] Date: 12/9/93 ES&H: [signature] Date: 12-9-93 Site Shipping Officer: [signature] Date: 12-9-93

ENVIRONMENTAL SAMPLE CHAIN-OF-CUSTODY / AUTHORIZATION FORM

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
7295 HIGHWAY 94 SOUTH, ST. CHARLES, MO 63304
TELEPHONE (314)441-8086 TELEX (314)447-0803

Validation Documentation: [X]

EST/ES&H 4.1.2.1, Rev.7, Effective 02/18/93

WSSRAP Contact: BRIAN CLAYTOR
Phone Number: (314)441-8086 ext. 3703
Request Number: 536.0

Lab/PO#: WESTON / 3589-0002-5885
Shipped By: QUINONEZ, M
Turnaround Time: [ ] Standard [ ] Accelerated [X] Priority [ ] Urgent [ ] Emergency

LWAB CAM

#	Sample ID	QC *	Date Sampled	WBS Code	Medium	Container Size	Container Type	Preserv.	Parameter	Arc
4D	GW-PW02-Q493		12/09/93	EMP	WATER	500 ML	PLASTIC, BOTTLE	H2SO4 PH < 2	PHOSPHORUS, TOTAL	No
E						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	ALKALINITY	No
E						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	SILICA, DISSOLVED	No
5A	GW-PW03-Q493	*	12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	ARSENIC (GEO)	No
A						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	BARIUM (GEO)	No
6A	GW-PW05-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	ARSENIC (GEO)	No
A						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	BARIUM (GEO)	No
7B	GW-PW09-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	COOL (ICE)	BROMIDE	No
B						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	CHLORIDE	No
B						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	NITRATE-N	No
B						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	NITRITE-N	No
B						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	SULFATE	No
C						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	METALS, HSL+LI+MO (CLP)	No
C						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	STRONTIUM (GEO)	No
D						500 ML	PLASTIC, BOTTLE	H2SO4 PH < 2	PHOSPHORUS, TOTAL	No

Samplers Signature: [signature]
Checked By: [signature]
Technical Reviewer: Team Piper Jim Meier

Relinquished By	Received By	Date	Time	Reason For Transfer	Seal Intact? (Y/N)	Cooler Temp
[signature]	[signature]	12-7-93	1745	Pick	N/A	N/T
[signature]	[signature]	12-9-93	1130	Ship	Yes	N/T
Fed Ex	B. Burnett	12-10-93	09:20	Ship	Y = inside N = outside	4.3°C

AUTHORIZATION

MK-F Procurement: [signature] 12/9/93 Date
ES&H: [signature] 12-9-93 Date
Site Shipping Officer: [signature] 12-9-93 Date

ENVIRONMENTAL SAMPLE CHAIN-OF-CUSTODY / AUTHORIZATION FORM

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
7295 HIGHWAY 94 SOUTH, ST. CHARLES, MO 63304
TELEPHONE (314)441-8086 TELEX (314)447-0803

Validation Documentation: [X]

EST/ES&H 4.1.2.1, Rev.7, Effective 02/18/93

WSSRAP Contact: BRIAN CLAYTOR
Phone Number: (314)441-8086 ext. 3703
Request Number: 536.0

Lab/PO#: WESTON / 3589-0002-5885
Shipped By: QUINONEZ, M
Turnaround Time: [ ] Standard [ ] Accelerated [X] Priority [ ] Urgent [ ] Emergency

4 HB CAM

#	Sample ID	QC *	Date Sampled	WBS Code	Medium	Container Size	Container Type	Preserv.	Parameter	Arc
7F	GW-PW09-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	COOL (ICE)	ALKALINITY	No
F						1 LITER	PLASTIC, BOTTLE	COOL (ICE)	SILICA, DISSOLVED	No
8A	GW-RAWW-Q493		12/09/93	EMP	WATER	1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	ARSENIC (GEO)	No
A						1 LITER	PLASTIC, BOTTLE	HNO3 PH < 2	BARIUM (GEO)	No

Samplers Signature: [signature]
Checked By: Terry Caldwell
Technical Reviewer: Jean Pike, Jim Meier

Relinquished By	Received By	Date	Time	Reason For Transfer	Seal Intact? (Y/N)	Cooler Temp
[signature]	[signature] Fed Ex	12-9-93	1445	Pack	N/A	N/T
[signature]	[illegible]	12-9-93	1630	Ship	Yes	N/T
Fed Ex	B. Burnett	12/10/93	09:30	Ship.	Y: inside N: outside	4.3°C

AUTHORIZATION

[signature] 12/9/93 MK-F Procurement Date
[signature] 12/9/93 ES&H Date
[signature] 12-9-93 Site Shipping Officer Date

WESTON Analytics Use Only
9312L956

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: M.K. Ferguson - WESRAP
Est. Final Proj. Sampling Date:
Work Order #: 05541-005-001-9999-00
Project Contact/Phone #:
AD Project Manager: Carol Schrenkel
QC: CLP Del: CLP TAT: 14 DAY
Date Rec'd: 12-10-93 Date Due: 12-24-93
Account #: MKFWSS-Pri

Refrigerator #

#/Type Container	Liquid	3	3	3		3	3	3			
	Solid	1pt	1pt	1pt		1pt	1pt	1pt			
Volume	Liquid	1L	500ml	1L		1L	500ml	1L			
	Solid										
Preservatives		HNO3	H2SO4	HNO3		—	H2SO4	—			

ANALYSES REQUESTED →

	ORGANIC							INORG						
	VOA	BNA	Pest PCB	Herb		metals (2)	NO3	Metal	CN	BR CL NO3 NO2 SO4	PO4T	ALK SO4		
WESTON Analytics Use Only						metals MS/MSD	TKN NO3P	see below		TCL TCL NO2 NO3 TKN	TPO4T	TPO4T TPO4		

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected															
001	GW-3024-120993			W	12-9-93								X	X							
002	GW-3025-120993			W	12-9-93								X	X							
003	GW-FINW-Q493			W	12-9-93							X									
004	GW-PW02-Q493			W	12-9-93									X		X	X	X			
005	GW-PW03-Q493	X		W	12-9-93							X									
006	GW-PW05-Q493			W	12-9-93							X									
007	GW-PW07-Q493			W	12-9-93									X		X	X	X			
008	GW-RAWW-Q493			W	12-9-93							X									
	metals = HSL + Li, Mo, Sr																				

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
Temp. = 4.3°C
Request #: 5536
TAT = Priority
Noairbill Rec'd
Orig. Rewillen
Run MS/Rep on 005
Full Documentation Required

DATE/REVISIONS:
12-10-93 1. Coolers sealed on outer package Rec'd
2. Broken inner seal noticed.
3.
4.
5.
6.

WESTON Analytics Use Only

Samples were:
1) Shipped ✓ or Hand Delivered
Airbill # 8403777501
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times (Y) or N

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package Y or (N)
3) Present on Sample Y or (N)
4) Unbroken on Sample Y or (N)
COC Record Present Upon Sample Rec'd (Y) or N

Discrepancies Between Samples Labels and COC Record? Y or (N)
NOTES:
the airbill # on cooler + written on orig. COC did not match.

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
Fed Ex	B. Burnette	12-10-93	09:20	B.B.	12-10-93		
B.B.	12-10-93						

RFW 21-21 A-7/91 1372 1373 1375 1377 1378 Ref# N/A Cooler# N/A 381-596a

LABORATORY ANALYTICAL ELECTRONIC DATA DELIVERABLE
FILE: K:\DATAVER\WS\WS536.DBF
PRINTED: 01/10/94 09:50

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-FINW-Q493	GROUNDWATER	12/09/93	12L956003

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
METALS	ARSENIC	ND		UG/L	2.00	12/15/93	12/19/93	EPA CLP		N
	BARIUM	86.4		UG/L	6.00	12/15/93	12/21/93	EPA CLP		N

LABORATORY ANALYTICAL ELECTRONIC DATA DELIVERABLE
FILE: K:\DATAVER\WS\WS536.DBF
PRINTED: 01/10/94 09:50

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW02-Q493	GROUNDWATER	12/09/93	12L956004

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
IONS	BROMIDE	ND		MG/L	0.38	12/14/93	12/14/93	EPA 300.0		N
	CHLORIDE	13.5		MG/L	1.00	12/14/93	12/14/93	EPA 300.1	DF 4.00	N
	NITRATE-N	ND		MG/L	0.02	12/10/93	12/10/93	EPA 353.1		N
	NITRITE-N	ND		MG/L	0.02	12/10/93	12/10/93	EPA 353.1		N
	SULFATE	48.4		MG/L	2.50	12/14/93	12/14/93	EPA 300.0	DF 10.00	N

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
METALS	ALUMINUM	ND		UG/L	48.0	12/15/93	12/21/93	EPA CLP		N
	ANTIMONY	ND		UG/L	46.0	12/15/93	12/21/93	EPA CLP		N
	ARSENIC	ND		UG/L	2.00	12/15/93	12/19/93	EPA CLP		N
	BARIUM	329		UG/L	6.00	12/15/93	12/21/93	EPA CLP		N
	BERYLLIUM	ND		UG/L	1.00	12/15/93	12/21/93	EPA CLP		N
	CADMIUM	ND		UG/L	5.00	12/15/93	12/21/93	EPA CLP		N
	CALCIUM	62400		UG/L	28.0	12/15/93	12/21/93	EPA CLP		N
	CHROMIUM	ND		UG/L	6.00	12/15/93	12/21/93	EPA CLP		N
	COBALT	ND		UG/L	7.00	12/15/93	12/21/93	EPA CLP		N
	COPPER	ND		UG/L	7.00	12/15/93	12/21/93	EPA CLP		N
	IRON	3810		UG/L	7.00	12/15/93	12/21/93	EPA CLP		N
	LEAD	ND		UG/L	2.00	12/15/93	12/17/93	EPA CLP		N
	LITHIUM	ND		UG/L	28.0	12/15/93	12/21/93	EPA CLP		N
	MAGNESIUM	15200		UG/L	58.0	12/15/93	12/21/93	EPA CLP		N
	MANGANESE	394		UG/L	2.00	12/15/93	12/21/93	EPA CLP		N
	MERCURY	ND		UG/L	0.10	12/20/93	12/20/93	EPA CLP		N
	MOLYBDENUM	ND		UG/L	39.0	12/15/93	12/21/93	EPA CLP		N
	NICKEL	ND		UG/L	12.0	12/15/93	12/21/93	EPA CLP		N
	POTASSIUM	4270		UG/L	905	12/15/93	12/21/93	EPA CLP		N
	SELENIUM	ND		UG/L	2.00	12/15/93	12/17/93	EPA CLP		N
	SILVER	ND		UG/L	7.00	12/15/93	12/21/93	EPA CLP		N
	SODIUM	21200		UG/L	47.0	12/15/93	12/21/93	EPA CLP		N
	STRONTIUM	370		UG/L	6.00	12/15/93	12/21/93	EPA CLP		N
	THALLIUM	ND		UG/L	2.00	12/15/93	12/17/93	EPA CLP		N
	VANADIUM	ND		UG/L	3.00	12/15/93	12/21/93	EPA CLP		N
	ZINC	11.4		UG/L	3.00	12/27/93	12/29/93	EPA CLP		N

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
MISC.	ALKALINITY	230		MG/L	10.0	12/17/93	12/17/93	EPA 310.1		N
	PHOSPHOROUS	0.38		MG/L	0.05	12/16/93	12/16/93	EPA 365.2		N
	SILICA, DISSOLVED	7.40		MG/L	2.00	12/15/93	12/15/93	EPA 370.1	DF 10.00	N

LABORATORY ANALYTICAL E. RONIC DATA DELIVERABLE
FILE: K:\DATAVER\WS\WS536.DBF
PRINTED: 01/10/94 09:50

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW03-Q493	GROUNDWATER	12/09/93	12L956005

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
METALS	ARSENIC	ND		UG/L	2.00	12/15/93	12/19/93	EPA CLP		N
	BARIUM	299		UG/L	6.00	12/15/93	12/21/93	EPA CLP		N

LABORATORY ANALYTICAL ELECTRONIC DATA DELIVERABLE
FILE: K:\DATAVER\WS\WS536.DBF
PRINTED: 01/10/94 09:50

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW03-Q493-DU	GROUNDWATER	12/09/93	12L956005

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
METALS	ARSENIC	ND		UG/L	2.00	12/15/93	12/19/93	EPA CLP	REP, % DIFF=NC	N
	BARIUM	310		UG/L	6.00	12/15/93	12/21/93	EPA CLP	REP, % DIFF=3.50	N

LABORATORY ANALYTICAL ELECTRONIC DATA DELIVERABLE
FILE: K:\DATAVER\WS\WS536.DBF
PRINTED: 01/10/94 09:50

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW03-Q493-MS	GROUNDWATER	12/09/93	12L956005

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
METALS	ARSENIC	36.6		UG/L	2.00	12/15/93	12/19/93	EPA CLP	MS, % REC=91.50	N
	BARIUM	2240		UG/L	6.00	12/15/93	12/21/93	EPA CLP	MS, % REC=97.20	N

LABORATORY ANALYTICAL ELECTRONIC DATA DELIVERABLE
FILE: K:\DATAVER\WS\WS536.DBF
PRINTED: 01/10/94 09:50

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW05-Q493	GROUNDWATER	12/09/93	12L956006

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
METALS	ARSENIC	ND		UG/L	2.00	12/15/93	12/19/93	EPA CLP		N
	BARIUM	512		UG/L	6.00	12/15/93	12/21/93	EPA CLP		N

WSSRAP Sample ID	Sample Matrix	Sample Date	Lab ID
GW-PW09-Q493	GROUNDWATER	12/09/93	12L956007

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
IONS	BROMIDE	ND		MG/L	0.38	12/14/93	12/14/93	EPA 300.0		N
	CHLORIDE	7.50		MG/L	0.25	12/14/93	12/14/93	EPA 300.1		N
	NITRATE-N	ND		MG/L	0.02	12/10/93	12/10/93	EPA 353.1		N
	NITRITE-N	ND		MG/L	0.02	12/10/93	12/10/93	EPA 353.1		N
	SULFATE	37.5		MG/L	2.50	12/14/93	12/14/93	EPA 300.0	DF 10.00	N

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
METALS	ALUMINUM	ND		UG/L	48.0	12/15/93	12/21/93	EPA CLP		N
	ANTIMONY	ND		UG/L	46.0	12/15/93	12/21/93	EPA CLP		N
	ARSENIC	3.90		UG/L	2.00	12/15/93	12/19/93	EPA CLP		N
	BARIUM	500		UG/L	6.00	12/15/93	12/21/93	EPA CLP		N
	BERYLLIUM	ND		UG/L	1.00	12/15/93	12/21/93	EPA CLP		N
	CADMIUM	ND		UG/L	5.00	12/15/93	12/21/93	EPA CLP		N
	CALCIUM	108000		UG/L	28.0	12/15/93	12/21/93	EPA CLP		N
	CHROMIUM	ND		UG/L	6.00	12/15/93	12/21/93	EPA CLP		N
	COBALT	ND		UG/L	7.00	12/15/93	12/21/93	EPA CLP		N
	COPPER	ND		UG/L	7.00	12/15/93	12/21/93	EPA CLP		N
	IRON	6110		UG/L	7.00	12/15/93	12/21/93	EPA CLP		N
	LEAD	ND		UG/L	2.00	12/15/93	12/17/93	EPA CLP		N
	LITHIUM	ND		UG/L	28.0	12/15/93	12/21/93	EPA CLP		N
	MAGNESIUM	26400		UG/L	58.0	12/15/93	12/21/93	EPA CLP		N
	MANGANESE	383		UG/L	2.00	12/15/93	12/21/93	EPA CLP		N
	MERCURY	ND		UG/L	0.10	12/20/93	12/20/93	EPA CLP		N
	MOLYBDENUM	ND		UG/L	39.0	12/15/93	12/21/93	EPA CLP		N
	NICKEL	ND		UG/L	12.0	12/15/93	12/21/93	EPA CLP		N
	POTASSIUM	3690		UG/L	905	12/15/93	12/21/93	EPA CLP		N
	SELENIUM	ND		UG/L	2.00	12/15/93	12/17/93	EPA CLP		N
	SILVER	ND		UG/L	7.00	12/15/93	12/21/93	EPA CLP		N
	SODIUM	7540		UG/L	47.0	12/15/93	12/21/93	EPA CLP		N
	STRONTIUM	569		UG/L	6.00	12/15/93	12/21/93	EPA CLP		N
	THALLIUM	ND		UG/L	2.00	12/15/93	12/17/93	EPA CLP		N
	VANADIUM	9.00		UG/L	3.00	12/15/93	12/21/93	EPA CLP		N
	ZINC	50.9		UG/L	3.00	12/27/93	12/29/93	EPA CLP		N

Category	Parameter	Conc.	±Err	Units	DL	Ext.Date	Ana.Date	Method	Comments	Qualifier
MISC.	ALKALINITY	350		MG/L	10.0	12/17/93	12/17/93	EPA 310.1		N
	PHOSPHOROUS	0.40		MG/L	0.05	12/16/93	12/16/93	EPA 365.2		N
	SILICA, DISSOLVED	8.30		MG/L	2.00	12/15/93	12/15/93	EPA 370.1	DF 10.00	N

ATTACHMENT B

Draft Summary Letter

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DRAFT LETTER

Mr. Stanley Remington
Consulting Hydrologist
919 Broadmoor Lane
St. Charles, MO 63301

Dear Mr. Remington:

ST. CHARLES COUNTY WELL FIELD RESULTS, FOURTH QUARTER 1993

Enclosed are the results of quarterly monitoring of the Saint Charles County Well Field for the fourth quarter of 1993. Parameters included for the production wells in the monitoring plan are total uranium, gross alpha, nitroaromatic compounds, and metals (As and Ba). Monitoring Locations GW-PW02 and GW-PW09 are also sampled for additional metals and inorganic anions as part of a geochemical study initiated in this calendar year's monitoring program. The analytical laboratory results for each well are attached.

Detectable concentrations of total uranium (less than or equal to 0.5 pCi/l) were observed for the fourth quarter but were within background for Missouri River alluvium. The detectable concentrations for gross alpha were within historic ranges and are representative of background levels in the Missouri River alluvium. No detectable concentrations of nitroaromatic compounds were observed in any of the production wells. The results for the remaining parameters were within expected ranges for this quarter.

Due to the 1993 flooding of the St. Charles County Well Field, four of the county's production wells (PW04, PW06, PW07, and PW08) have not been operational since the second quarter. Due to water damage to the pumps, these production wells could not able sampled. The county's RMW-series groundwater monitoring wells were also inundated during the flood in July and September and the wells have not been

redeveloped due to minor damages to the permanent pumps. The RMW-series wells are presently being repaired and are to be sampled for the first quarter of 1994.

If you have any questions or comments regarding the Well Field results for the fourth quarter, please contact Tom Paulings of my staff.

Sincerely,

Stephen H. McCracken
Project Manager
Weldon Spring Site
Remedial Action Project

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