



**Department of Energy**

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1931

JAN 15 1999

Mr. James A. Saric, Remedial Project Manager  
U.S. Environmental Protection Agency  
Region V-SRF-5J  
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DOE-0346-99

Mr. Tom Schneider, Project Manager  
Ohio Environmental Protection Agency  
401 East 5<sup>th</sup> Street  
Dayton, Ohio 45402-2911

Mr. Val Orr  
Division of Drinking and Ground Waters - UIC Unit  
P.O. Box 1049  
1800 Watermark Drive  
Columbus, Ohio 43216-1049

Dear Mr. Saric, Mr. Schneider, and Mr. Orr:

**NOVEMBER 1998 OPERATING REPORT FOR THE RE-INJECTION DEMONSTRATION**

This correspondence submits the Re-Injection Demonstration Operation Report for the month of November 1998.

As specified in the Re-Injection Demonstration Test Plan, monthly operating reports for the re-injection demonstration are to be prepared and submitted to the U.S. Environmental Protection Agency (U.S. EPA), Ohio Environmental Protection Agency (OEPA), Office of Federal Facilities Oversight, and the OEPA Division of Drinking and Ground Waters-Underground Injection Control (UIC) Unit.

JAN 15 1999

Mr. James A. Saric  
Mr. Tom Schneider  
Mr. Val Orr

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If you have any questions regarding this submittal, please contact John Kappa at (513) 648-3149.

Sincerely,



Johnny W. Reising  
Fernald Remedial Action  
Project Manager

FEMP:Kappa

Enclosure

cc w/enclosure:

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M. Schupe, HSI GeoTrans  
R. Vandegrift, ODH  
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D. Carr, FDF/52-2  
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**MONTHLY OPERATING REPORT  
RE-INJECTION DEMONSTRATION  
NOVEMBER 1998**

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OVERVIEW

The FEMP Re-Injection Demonstration began on September 2, 1998. The controlling document for the Re-Injection Demonstration is the Re-Injection Demonstration Test Plan, Rev. 0. A requirement of Section 6 of the test plan is that monthly operating reports be submitted to the U.S. EPA, Ohio EPA Office of Federal Facilities Oversight, and the Division of Ohio EPA Drinking and Ground Waters-UIC Unit. The monthly operating reports are to include the following information:

- I. Analysis of the injectate
- II. The volume and rate of re-injection
- III. A description of any well maintenance and rehabilitation procedures which were conducted
- IV. Results of groundwater monitoring at the re-injection test site.

This report serves to fulfill this commitment for the month of November 1998. It covers operation of the Re-Injection Demonstration from November 1, 1998 through December 1, 1998.

ANALYSIS OF THE INJECTATE

Groundwater which is being extracted from the Great Miami Aquifer is being treated for uranium and re-injected back into the Great Miami Aquifer. The groundwater is being treated in the FEMP Advanced Waste Water Treatment (AWWT) Expansion Facility. The effluent from the AWWT Expansion Facility, is being sampled monthly for the parameters listed in Table 2.1 of the Re-Injection Demonstration Test Plan, Rev. 0. Monthly injectate sampling is focusing on the final remediation level (FRL) constituents that have had an exceedance of their FRL in the area of the aquifer from which the groundwater is being pumped.

The monthly samples are being sent to an off-site laboratory for analysis. Contracted for schedules with the off-site labs for reporting analytical results are not being met. The laboratory delay has affected FEMP reporting of the injectate sampling results.

The October report provided partial preliminary results for injectate samples collected in September and October. All but the radiological results were provided and discussed. Complete preliminary

results for injectate samples collected in September and October, which include the radiological results, are provided in Tables 1 and 2 of this report. A review of the radiological results from samples collected in September and October indicates that all of the radiological constituent concentrations are below their respective FRLs.

Partial preliminary results from the injectate sample collected in November are provided in Table 3. All but the radiological results are provided. Radiological results for the November injectate sample are still pending from the offsite laboratory. A review of the preliminary data from November indicates that all of the constituent concentrations are below their respective FRLs. The concentration for zinc in October was right at the FRL, but data from November indicates that the zinc concentration was again below the FRL. Efforts continue to expedite the receipt of radiological results from the offsite laboratories in order to achieve a more timely reporting. The radionuclide data for November should be available for the next monthly report.

#### VOLUME AND RATE OF RE-INJECTION

Treated groundwater is being re-injected into the Great Miami Aquifer in five re-injection wells at a rate of 200 gallons per minute, per well. Figure 1 illustrates the location of the five re-injection wells. Re-Injection Well 8 is an 8-inch diameter well. Re-Injection Well 9 is a 12-inch diameter well. The other re-injection wells are all 16-inches in diameter. The combined design re-injection rate for all five wells is 1000 gallons per minute. Operational data specific to each re-injection well are provided in Tables 4 through 8.

Figure 2 illustrates the water level rise in each of the five re-injection wells from November 1, 1998 through December 1, 1998, as measured by the operators at the AWWT Expansion Facility Distributed Control System (DCS). Water levels are recorded three times per day.

#### WELL MAINTENANCE AND REHABILITATION

No well maintenance or rehabilitation work was required or performed on the five re-injection wells during the month of November.

#### GROUNDWATER MONITORING RESULTS

The next scheduled collection of water quality samples for the Re-Injection Demonstration is in December of 1998.

TABLE 1

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ANALYSIS OF INJECTATE PRELIMINARY RESULTS  
Sample Collected September 21, 1998

Constituents <sup>a</sup>	Result <sup>b</sup>	Groundwater FRL <sup>c</sup>	Detection Limit	Constituent Type <sup>e</sup>	Basis for FRL <sup>f</sup>
<b>General Chemistry</b>		<b>mg/L</b>			
Nitrate	1.1	11.0		MP	B
<b>Inorganics</b>		<b>mg/L</b>			
Antimony	U	0.006	0.00088	N	A
Arsenic	U	0.05	0.0007	N	A
Barium	0.0431	2.0		N	A
Beryllium	U	0.004	0.00002	N	A
Cadmium	U	0.014	0.0001	N	B
Total Chromium	0.00032 B	0.022 <sup>d</sup>		MP	R
Cobalt	U	0.17	0.00018	N	R
Lead	U	0.015	0.00042	N	A
Manganese	0.0035 B	0.9		N	B
Mercury	U	0.002	0.00010	MP	A
Nickel	0.0066 B	0.1		N	A
Selenium	0.00097 B	0.05		N	A
Silver	U	0.05	0.00012	N	A
Vanadium	U	0.038	0.00015	N	R
Zinc	0.0051 B	0.021		N	B
<b>Radionuclides</b>		<b>pCi/L</b>			
Neptunium-237	U	1.0	0.024	MP	R*
Radium-226	U	20.0	-0.067	N	A
Strontium-90	U	8.0	0.503	MP	A
Thorium-228	U	4.0	0.097	N	R*
Thorium-232	U	1.2	0.003	N	R*
Total Uranium	U	<b>µg/L</b> 20.0	0.020	MP	A
<b>Organics</b>		<b>µg/L</b>			
Bis(2-ethylhexyl)phthalate	U	6.0	5	N	A
Carbon disulfide	U	5.5	1	N	A
1,1-Dichloroethene	U	7.0	1	N	A
1,2-Dichloroethane	U	5.0	1	MP	A
Trichloroethene	U	5.0	1	N	A

<sup>a</sup>Constituents taken from Table 2-1 of Re-Injection Demonstration Test Plan. Constituents are those previously detected in aquifer zones 2 and 4 at concentrations above their FRL.

<sup>b</sup>If a duplicate sample was analyzed the highest concentration between the regular sample and duplicate sample is reported. B = Lab qualifier. Reported value was obtained from a reading that was less than the contract required detection limit but greater than or equal to the instrument detection limit.

U = Undetect

<sup>c</sup>From Table 9-4 in OU5 ROD.

<sup>d</sup>FRL is for hexavalent chromium.

<sup>e</sup>Constituent types from Appendix A of IEMP. MP indicates that the constituent has been identified as being able to migrate to the aquifer. N indicates that the constituent has been identified as not being able to migrate to the aquifer.

<sup>f</sup>A - Applicable or relevant and appropriate requirement based (MCL, PMCL, etc.).

B - Based on 95<sup>th</sup> percentile background concentrations.

R - Risk Based

R\* - Risk Based radionuclide cleanup levels include constituent specific 95<sup>th</sup> percentile background concentration.

TABLE 2

**ANALYSIS OF INJECTATE PRELIMINARY RESULTS**  
**Sample Collected October 23, 1998**

Constituents <sup>a</sup>	Result <sup>b</sup>	Groundwater FRL <sup>c</sup>	Detection Limit	Constituent Type <sup>e</sup>	Basis for FRL <sup>f</sup>
<b>General Chemistry</b>		mg/L			
Nitrate	0.487	11.0		MP	B
<b>Inorganics</b>		mg/L			
Antimony	U	0.006	0.003	N	A
Arsenic	U	0.05	0.0018	N	A
Barium	0.0467B	2.0		N	A
Beryllium	U	0.004	0.0004	N	A
Cadmium	U	0.014	0.0004	N	B
Total Chromium	U	0.022 <sup>d</sup>	0.0027	MP	R
Cobalt	U	0.17	0.0024	N	R
Lead	0.0014B	0.015		N	A
Manganese	0.0053B	0.9		N	B
Mercury	U	0.002	0.0001	MP	A
Nickel	U	0.1	0.0108	N	A
Selenium	U	0.05	0.0022	N	A
Silver	U	0.05	0.0013	N	A
Vanadium	U	0.038	0.0013	N	R
Zinc	0.0213	0.021		N	B
<b>Radionuclides</b>		pCi/L			
Neptunium-237	U	1.0	0.160	MP	R*
Radium-226	U	20.0	0.081	N	A
Strontium-90	U	8.0	0.468	MP	A
Thorium-228	U	4.0	0.132	N	R*
Thorium-232	U	1.2	0.014	N	R*
		µg/L			
Total Uranium	U	20.0	0.053	MP	A
<b>Organics</b>		µg/L			
Bis(2-ethylhexyl)phthalate	U	6.0	5	N	A
Carbon disulfide	U	5.5	1	N	A
1,1-Dichloroethene	U	7.0	1	N	A
1,2-Dichloroethane	U	5.0	1	MP	A
Trichloroethene	U	5.0	1	N	A

<sup>a</sup>Constituents taken from Table 2-1 of Re-Injection Demonstration Test Plan. Constituents are those previously detected in aquifer zones 2 and 4 at concentrations above their FRL.

<sup>b</sup>If a duplicate sample was analyzed the highest concentration between the regular sample and duplicate sample is reported. B = Lab qualifier. Value was obtained from a reading that was less than the contract required detection limit but greater than or equal to the instrument detection limit.

U = Undetect

<sup>c</sup>From Table 9-4 in OUS ROD.

<sup>d</sup>FRL is for hexavalent chromium.

<sup>e</sup>Constituent types from Appendix A of IEMP. MP indicates that the constituent has been identified as being able to migrate to the aquifer. N indicates that the constituent has been identified as not being able to migrate to the aquifer.

<sup>f</sup>A - Applicable or relevant and appropriate requirement based (MCL, PMCL, etc.).

B - Based on 95<sup>th</sup> percentile background concentrations.

R - Risk Based

R\* - Risk Based radionuclide cleanup levels include constituent specific 95<sup>th</sup> percentile background concentration.

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TABLE 3

ANALYSIS OF INJECTATE PRELIMINARY RESULTS  
Sample Collected November 24, 1998

Constituents <sup>a</sup>	Result <sup>b</sup>	Groundwater FRL <sup>c</sup>	Detection Limit	Constituent Type <sup>e</sup>	Basis for FRL <sup>f</sup>
<b>General Chemistry</b>		mg/L			
Nitrate	0.454	11.0		MP	B
<b>Inorganics</b>		mg/L			
Antimony	U	0.006	0.003	N	A
Arsenic	U	0.05	0.0018	N	A
Barium	0.0502B	2.0		N	A
Beryllium	U	0.004	0.0004	N	A
Cadmium	U	0.014	0.0004	N	B
Total Chromium	0.0012B	0.022 <sup>d</sup>		MP	R
Cobalt	0.0042B	0.17		N	R
Lead	U	0.015	0.0009	N	A
Manganese	0.0053B	0.9		N	B
Mercury	U	0.002	0.0001	MP	A
Nickel	U	0.1	0.0108	N	A
Selenium	U	0.05	0.0022	N	A
Silver	U	0.05	0.0013	N	A
Vanadium	0.0161B	0.038		N	R
Zinc	0.0105	0.021		N	B
<b>Radionuclides</b>		pCi/L			
Neptunium-237		1.0		MP	R*
Radium-226		20.0		N	A
Strontium-90		8.0		MP	A
Thorium-228		4.0		N	R*
Thorium-232		1.2		N	R*
		µg/L			
Total Uranium		20.0		MP	A
<b>Organics</b>		µg/L			
Bis(2-ethylhexyl)phthalate	2JB	6.0		N	A
Carbon disulfide	U	5.5	1	N	A
1,1-Dichloroethene	U	7.0	1	N	A
1,2-Dichloroethane	U	5.0	1	MP	A
Trichloroethene	U	5.0	1	N	A

<sup>a</sup>Constituents taken from Table 2-1 of Re-Injection Demonstration Test Plan. Constituents are those previously detected in aquifer zones 2 and 4 at concentrations above their FRL.

<sup>b</sup>If a duplicate sample was analyzed the highest concentration between the regular sample and duplicate sample is reported. B = Lab qualifier. Value was obtained from a reading that was less than the contract required detection limit but greater than or equal to the instrument detection limit.

J = Lab qualifier, means data is estimated.

U = Undetect

<sup>c</sup>From Table 9-4 in OUS ROD.

<sup>d</sup>FRL is for hexavalent chromium.

<sup>e</sup>Constituent types from Appendix A of IEMP. MP indicates that the constituent has been identified as being able to migrate to the aquifer. N indicates that the constituent has been identified as not being able to migrate to the aquifer.

<sup>f</sup>A - Applicable or relevant and appropriate requirement based (MCL, PMCL, etc.).

B - Based on 95<sup>th</sup> percentile background concentrations.

R - Risk Based

R\* - Risk Based radionuclide cleanup levels include constituent specific 95<sup>th</sup> percentile background concentration.

TABLE 4

RE-INJECTION WELL 22107 (IW-8)  
OPERATIONAL SUMMARY SHEET  
NOVEMBER 1998

Reference Elevation (feet AMSL) - 539.92 (top of casing)  
Northing Coordinate ('83) - 476196.22  
Easting Coordinate ('83) - 1347978.25

Hours in reporting period<sup>a</sup> = 720.58  
Hours not injecting<sup>b</sup> = 0  
Hours injecting<sup>c</sup> = 720.58  
Operational percent<sup>d</sup> = 100

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected <sup>e</sup>	Average Operating Injection Rate (gpm) <sup>f</sup>
9/98	8.16	206
10/98	5.78	203
11/98	8.47	196

<sup>a</sup>First operational shift reading on 10/1/98 to first operational shift reading on 11/1/98

<sup>b</sup>Downtime

<sup>c</sup>Hours in reporting period - Hours not injecting

<sup>d</sup>(Hours injecting / Hours in reporting period) x 100

<sup>e</sup>Summation of daily totalizer differences

<sup>f</sup>Million Gallons Injected / (Hours Injecting x 60)

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TABLE 5

RE-INJECTION WELL 22108 (IW-9)  
OPERATIONAL SUMMARY SHEET  
NOVEMBER 1998

Reference Elevation (feet AMSL) - 578.025 (top of casing)  
Northing Coordinate ('83) - 476255.74  
Easting Coordinate ('83) - 1348384.49

Hours in reporting period<sup>a</sup> = 721.08  
Hours not injecting<sup>b</sup> = 0  
Hours injecting<sup>c</sup> = 721.08  
Operational percent<sup>d</sup> = 100

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected <sup>e</sup>	Average Operating Injection Rate (gpm) <sup>f</sup>
9/98	8.17	206
10/98	8.30	201
11/98	8.53	197

<sup>a</sup>First operational shift reading on 10/1/98 to first operational shift reading on 11/1/98.

<sup>b</sup>Downtime

<sup>c</sup>Hours in reporting period - Hours not injecting

<sup>d</sup>(Hours injecting / Hours in reporting period) x 100

<sup>e</sup>Summation of daily totalizer differences

<sup>f</sup>Million Gallons Injected / (Hours Injecting x 60)

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TABLE 6

**RE-INJECTION WELL 22109 (IW-10)  
OPERATIONAL SUMMARY SHEET  
NOVEMBER 1998**

Reference Elevation (feet AMSL) - 576.92 (top of casing)

Northing Coordinate ('83) - 476175.65

Easting Coordinate ('83) - 1348860.53

Hours in reporting period<sup>a</sup> = 721.05

Target Injection Rate = 200 gpm

Hours not injecting<sup>b</sup> = 0

Hours injecting<sup>c</sup> = 721.05

Operational percent<sup>d</sup> = 100

Monthly Measurements		
Month	Million Gallons Injected <sup>e</sup>	Average Operating Injection Rate (gpm) <sup>f</sup>
9/98	8.13	205
10/98	8.28	200
11/98	8.50	196

<sup>a</sup>First operational shift reading on 10/1/98 to first operational shift reading on 11/1/98

<sup>b</sup>Downtime

<sup>c</sup>Hours in reporting period - Hours not injecting

<sup>d</sup>(Hours injecting / Hours in reporting period) x 100

<sup>e</sup>Summation of daily totalizer differences

<sup>f</sup>Million Gallons Injected / (Hours Injecting x 60)

TABLE 7

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RE-INJECTION WELL 22240 (IW-11)  
 OPERATIONAL SUMMARY SHEET  
 NOVEMBER 1998

Reference Elevation (feet AMSL) - 577.14 (top of casing)

Northing Coordinate ('83) - 476422.82

Easting Coordinate ('83) - 1349386.92

Hours in reporting period<sup>a</sup> = 721.08

Target Injection Rate = 200 gpm

Hours not injecting<sup>b</sup> = 0

Hours injecting<sup>c</sup> = 721.08

Operational percent<sup>d</sup> = 100

Monthly Measurements

Month	Million Gallons Injected <sup>e</sup>	Average Operating Injection Rate (gpm) <sup>f</sup>
9/98	8.39	211
10/98	8.29	199
11/98	8.50	197

<sup>a</sup>First operational shift reading on 10/1/98 to first operational shift reading on 11/1/98

<sup>b</sup>Downtime

<sup>c</sup>Hours in reporting period - Hours not injecting

<sup>d</sup>(Hours injecting / Hours in reporting period) x 100

<sup>e</sup>Summation of daily totalizer differences

<sup>f</sup>Million Gallons Injected / (Hours Injecting x 60)



TABLE 8

RE-INJECTION WELL 22111 (IW-12)  
OPERATIONAL SUMMARY SHEET  
NOVEMBER 1998

Reference Elevation (feet AMSL) - 583.01 (top of casing)

Northing Coordinate ('83) - 476518.64

Easting Coordinate ('83) - 1350105.39

Hours in reporting period<sup>a</sup> = 720.92

Target Injection Rate = 200 gpm

Hours not injecting<sup>b</sup> = 0Hours injecting<sup>c</sup> = 720.92Operational percent<sup>d</sup> = 100

Monthly Measurements		
Month	Million Gallons Injected <sup>e</sup>	Average Operating Injection Rate (gpm) <sup>f</sup>
9/98	8.12	205
10/98	8.27	201
11/98	8.53	197

<sup>a</sup>First operational shift reading on 10/1/98 to first operational shift reading on 11/1/98<sup>b</sup>Downtime<sup>c</sup>Hours in reporting period - Hours not injecting<sup>d</sup>(Hours injecting / Hours in reporting period) x 100<sup>e</sup>Summation of daily totalizer differences<sup>f</sup>Million Gallons Injected / (Hours Injecting x 60)

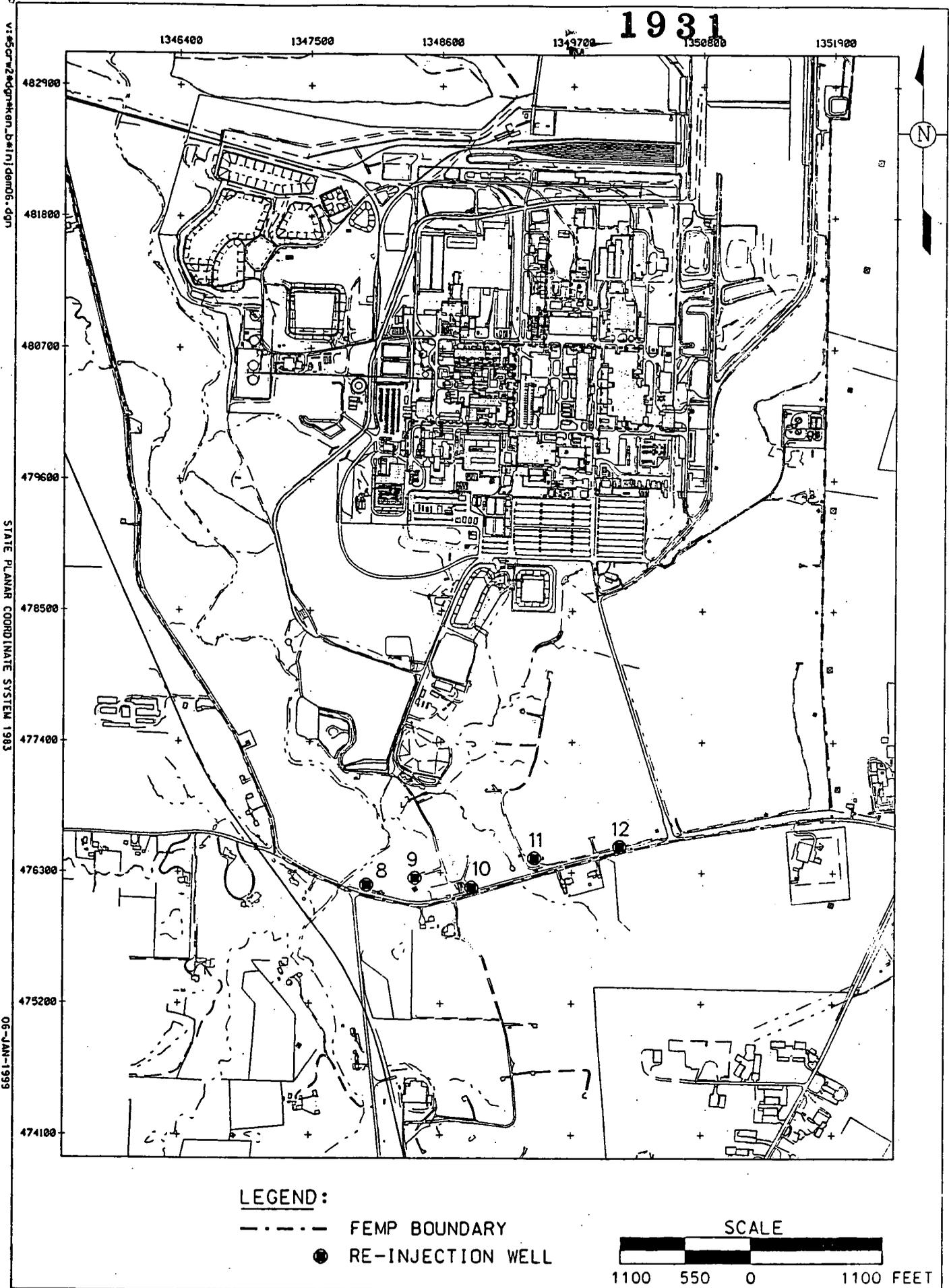
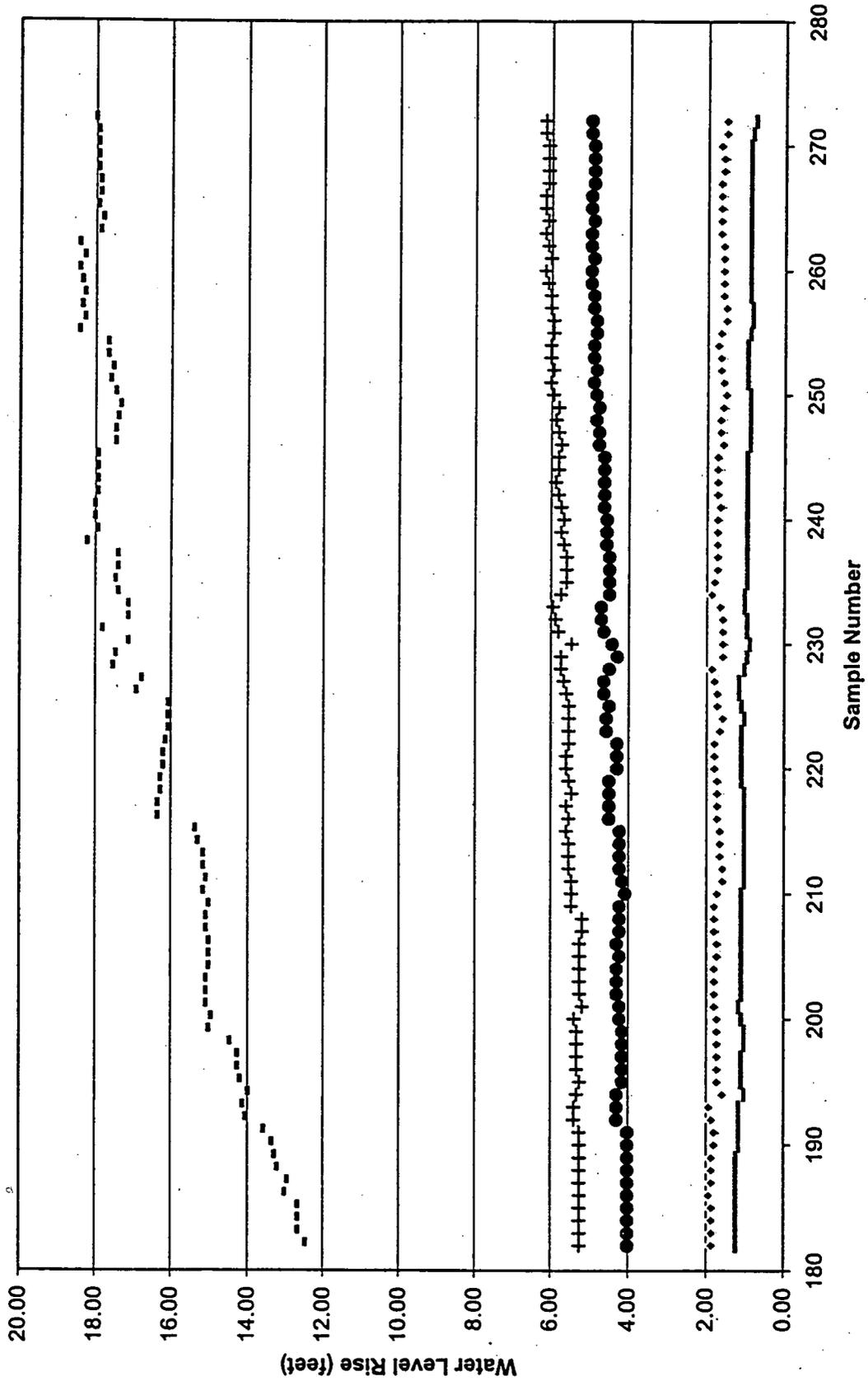


FIGURE 1. LOCATION OF RE-INJECTION WELLS

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Re-Injection Wells, Water Level Rise  
First Shift Nov. 01, 1998 to First Shift Dec. 01, 1998



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