MONTHLY OPERATING REPORT
RE-INJECTION DEMONSTRATION
DECEMBER 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 December 1998. It covers operation of the Re-Injection Demonstration from December 1, 1998 through January 1, 1999.

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

injectate sample collected in November, which include the radiological results, are provided in Table 1 of this report. A review of the radiological results from the sample collected in November indicates that all of the radiological constituent concentrations are below their respective FRLs.

Partial preliminary results from the injectate sample collected in December are provided in Table 2. All the results are provided except for Neptunium-237 and Strontium-90. These remaining two results for the December injectate sample are still pending from the offsite laboratory. A review of the preliminary data from December indicates that all of the constituent concentrations are below their respective FRLs. The initial results for Thorium-228 and -232 samples were non-detects. However, they are being re-analyzed to address a QC issue. It is expected that the new results will also turn out to be non-detects. Efforts continue to expedite the receipt of radiological results from the offsite laboratories in order to achieve a more timely reporting. The pending data for December 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 3 through 7.

Figure 2 illustrates the water level rise in each of the five re-injection wells from December 1, 1998 through January 1, 1999, as measured by the operators at the AWWT Expansion Facility Distributed Control System (DCS). Water levels are recorded three times per day. Water levels inside of the re-injection wells are monitored as an indicator of plugging within the wells. As a well screen becomes plugged, the water level in the well rises to compensate for the greater pressure needed to maintain a constant re-injection rate. During December, the water level rise recorded in four out of five of the re-injection wells was less than seven feet. The water level rise reached in IW-10 was approximately 22.5 feet. This well will probably be the next re-injection well which will need to be rehabilitated to address plugging.

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While it is not the intent of this report to discuss operational efficiency issues, the following information is provided to aid in the interpretation of Figure 2. There were two time periods in December when the re-injection system was not operating. Between sample numbers 321 and 328 (a time period of approximately 56 hours) all five re-injections wells were turned off. Turning off the re-injection wells during this time period had nothing to do with the need to rehabilitate the re-injection wells themselves. They were turned off to facilitate maintenance to the sparge ring in the AWWT Phase III Aeration Tank. The sparge ring is used to inject air, which promotes the precipitation of iron prior to groundwater entering the water treatment facility.

Between sample number 336 and 364 (a time period of approximately 224 hours) all five re-injection wells were again turned off. This outage was conducted to manage uranium concentrations in the site effluent discharge to the Great Miami River. The treated groundwater which would have normally been re-injected back into the aquifer was mixed with discharge going to the Great Miami River in an effort to meet uranium concentration limits.

WELL MAINTENANCE AND REHABILITATION

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

GROUNDWATER MONITORING RESULTS

Water quality samples for the Re-Injection Demonstration were collected in Decemberof 1998. Results will be reported as soon as they are available.

TABLE 1

ANALYSIS OF INJECTATE PRELIMINARY RESULTS
Sample Collected November 24, 1998

Constituents[a]	Result[b]	Groundwater FRL[c]	Detection Limit	Constituent Type[e]	Basis for FRL[f]
General Chemistry		**mg/L**			
Nitrate	0.454	11.0		MP	B
Inorganics		**mg/L**			
Antimony	U	0.006	0.003	N	A
Arsenic	U	0.05	0.0018	N	A
Barium	0.0502 B	2.0		N	A
Beryllium	U	0.004	0.0004	N	A
Cadmium	U	0.014	0.0004	N	B
Total Chromium	0.0012 B	0.022[d]		MP	R
Cobalt	0.0042 B	0.17		N	R
Lead	U	0.015	0.0009	N	A
Manganese	0.0053 B	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	0.0161 B	0.038		N	R
Zinc	0.0105	0.021		N	B
Radionuclides		**pCi/L**			
Neptunium-237	U	1.0	0.017	MP	R*
Radium-226	U	20.0	0.12	N	A
Strontium-90	U	8.0	0.54	MP	A
Thorium-228	U	4.0	0.16	N	R*
Thorium-232	U	1.2	0.16	N	R*
		µg/L			
Total Uranium	0.018 J	20.0		MP	A
Organics		**µg/L**			
Bis(2-ethylhexyl)phthalate	2 J B	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

[a]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.
[b]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 = Nondetect
[c]From Table 9-4 in OU5 ROD.
[d]FRL is for hexavalent chromium.
[e]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.
[f]A - Applicable or relevant and appropriate requirement based (MCL, PMCL, etc.).
B - Based on 95th percentile background concentrations.
R - Risk-based
R* - Risk-based radionuclide cleanup levels include constituent specific 95th percentile background concentration.

TABLE 2

ANALYSIS OF INJECTATE PRELIMINARY RESULTS
Sample Collected December 17, 1998

Constituents[a]	Result[b]	Groundwater FRL[c]	Detection Limit	Constituent Type[e]	Basis for FRL[f]
General Chemistry		**mg/L**			
Nitrate	0.377	11.0		MP	B
Inorganics		**mg/L**			
Antimony	U	0.006	0.0039	N	A
Arsenic	U	0.05	0.0025	N	A
Barium	0.0542 B	2.0		N	A
Beryllium	U	0.004	0.0003	N	A
Cadmium	U	0.014	0.0005	N	B
Total Chromium	U	0.022[d]	0.0018	MP	R
Cobalt	U	0.17	0.0034	N	R
Lead	U	0.015	0.0016	N	A
Manganese	0.0072 B	0.9		N	B
Mercury	U	0.002	0.00010	MP	A
Nickel	U	0.1	0.0158	N	A
Selenium	0.0045 B	0.05		N	A
Silver	U	0.05	0.0025	N	A
Vanadium	0.0128 B	0.038		N	R
Zinc	0.0179	0.021		N	B
Radionuclides		**pCi/L**			
Neptunium-237		1.0		MP	R*
Radium-226	U	20.0	0.11	N	A
Strontium-90		8.0		MP	A
Thorium-228	U	4.0	0.46	N	R*
Thorium-232	U	1.2	0.46	N	R*
		µg/L			
Total Uranium	0.058 J	20.0		MP	A
Organics		**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

[a]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.
[b]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.
J = Lab qualifier, means data is estimated.
U = Nondetect
[c]From Table 9-4 in OU5 ROD.
[d]FRL is for hexavalent chromium.
[e]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.
[f]A - Applicable or relevant and appropriate requirement based (MCL, PMCL, etc.).
B - Based on 95th percentile background concentrations.
R - Risk-based
R* - Risk-based radionuclide cleanup levels include constituent specific 95th percentile background concentration.

TABLE 3

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

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

Hours in reporting period[a] = 751.85
Hours not injecting[b] = 319.83
Hours injecting[c] = 432.02
Operational percent[d] = 57.5

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
9/98	8.16	206
10/98	5.78	203
11/98	8.47	196
12/98	5.76	222

[a]First operational shift reading on 12/01/98 to first operational shift reading on 01/01/99
[b]Downtime. System was off to facilitate maintenance in the aeration tank, and to achieve the discharge limit to the Great Miami River.
[c]Hours in reporting period -Hours not injecting
[d](Hours injecting / Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected / (Hours Injecting x 60)

TABLE 4

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

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

Hours in reporting period[a] = 743.98
Hours not injecting[b] = 303.98
Hours injecting[c] = 440.00
Operational percent[d] = 59.1

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
9/98	8.17	206
10/98	8.30	201
11/98	8.53	197
12/98	5.66	214

[a]First operational shift reading on 12/01/98 to first operational shift reading on 01/01/99
[b]Downtime. System was off to facilitate maintenance in the aeration tank, and to achieve the discharge limit to the Great Miami River.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting / Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected / (Hours Injecting x 60)

TABLE 5

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

Reference Elevation (feet AMSL) - 576.92 (top of casing)
Northing Coordinate ('83) - 476175.65
Easting Coordinate ('83) - 1348860.53

Hours in reporting period[a] = 744.15
Hours not injecting[b] = 305.35
Hours injecting[c] = 438.80
Operational percent[d] = 59.0

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
9/98	8.13	205
10/98	8.28	200
11/98	8.50	196
12/98	5.72	217

[a]First operational shift reading on 12/01/98 to first operational shift reading on 01/01/99
[b]Downtime. System was off to facilitate maintenance in the aeration tank, and to achieve the discharge limit to the Great Miami River.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting / Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected / (Hours Injecting x 60)

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TABLE 6

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

Reference Elevation (feet AMSL) - 577.14 (top of casing)
Northing Coordinate ('83) - 476422.82
Easting Coordinate ('83) - 1349386.92

Hours in reporting period[a] = 744.18
Hours not injecting[b] = 306.08
Hours injecting[c] = 438.10
Operational percent[d] = 58.9

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
9/98	8.39	211
10/98	8.29	199
11/98	8.50	197
12/98	5.68	216

[a]First operational shift reading on 12/01/98 to first operational shift reading on 01/01/99
[b]Downtime. System was off to facilitate maintenance in the aeration tank, and to achieve the discharge limit to the Great Miami River.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting / Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected / (Hours Injecting x 60)

TABLE 7

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

Reference Elevation (feet AMSL) - 583.01 (top of casing)
Northing Coordinate ('83) - 476518.64
Easting Coordinate ('83) - 1350105.39

Hours in reporting period[a] = 744.18
Hours not injecting[b] = 317.00
Hours injecting[c] = 427.18
Operational percent[d] = 57.4

Target Injection Rate = 200 gpm

Monthly Measurements		
Month	Million Gallons Injected[e]	Average Operating Injection Rate (gpm)[f]
9/98	8.12	205
10/98	8.27	201
11/98	8.53	197
12/98	5.61	219

[a]First operational shift reading on 12/01/98 to first operational shift reading on 01/01/99
[b]Downtime. System was off to facilitate maintenance in the aeration tank, and to achieve the discharge limit to the Great Miami River.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting / Hours in reporting period) x 100
[e]Summation of daily totalizer differences
[f]Million Gallons Injected / (Hours Injecting x 60)

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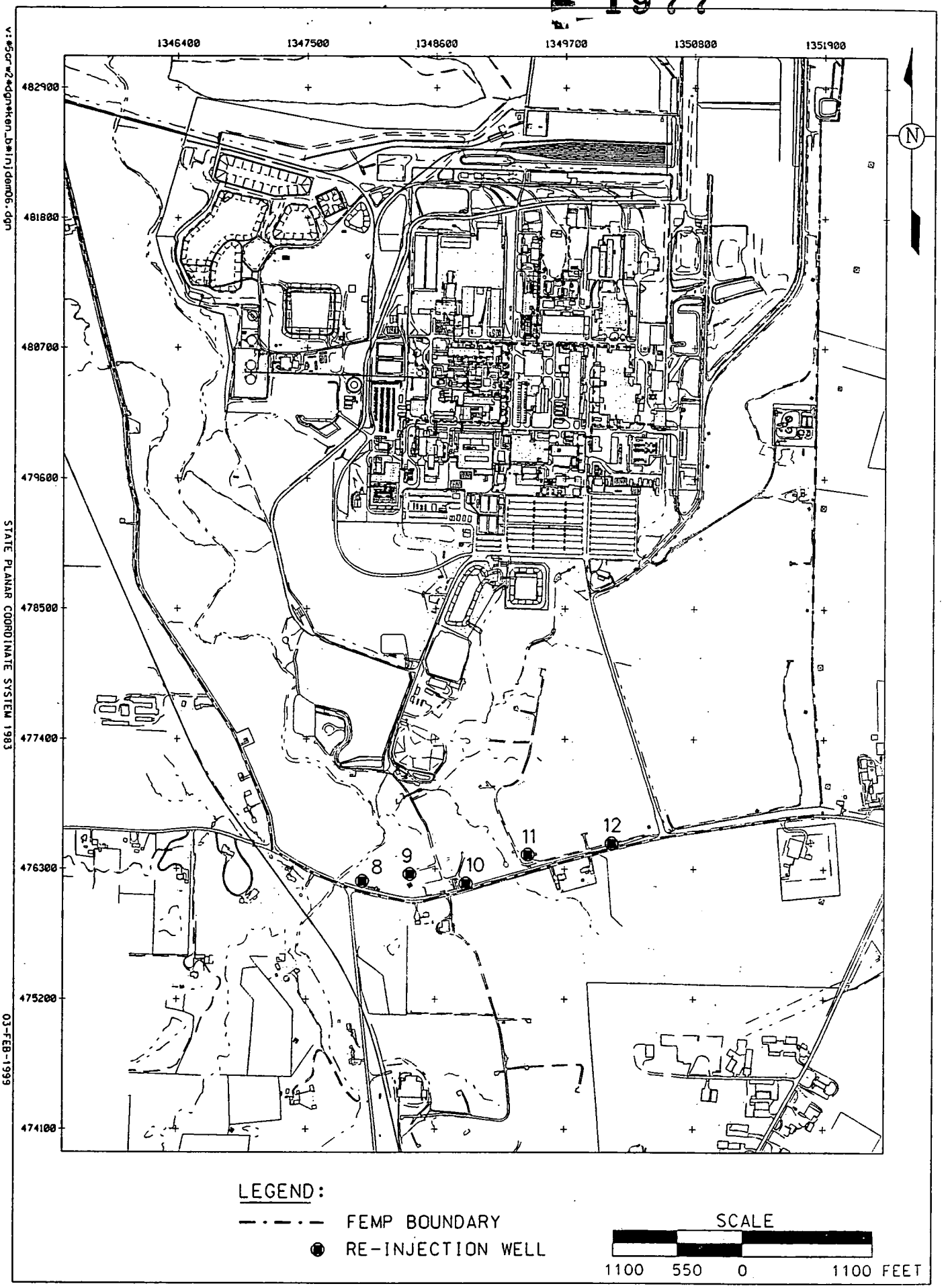

FIGURE 1. LOCATION OF RE-INJECTION WELLS

Figure 2.
Re-Injection Wells, Water Level Rise
First Shift Dec. 01, 1998 to First Shift Jan. 01, 1999