



Department of Energy

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NOV 19 1998

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0161-99

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th 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:

SEPTEMBER 1998 OPERATING REPORT FOR THE RE-INJECTION DEMONSTRATION

This correspondence submits the Re-Injection Demonstration Operation Report for the month of September 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) and Ohio Environmental Protection Agency (OEPA) Division of Drinking and Ground Waters - Underground Injection Control (UIC).

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

NOV 19 1998

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

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cc w/enclosure:

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**MONTHLY OPERATING REPORT
RE-INJECTION DEMONSTRATION
SEPTEMBER 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 and 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 September 1998. It covers operation of the Re-Injection Demonstration from September 2, 1998 through September 30, 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 AWWT Expansion Facility began operation on April 30, 1998. 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.

Monthly sampling of the injectate began in May. The monthly samples are being sent to an off-site laboratory for analysis. The laboratory has reported that due to an increased sample load received during the summer from all of its clients, contracted schedules for reporting analytical results are not being met. Reporting by the laboratory on FEMP injectate samples is currently running approximately 90 days later than what was contracted for.

The laboratory delay has affected FEMP reporting of the injectate results. May sampling results were reported on August 18, 1998 (Letter [DOE-1104-98] from Johnny W. Reising to James A Saric, U.S. EPA; Tom Schneider, Ohio EPA; and Mt. Val Orr, Ohio EPA). June sampling results were reported on October 8, 1998, (Letter [DOE-0009-99] from Johnny W. Reising to James A Saric, U.S. EPA; Tom Schneider, Ohio EPA; and Mt. Val Orr, Ohio EPA). The May and June injectate sampling results indicate that the treated groundwater currently being re-injected back into the Great Miami Aquifer do not contain any FRL constituent concentration exceedances.

Results for July and August are presented in Tables 1 and 2 respectively. Results for the July sample are complete with the exception of Radium-226. This sample has been re-run several times because the lab was outside of Quality Control requirements. Two previous results indicated that the value will come out to be < 1 pCi/L. Results from July and August indicate that the treated groundwater currently being re-injected back into the GMA do not contain any FRL constituent concentration exceedances. Results for the September injectate samples are still pending from the offsite laboratory. Now that the Re-injection Demonstration has begun, future injectate results will be included in the monthly operating reports. Efforts are being taken to expedite receipt of the results from the offsite laboratories, in order to achieve a more timely reporting.

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. The combined 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.

WELL MAINTENANCE AND REHABILITATION

No well maintenance or rehabilitation work was required or performed on the five re-injection wells during the month of September. Figure 2 illustrates the water level rise in each of the five re-injection wells, as measured by the operators at the AWWT Expansion Facility Distributed Control System (DCS). Water levels are recorded three times per day. The water level in Re-Injection Well 8 (which is an 8" diameter well) is rising at a greater rate than the other four re-injection wells. Re-Injection Well 9 is a 12" diameter well and the other three are 16" diameter wells. It is anticipated that maintenance work will need to be performed on Re-Injection Well 8 during the month of October.

GROUNDWATER MONITORING RESULTS

Groundwater quality sampling is taking place during the re-injection demonstration to monitor the morphology of the 20 $\mu\text{g/L}$ total uranium plume and to monitor the water chemistry of the aquifer in the area around the re-injection wells. The Re-Injection Demonstration Test Plan calls for the collection of water quality samples prior to the start of re-injection and then quarterly during the re-injection demonstration from the groundwater monitoring wells listed in the test plan. Sampling prior to the start of re-injection was conducted from August 17th to the 25th. Preliminary results are presented in Table 8. These preliminary pre-injection results will be compared to later post injection sampling results to determine how re-injection is affecting water chemistry in the Great Miami Aquifer. The next scheduled collection of water quality samples for the Re-Injection Demonstration is in December of 1998.

TABLE 1

ANALYSIS OF INJECTATE
Sample Collected July 28, 1998

| Constituents ^a | Result ^b | Groundwater FRL ^c | Detection Limit | Constituent Type ^e | Basis for FRL ^f |
|----------------------------|---------------------|------------------------------|-----------------|-------------------------------|----------------------------|
| General Chemistry | | mg/L | | | |
| Nitrate | 1.50 | 11.0 | | MP | B |
| Inorganics | | mg/L | | | |
| Antimony | U | 0.006 | 0.00090 | N | A |
| Arsenic | U | 0.05 | 0.00065 | N | A |
| Barium | 0.0562 | 2.0 | | N | A |
| Beryllium | U | 0.004 | 0.00002 | N | A |
| Cadmium | U | 0.014 | 0.00010 | N | B |
| Total Chromium | 0.00021 | 0.022 ^d | | MP | R |
| Cobalt | U | 0.17 | 0.00015 | N | R |
| Lead | U | 0.015 | 0.00048 | N | A |
| Manganese | 0.0019 | 0.9 | | N | B |
| Mercury | U | 0.002 | 0.001 | MP | A |
| Nickel | 0.007 | 0.1 | | N | A |
| Selenium | 0.00099 | 0.05 | | N | A |
| Silver | U | 0.05 | .00025 | N | A |
| Vanadium | U | 0.038 | .00020 | N | R |
| Zinc | .0015 | 0.021 | | N | B |
| Radionuclides | | pCi/L | | | |
| Neptunium-237 | U | 1.0 | 0.07 | MP | R* |
| Radium-226 | <1 ^g | 20.0 | | N | A |
| Strontium-90 | U | 8.0 | 1 | MP | A |
| Thorium-228 | 0.273 | 4.0 | | N | R* |
| Thorium-232 | 0.17 | 1.2 | | N | R* |
| Total Uranium | | µg/L | | | |
| Total Uranium | 0.619 | 20.0 | | MP | A |
| Organics | | µg/L | | | |
| Bis(2-ethylhexyl)phthalate | 2 J | 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 |

^aConstituents 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.

^bIf a duplicate sample was analyzed the highest concentration between the regular sample and duplicate sample is reported.
J = Lab qualifier, means data is estimated.

U = Undetect

^cFrom Table 9-4 in OU5 ROD.

^dFRL is for hexavalent chromium.

^eConstituent 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.

^fA - 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.

^gTentative result. Sample result outside of QC requirements.

TABLE 2
ANALYSIS OF INJECTATE
Sample Collected August 19, 1998

| Constituents ^a | Result ^b | Groundwater FRL ^c | Detection Limit | Constituent Type ^e | Basis for FRL ^f |
|----------------------------|---------------------|------------------------------|-----------------|-------------------------------|----------------------------|
| General Chemistry | | mg/L | | | |
| Nitrate | 0.740 J | 11.0 | | MP | B |
| Inorganics | | mg/L | | | |
| Antimony | 0.432 J | 0.006 | 0.00075 | N | A |
| Arsenic | U | 0.05 | 0.0005 | N | A |
| Barium | 0.0505 | 2.0 | | N | A |
| Beryllium | 0.000072 J | 0.004 | | N | A |
| Cadmium | U | 0.014 | 0.000294 | N | B |
| Total Chromium | U | 0.022 ^d | 0.000598 | MP | R |
| Cobalt | 0.000291 J | 0.17 | | N | R |
| Lead | 0.000603 J | 0.015 | | N | A |
| Manganese | 0.0339 | 0.9 | | N | B |
| Mercury | U | 0.002 | 0.000104 | MP | A |
| Nickel | 0.0173 J | 0.1 | | N | A |
| Selenium | U | 0.05 | 0.00139 | N | A |
| Silver | U | 0.05 | 0.000801 | N | A |
| Vanadium | U | 0.038 | 0.00294 | N | R |
| Zinc | U | 0.021 | 0.00787 | N | B |
| Radionuclides | | pCi/L | | | |
| Neptunium-237 | 0.115 | 1.0 | | MP | R* |
| Radium-226 | 0.196 | 20.0 | | N | A |
| Strontium-90 | 0.337 | 8.0 | | MP | A |
| Thorium-228 | U | 4.0 | 0.021 | N | R* |
| Thorium-232 | U | 1.2 | 0.004 | N | R* |
| Total Uranium | | μg/L | | | |
| Total Uranium | 0.349 | 20.0 | | MP | A |
| Organics | | μg/L | | | |
| Bis(2-ethylhexyl)phthalate | U | 6.0 | 4.95 | N | A |
| Carbon disulfide | U | 5.5 | 1.8 | N | A |
| 1,1-Dichloroethene | U | 7.0 | 0.7 | N | A |
| 1,2-Dichloroethane | U | 5.0 | 0.2 | MP | A |
| Trichloroethene | U | 5.0 | 0.6 | N | A |

^aConstituents 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.

^bIf a duplicate sample was analyzed the highest concentration between the regular sample and duplicate sample is reported. J = Lab qualifier, means data is estimated.

U = Undetect

^cFrom Table 9-4 in OU5 ROD.

^dFRL is for hexavalent chromium.

^eConstituent 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.

^fA - 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
SEPTEMBER 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 = 693.2
Hours not injecting^b = 32
Hours injecting^c = 661.2
Operational percent^d = 95.4

Target Injection Rate = 200 gpm

| Monthly Measurements | | |
|----------------------|---|-------------------------------------|
| Month | Million ^e Gallons Injected | Average Operating Injection Rate |
| 9/98 | 8.16 | 206 |

^aTime injection began on September 2nd to first operational shift reading on October 1, 1998

^bDowntime - Due to a lighting strike

^cHours in reporting period - Hours not injecting

^d(Hours injecting / Hours in reporting period) x 100

^eSummation of daily totalizer differences

^fMillion Gallons Injected / (Hours Injecting x 60)

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TABLE 4

RE-INJECTION WELL 22108 (IW-9)
 OPERATIONAL SUMMARY SHEET
 SEPTEMBER 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 = 693.12
 Hours not injecting^b = 32
 Hours injecting^c = 661.12
 Operational percent^d = 95.4

Target Injection Rate = 200 gpm

| Monthly Measurements | | |
|----------------------|---|-------------------------------------|
| Month | Million ^e Gallons Injected | Average Operating Injection Rate |
| 9/98 | 8.17 | 206 |

^aTime injection began on September 2nd to first operational shift reading on October 1, 1998

^bDowntime - Due to a lighting strike

^cHours in reporting period - Hours not injecting

^d(Hours injecting / Hours in reporting period) x 100

^eSummation of daily totalizer differences

^fMillion Gallons Injected / (Hours Injecting x 60)

TABLE 5

RE-INJECTION WELL 22109 (IW-10)
OPERATIONAL SUMMARY SHEET
SEPTEMBER 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 = 693.07
Hours not injecting^b = 32
Hours injecting^c = 661.07
Operational percent^d = 95.4

Target Injection Rate = 200 gpm

| Monthly Measurements | | |
|----------------------|---|-------------------------------------|
| Month | Million ^e Gallons Injected | Average Operating Injection Rate |
| 9/98 | 8.13 | 205 |

^aTime injection began on September 2nd to first operational shift reading on October 1, 1998

^bDowntime - Due to a lighting strike

^cHours in reporting period - Hours not injecting

^d(Hours injecting / Hours in reporting period) x 100

^eSummation of daily totalizer differences

^fMillion Gallons Injected / (Hours Injecting x 60)

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TABLE 6

RE-INJECTION WELL 22240 (IW-11)
OPERATIONAL SUMMARY SHEET
SEPTEMBER 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 = 693.55
Hours not injecting^b = 32
Hours injecting^c = 661.55
Operational percent^d = 95.4

Target Injection Rate = 200 gpm

| Monthly Measurements | | |
|----------------------|---|-------------------------------------|
| Month | Million ^e Gallons Injected | Average Operating Injection Rate |
| 9/98 | 8.39 | 211 |

^aTime injection began on September 2nd to first operational shift reading on October 1, 1998

^bDowntime - Due to a lighting strike

^cHours in reporting period - Hours not injecting

^d(Hours injecting / Hours in reporting period) x 100

^eSummation of daily totalizer differences

^fMillion Gallons Injected / (Hours Injecting x 60)

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TABLE 7

**RE-INJECTION WELL 22111 (IW-12)
OPERATIONAL SUMMARY SHEET
SEPTEMBER 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 = 693.62
Hours not injecting^b = 32
Hours injecting^c = 661.62
Operational percent^d = 95.4

Target Injection Rate = 200 gpm

| Monthly Measurements | | |
|----------------------|---|-------------------------------------|
| Month | Million ^e Gallons Injected | Average Operating Injection Rate |
| 9/98 | 8.12 | 205 |

^aTime injection began on September 2nd to first operational shift reading on October 1, 1998

^bDowntime - Due to a lighting strike

^cHours in reporting period - Hours not injecting

^d(Hours injecting / Hours in reporting period) x 100

^eSummation of daily totalizer differences

^fMillion Gallons Injected / (Hours Injecting x 60)

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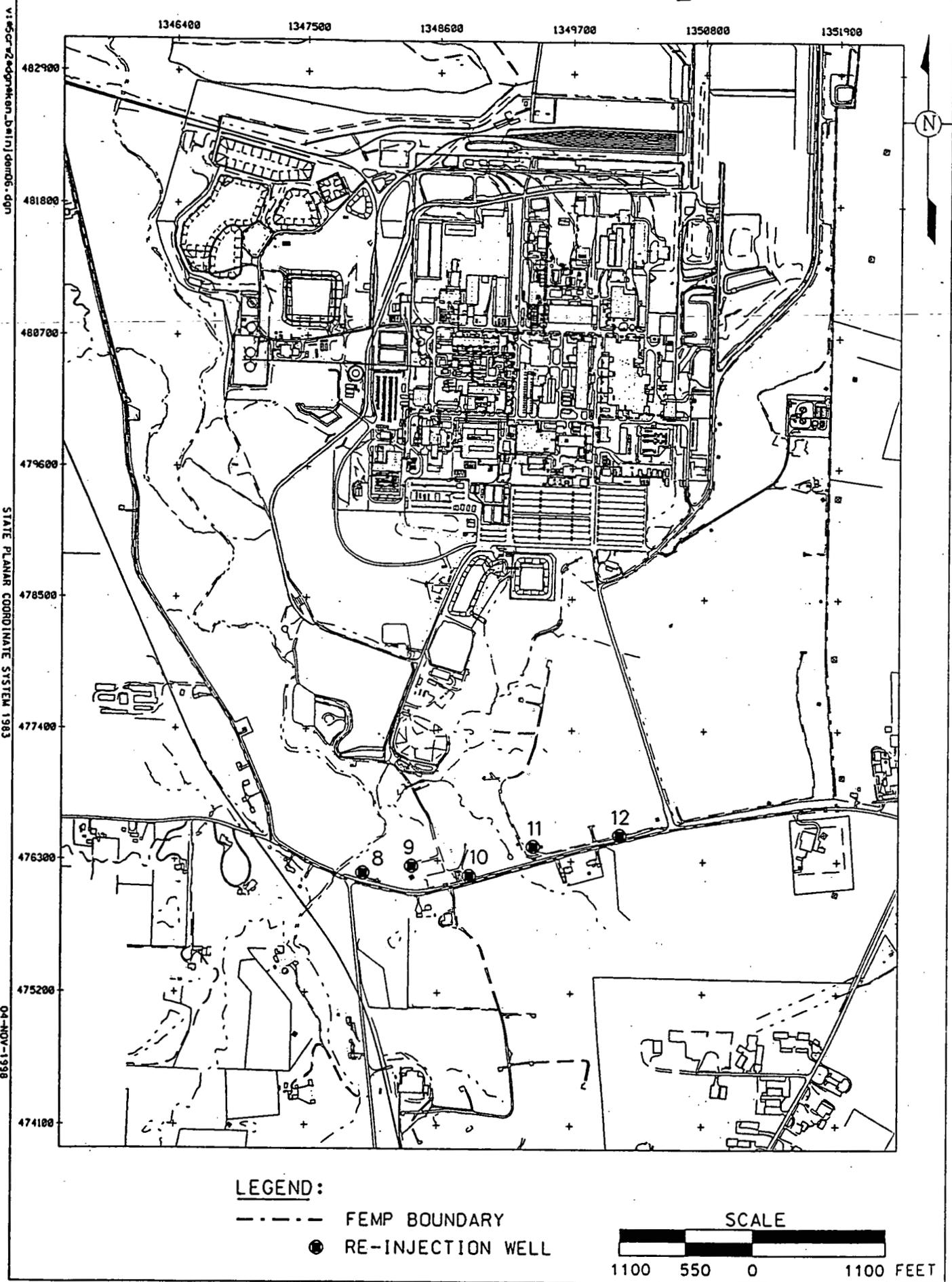


FIGURE 1. LOCATION OF RE-INJECTION WELLS

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Figure 2
Water Level Rise Within the Re-Injection Wells
September 2, 1998 through September 30, 1998

