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AUG 2 2 2001

DOE-0827-01

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

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

Ms. 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 Ms. Orr:

JUNE 2001 RE-INJECTION OPERATING REPORT

The purpose of this letter is to transmit, for your review and approval, the June 2001 Re-Injection Operating Report. The monthly re-injection reports are being submitted to the United States Environmental Protection Agency (USEPA) and Ohio Environmental Protection Agency (OEPA) Office of Federal Facilities Oversight in accordance with the Re-Injection Demonstration Test Plan. The monthly reports are also being submitted to the OEPA Division of Drinking and Ground Waters Unit of Underground Injection Control (UIC) in accordance with their guidelines.

If you have any questions or require additional information, please contact John Kappa at (513) 648-3149 or Robert Janke at (513) 648-3124.

Sincerely,

Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Kappa

Enclosure: As Stated

Recycled and Recyclable

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MONTHLY RE-INJECTION OPERATING REPORT JUNE 2001

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OVERVIEW

On September 2, 1999, DOE completed one year of active groundwater re-injection as part of a field-scale demonstration. A report detailing the demonstration was issued to the U.S. EPA and Ohio EPA on May 30, 2000.

Re-Injection at Fernald is exempted under 40 CFR 300.400(e)(1) from requiring a permit, as it is a CERCLA action. In accordance with Ohio EPA Guidelines (OEPA 1997), DOE will prepare monthly operating reports that include:

I. An analysis of the injectate
II. The volume and rate of re-injection
III. A description of any well maintenance and rehabilitation procedures conducted.

DOE will submit the monthly re-injection operating reports to the U.S. EPA, Ohio EPA Office of Federal Facilities Oversight, and the Division of Ohio EPA Drinking and Ground Waters – Underground Injection Control Unit. This report covers re-injection operations from June 1 to July 1, 2001.

Routine monitoring of the aquifer in the re-injection area is conducted as part of the groundwater remedy performance monitoring program specified in Fernald's Integrated Environmental Monitoring Plan. Results of the Integrated Environmental Monitoring Plan are reported quarterly and are available for viewing on the Fernald Website, www.fernald.gov.

ANALYSIS OF THE INJECTATE

Groundwater extracted from the Great Miami Aquifer is treated for uranium removal and is then re-injected into the Great Miami Aquifer. The groundwater is treated in the FEMP Advanced Waste Water Treatment (AWWT) Expansion Facility. The effluent from the AWWT Expansion Facility is sampled monthly for the parameters listed in Table 2-1 of the Re-Injection Demonstration Test Plan, Revision 0.

Monthly injectate grab sampling focuses on the groundwater final remediation level (FRL) constituents that have had an exceedance of their FRL in the region of the aquifer from which the groundwater is being pumped. The monthly injectate grab samples are sent to an off-site laboratory for analysis. In addition to the monthly grab sample, 24-hour composite samples are collected and analyzed at the on-site lab for uranium. The 24-hour composite sampler samples the combined effluent from the active treatment trains comprising the facility. The daily composite results are used by plant management for

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making process control decisions. They provide a daily evaluation of the quality of the water that is re-injected into the aquifer. Composite daily uranium results from the AWWT Expansion Facility effluent for days when re-injection occurred are shown in Figure 1.

The monthly grab sample was collected on June 5, 2001. Results are provided in Table 1. These results indicate that all the constituent concentrations are below their respective FRLs. The uranium concentration measured in the monthly grab sample was 1.91 µg/L. The FRL for uranium is 20 µg/L. The total uranium concentration of the daily composite sample also collected on June 5, 2001 was 2.00 µg/L.

VOLUME AND RATE OF RE-INJECTION

Only one of the five re-injection wells is currently available. The design re-injection set point for each of the re-injection wells is 200 gpm. The combined design re-injection rate for all five wells is 1000 gallons per minute. Figure 2 illustrates the location of the five re-injection wells; Tables 2 through 6 summarize the current calendar year's operational data by month. The tables also provide averages by year for the calendar years 1998, 1999, and 2000. Re-Injection Well 8 is 8 inches in diameter. Re-Injection Well 9 is 12 inches in diameter. The other re-injection wells are all 16 inches in diameter.

In February 2000, a new injection rate strategy was initiated to help compensate for well downtimes due to maintenance, electrical outages, etc. Injection rate set points may be temporarily increased to 220 gpm toward the end of a month and decreased to the 200 gpm rate at the start of a new month. The ability to increase re-injection rates is dependent upon the condition of the wells, availability of higher than average groundwater treatment capacity, and lower than normal uranium concentrations in the site effluent. This strategy for adjusting re-injection rate set points may continue in future months, depending on the variables noted above.

Figure 3 illustrates the water level rise in each of the operating re-injection wells from June 1 to July 1, 2001, as recorded by the operators at the AWWT Expansion Facility Distributed Control System (DCS). Water levels are recorded three times each day. Water levels inside the re-injection wells are monitored as an indicator of plugging within the wells. Given a constant re-injection rate, as a well becomes plugged, the water level in the well rises to compensate for the greater pressure needed to move the same volume of water through a smaller opening.

While it is not the intent of this report to discuss operational issues, the following information is provided to aid in the interpretation of Figures 1 and 3.

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SUMMARY OF SYSTEM OUTAGES FOR THE REPORTING PERIOD

For the month of June 2001, re-injection took place at a reduced rate due to outages of Re-Injection Wells 8, 9, 10, and 12. As depicted in Figure 1, Re-Injection Well 10 was down from June 5 through the end of the month due to plugging. Re-Injection Well 11 was down on June 21 due to a pump failure at the re-injection tank; the system was restarted on June 27, 2001.

SUMMARY OF WELL MAINTENANCE FOR THE REPORTING PERIOD

- Re-Injection Well 10 went offline on June 5, 2001 due to plugging.
- Re-Injection Wells 8, 9, and 12 were offline through the end of June 2001 as presented in Tables 2, 3, and 6, respectively.

NOTIFICATION OF SIGNIFICANT REDUCTION IN REINJECTION EFFICIENCY

The re-injection wells have been subject to increased residual plugging that has effectively stopped re-injection at Re-Injection Wells 8, 9, 10, and 12. The cessation of re-injection in these four wells has resulted in an overall well field reduction of 80 percent; the system has been re-injecting at roughly 200 gpm instead of the design rate of 1000 gpm.

While it is not within the scope of this report to detail both problem analysis and methods of solving this problem, steps currently underway include:

- On June 13, 2001, DOE received preliminary results from analysis of the water samples collected the week of May 21, 2001. Interpretation of the results, including recommendations regarding well treatments was received and discussed via teleconference on June 15, 2001. A key component of the recommended treatment is a polymeric acid enhancer called NW-310. NW-310 readily biodegrades and is used to treat potable water systems. Other acids were additionally recommended and may be used pending EPA and OEPA concurrence. A letter requesting concurrence with use of these additional chemicals was submitted the week of June 18, 2001.
- A report is being prepared to status and update the issues associated with these re-injection wells. The report will outline the rehabilitation efforts that have taken place to date, including an analysis of the project's successes and failures.
- If the plugging of the re-injection wells proves to be non-reversible, the FEMP will re-evaluate the re-injection program to determine whether the program still possesses significant cost savings with respect to the acceleration of the groundwater remedy.
- If supportable, DOE will explore the possibility of new injection wells, including the possibility of a new well design to allow periodic pumping from the re-injection well at rates of 100 gpm or greater.

More information, including information beyond the temporal scope of this report (e.g., more recent than June 2001), will be presented in the weekly site conference calls as it becomes available.

TABLE 1

ANALYSIS OF INJECTATE
Sample collected June 5, 2001

Constituents[a]	Result[b]	Groundwater FRL[e]	Detection Limit	Constituent Type[g]	Basis for FRL[h]
General Chemistry		mg/L			
Nitrate	0.37	11.0		MP	B
Inorganics		mg/L			
Antimony	U	0.006	0.0019	N	A
Arsenic[a]	U	0.05	0.0023	N	A
Barium	0.0530 B[c]	2.0		N	A
Beryllium	0.00025 B[c]	0.004		N	A
Cadmium	U	0.014	0.0003	N	B
Total Chromium	U	0.022[f]	0.0009	MP	R
Cobalt	U	0.17	0.0008	N	R
Lead	U	0.015	0.0026	N	A
Manganese	0.00069 B[c]	0.9		N	B
Mercury	U	0.002	0.0001	MP	A
Nickel	U	0.1	0.0012	N	A
Selenium	U	0.05	0.0026	N	A
Silver	U	0.05	0.0010	N	R
Vanadium	U	0.038	0.0007	N	R
Zinc	0.0013 B[c]	0.021		N	B
Radionuclides		pCi/L			
Neptunium-237	U	1.0	0.0108	MP	R*
Radium-226	1.29	20.0		N	A
Strontium-90	U	8.0	0.155	MP	A
Thorium-228	U	4.0	-0.00443	N	R*
Thorium-232	U	1.2	-0.000142	N	R*
		µg/L			
Total Uranium	1.91	20.0		MP	A
Organics		µg/L			
Bis(2-ethylhexyl)phthalate	0.5 J[d]	6.0		N	A
Carbon disulfide	U	5.5	1.0	N	A
1, 1-Dichloroethene	U	7.0	1.0	N	A
1, 2-Dichloroethane	U	5.0	1.0	MP	A
Trichloroethene	U	5.0	1.0	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.
U = Nondetect
[c]B = Lab qualifier. Reported result is greater than the instrument detection level but less than the contract required detection limit.
[d]J = Lab qualifier. Reported result is positvely detected but is estimated; the result is still usable for making decisions.
[e]From Table 9-4 in OU5 ROD.
[f]FRL is for hexavalent chromium.
[g]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.
[h]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

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RE-INJECTION WELL 22107 (IW-8) OPERATIONAL SUMMARY SHEET JUNE 2001

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

Hours in reporting period[a] = 720.00
Hours not injecting[b] = 720.00
Hours injecting[c] = 0.00
Operational percent[d] = 0.0

Target Injection Rate = 200 gpm

Monthly Measurements		
Month[e]	Million Gallons Injected[f]	Average Operating Injection Rate (gpm)[g]
1998	7.04	207
1999	7.21	199
2000	4.26	149
1/01	0.00	0
2/01	0.00	0
3/01	0.00	0
4/01	0.00	0
5/01	0.00	0
6/01	0.00	0

[a]First operational shift reading on June 1, 2001 to first operational shift reading on July 1, 2001.
[b]Downtime as noted in the text.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Average for calendar years 1998, 1999, and 2000
[f]Summation of daily totalizer differences
[g]Gallons Injected/(Hours Injecting x 60)

TABLE 3

RE-INJECTION WELL 22108 (IW-9)
OPERATIONAL SUMMARY SHEET
JUNE 2001

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

Hours in reporting period[a] = 720.00
Hours not injecting[b] = 720.00
Hours injecting[c] = 0.00
Operational percent[d] = 0.0

Target Injection Rate = 200 gpm

Monthly Measurements		
Month[e]	Million Gallons Injected[f]	Average Operating Injection Rate (gpm)[g]
1998	7.67	204
1999	6.64	188
2000	4.29	164
1/01	0.00	0
2/01	0.00	0
3/01	0.11	204
4/01	0.00	0
5/01	0.00	0
6/01	0.00	0

[a]First operational shift reading on June 1, 2001 to first operational shift reading on July 1, 2001.
[b]Downtime as noted in the text.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Average for calendar years 1998, 1999, and 2000
[f]Summation of daily totalizer differences
[g]Gallons Injected/(Hours Injecting x 60)

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TABLE 4

RE-INJECTION WELL 22109 (IW-10)
OPERATIONAL SUMMARY SHEET
JUNE 2001

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

Hours in reporting period[a] = 730.47
Hours not injecting[b] = 624.00
Hours injecting[c] = 106.47
Operational percent[d] = 17.0

Target Injection Rate = 200 gpm

Monthly Measurements		
Month[e]	Million Gallons Injected[f]	Average Operating Injection Rate (gpm)[g]
1998	7.66	204
1999	7.07	196
2000	3.96	149
1/01	2.72	206
2/01	6.27	199
3/01	7.82	200
4/01	7.81	201
5/01	8.01	199
6/01	1.28	201

[a]First operational shift reading on June 1, 2001 to first operational shift reading on July 1, 2001.
[b]Downtime as noted in the text.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Average for calendar years 1998, 1999, and 2000
[f]Summation of daily totalizer differences
[g]Gallons Injected/(Hours Injecting x 60)

TABLE 5

RE-INJECTION WELL 22240 (IW-11)
OPERATIONAL SUMMARY SHEET
JUNE 2001

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

Hours in reporting period[a] = 720.00
Hours not injecting[b] = 168.00
Hours injecting[c] = 552.00
Operational percent[d] = 77.0

Target Injection Rate = 200 gpm

Monthly Measurements		
Month[e]	Million Gallons Injected[f]	Average Operating Injection Rate (gpm)[g]
1998	7.72	206
1999	7.61	199
2000	6.38	196
1/01	5.97	200
2/01	6.26	199
3/01	7.76	196
4/01	7.68	202
5/01	8.03	201
6/01	6.61	200

[a]First operational shift reading on June 1, 2001 to first operational shift reading on July 1, 2001.
[b]Downtime as noted in the text.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Average for calendar years 1998, 1999, and 2000
[f]Summation of daily totalizer differences
[g]Gallons Injected/(Hours Injecting x 60)

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TABLE 6

RE-INJECTION WELL 22111 (IW-12)
OPERATIONAL SUMMARY SHEET
JUNE 2001

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

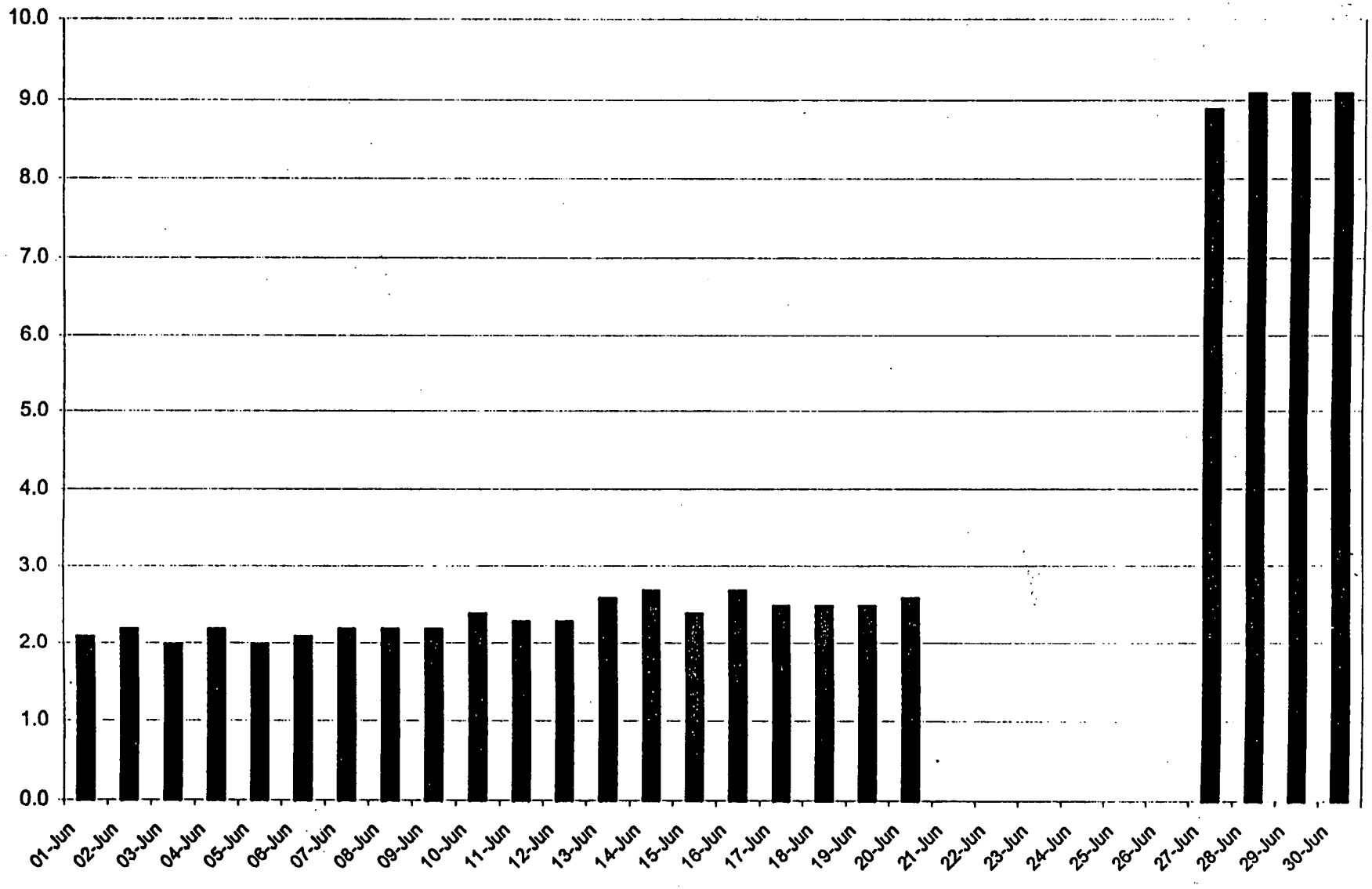
Hours in reporting period[a] = 720.00
Hours not injecting[b] = 720.00
Hours injecting[c] = 0.00
Operational percent[d] = 0.0

Target Injection Rate = 200 gpm

Monthly Measurements		
Month[e]	Million Gallons Injected[f]	Average Operating Injection Rate (gpm)[g]
1998	7.63	206
1999	7.55	198
2000	6.05	180
1/01	0.00	0
2/01	0.00	0
3/01	0.00	0
4/01	0.00	0
5/01	0.00	0
6/01	0.00	0

[a]First operational shift reading on June 1, 2001 to first operational shift reading on July 1, 2001.
[b]Downtime as noted in the text.
[c]Hours in reporting period - Hours not injecting
[d](Hours injecting/Hours in reporting period) x 100
[e]Average for calendar years 1998, 1999, and 2000
[f]Summation of daily totalizer differences
[g]Gallons Injected/(Hours Injecting x 60)

Figure 1
AWWT Expansion 1800 System Effluent Total Uranium Concentration (µg/L) on Days when Re-Injection Occurred



Note: Down times are discussed in the text.

Jun01 awwt expansion effluent.xls Chart1 08/14/2001 8:26 AM

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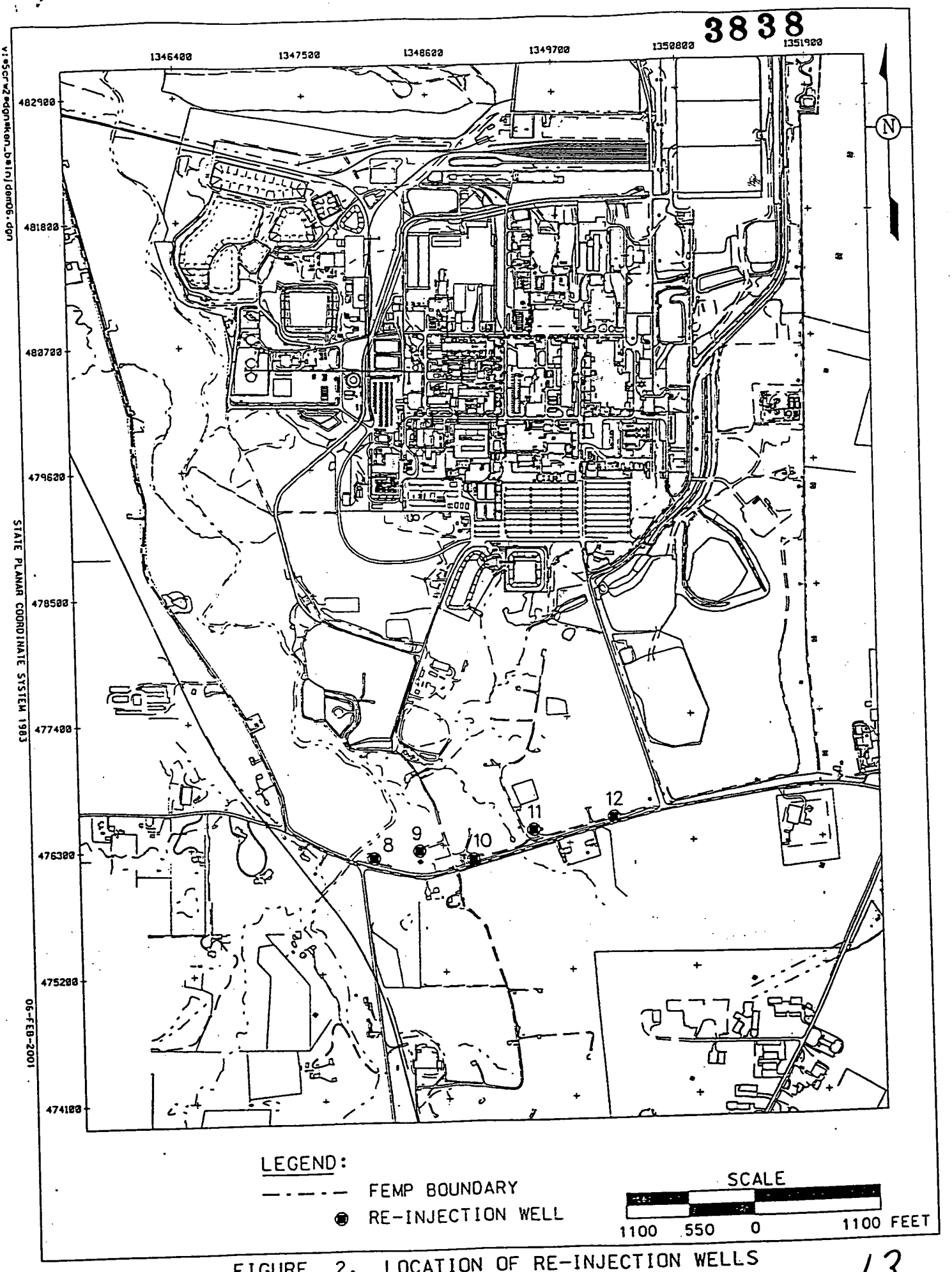
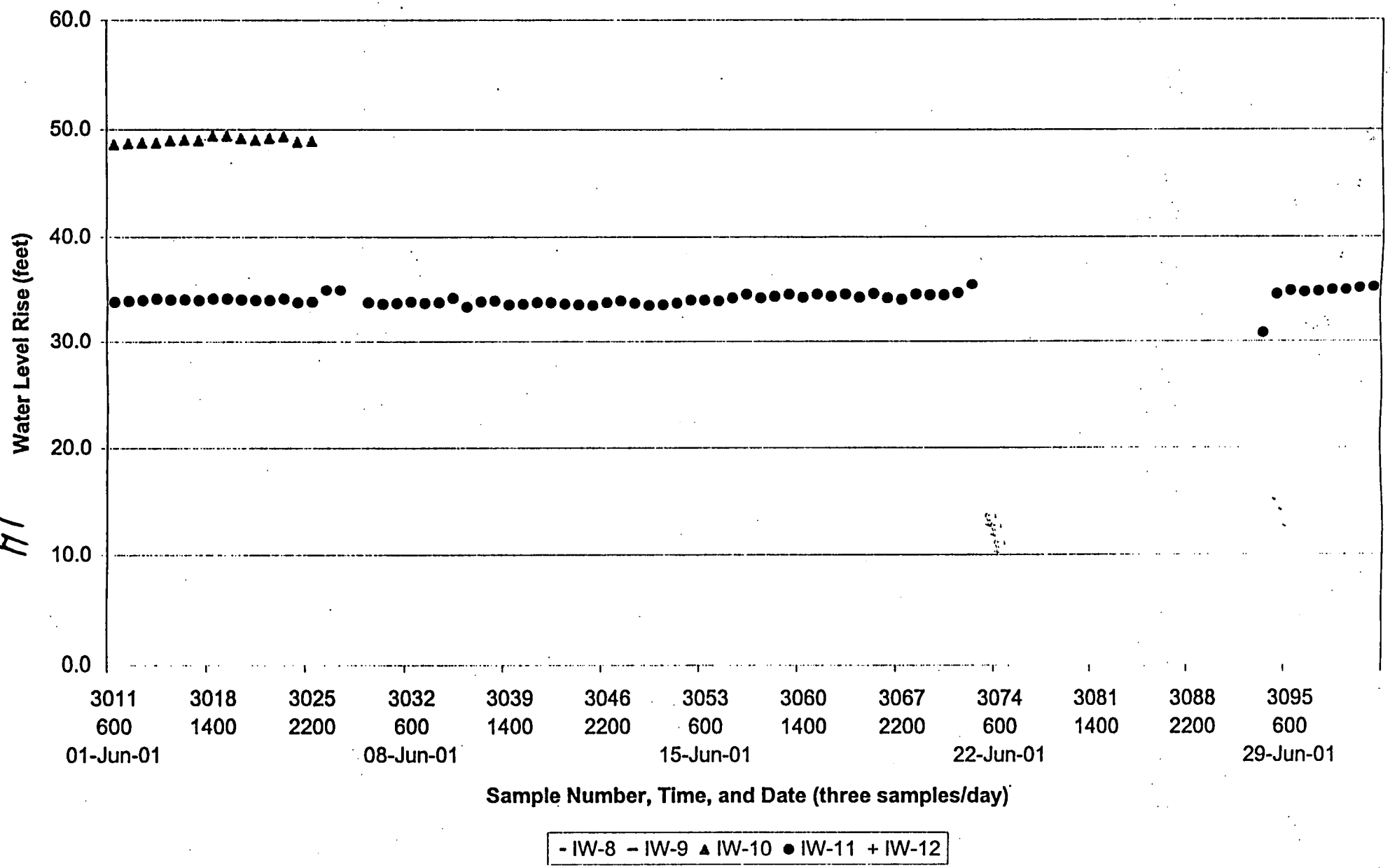


FIGURE 2. LOCATION OF RE-INJECTION WELLS

Figure 3
Re-Injection Wells, Water Level Rise
First Shift on June 1, 2001 (Sample Number 3011) to First Shift on July 1, 2001 (Sample Number 3100)



0106Inj-tab.xls Chart2 08/14/2001 8:25 AM