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OCT 17 2000

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-0053-01

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 45316-1049

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

JULY 2000 RE-INJECTION OPERATING REPORT

This correspondence submits the Re-Injection Operation Report for the month of July 2000.

As specified in the Re-Injection Demonstration Test Plan, monthly re-injection operating reports 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 - UIC Unit.

If you have any questions regarding this submittal, please contact Robert Janke at (513) 648-3124.

Sincerely,

Johnny W. Reising
Fernald Remedial Action
Project Manager

Enclosure

cc: w/enclosure
R.J. Janke, OH/FEMP
G. Jablonowski, USPEA-V, SRF-5J
T. Schneider, OEPA-Dayton (three copies of enclosure)
F. Bell, ATSDR
F. Hodge, Tetra Tech
M. Schupe, HSI GeoTrans
R. Vandegrift, ODH
D. Brettschneider, Fluor Fernald, Inc./52-5
K. Broberg, Fluor Fernald, Inc./52-5
W. Hertel, Fluor Fernald, Inc./52-5
M. Jewett, Fluor Fernald, Inc./52-2
R. White, Fluor Fernald, Inc./52-5
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J. Harmon, Fluor Fernald, Inc./90
S. Hinnefeld, Fluor Fernald, Inc./31
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T. Walsh, Fluor Fernald, Inc./65-2
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MONTHLY RE-INJECTION OPERATING REPORT JULY 2000

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. Based on the results of the demonstration, re-injection will continue at Fernald.

Re-Injection at Fernald is exempted under 40 CFR 300.400(e)(1) from requiring a permit, as it is a CERCLA action. Per 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.

Routine monitoring of the aquifer in the re-injection area is conducted for the Integrated Environmental Monitoring Program. Results of the Integrated Monitoring Program are reported quarterly and are available for viewing on the Fernald Website, www.fernald.gov.

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 July 1, 2000 to August 1, 2000.

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 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 for uranium. The 24-hour composite

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sampler samples the combined effluent from the active treatment trains comprising the facility. The daily composite results are used by plant management for 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 are shown in Figure 1.

The monthly grab sample was collected on July 18, 2000. 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 grab sample was 6.26 μg/L. The FRL for uranium is 20 μg/L. The uranium concentration of the grab sample collected on July 18, 2000 compares favorably with the 24-hour composite sample collected also collected on July 18, 2000. That result was 6.7 μg/L total uranium.

VOLUME AND RATE OF RE-INJECTION

Treated groundwater is being re-injected into the Great Miami Aquifer in five re-injection wells. 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. 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 of 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 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 available treatment capacity and uranium concentrations in the site effluent.

Figure 3 illustrates the water level rise in each of the five re-injection wells from July 1, 2000 to August 1, 2000, as measured 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 screen 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.

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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.

SUMMARY OF SYSTEM OUTAGES FOR THE REPORTING PERIOD

For the month of July 2000, the re-injection system was inoperative during the following intervals:

- From July 1 to July 4, 2000 (sample numbers 2006-2019 [on Figure 3]) the re-injection system was shut down because the AWWT Phase III combined flow concentration was greater than the 10 µg/L total uranium administrative action level.
- From July 11 to July 17, 2000 (sample numbers 2036-2054 [on Figure 3]) all wells in the re-injection system were shut down due to an electrical outage affecting all treatment and extraction systems. Restart of re-injection was delayed until after Phase III of the AWWT facility was brought on line in order to evaluate uranium discharge concentrations.
- From July 20 to July 23, 2000 (sample numbers 2063-2074 [on Figure 3]) the re-injection system was shut down because Phase III of the AWWT facility was down due to water in the air supply and DCS problems. Restart of re-injection was delayed until Phase III discharge total uranium concentrations were less than the 10 µg/L administrative action level.
- On July 29, 2000 (sample numbers 2090-2092 [on Figure 3]) the re-injection system was down for part of the day to replace lightning arrestors in the injection tank feed pumps.

SUMMARY OF WELL MAINTENANCE FOR THE REPORTING PERIOD

After ion exchange resin was found in Re-Injection Well 8 in May, four (wells 8, 9, 10, and 12) of the five re-injection wells were chemically treated and rehabilitated; that is, the wells were treated for plugging and any resin present was removed. In July, chemical treatment/rehabilitation procedures were completed on three wells (wells 9, 10, and 12) as described below.

- Re-Injection Well 8 was turned off on July 20, 2000 (sample number 2064) during second shift due to high water level. For the remainder of the month, Re-Injection Well 8 was off while awaiting rehabilitation.
- Re-Injection Well 9 was turned off for chemical treatment and rehabilitation from July 10 to July 17, 2000 (sample numbers 2033 to 2054). The surge/airlift equipment was removed on July 18, 2000. The well was treated using approximately 5 gallons of sodium hypochlorite with a concentration of 12.5 percent chlorine. The volume pumped from the well during treatment was approximately 8,025 gallons.
- Re-Injection Well 10 was turned off for chemical treatment and rehabilitation from June 28 to July 6, 2000 (sample numbers 1997 to 2020). The well was treated using approximately seven gallons of sodium hypochlorite with a concentration of 12.5 percent chlorine. The volume pumped from the well during treatment was approximately 8,700 gallons.

- Re-Injection Well 12 was turned off for chemical treatment and rehabilitation from July 18 through July 27, 2000 (sample numbers 2057 to 2086). A larger quantity of resin was recovered from Re-Injection Well 12 than from Re-Injection Wells 8, 9, or 10. Additional airlifting and surging above the effort applied at the other re-injection wells was required to remove the resin from Re-Injection Well 12. The surge/airlift equipment was removed on July 31, 2000. The well was treated using approximately 33.5 gallons of sodium hypochlorite with a concentration of 12.5 percent chlorine. The volume pumped from the well during treatment was approximately 11,400 gallons.

ADDITIONAL INFORMATION

The June 2000 re-injection monthly report contained several errors, which are enumerated below:

1. Table 1, Analysis of Injectate, for a sample collected June 27, 2000, erroneously reported the arsenic concentration as 0.000117B mg/L. The correct number is 0.00146B mg/L arsenic, which is still below the 0.05 mg/L FRL for this constituent.

2. Table 4, Re-Injection Well 22109 (IW-10) Operational Summary Sheet, June 2000, erroneously reported 604.30 hours not injecting, 124.22 hours injecting, and 17.0 operational percent. The correct numbers are: 618.00 hours not injecting, 110.52 hours injecting, and 15.2 operational percent.

3. Table 4 also erroneously reported the Average Operating Injection Rate as 169 gallons per minute (gpm); the correct number is 190 gpm and has been placed in the attached version of Table 4.

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TABLE 1

ANALYSIS OF INJECTATE
Sample Collected July 18, 2000

Constituents[a]	Result[b]	Groundwater FRL[c]	Detection Limit	Constituent Type[e]	Basis for FRL[f]
General Chemistry		**mg/L**			
Nitrate	0.300 J	11.0		MP	B
Inorganics		**mg/L**			
Antimony	U	0.006	0.00068	N	A
Arsenic	0.00153 B	0.05		N	A
Barium	0.04814 B	2.0		N	A
Beryllium	U	0.004	0.00001	N	A
Cadmium	0.00024 B	0.014		N	B
Total Chromium	0.00072 B	0.022[d]		MP	R
Cobalt	0.00026 B	0.17		N	R
Lead	0.00015 B	0.015		N	A
Manganese	0.00163 B	0.9		N	B
Mercury	0.00008 B	0.002		MP	A
Nickel	0.00130 B	0.1		N	A
Selenium	0.00105 B	0.05		N	A
Silver	0.00056 B	0.05		N	R
Vanadium	0.00109 B	0.038		N	R
Zinc	0.00199 B	0.021		N	B
Radionuclides		**pCi/L**			
Neptunium-237	U	1.0	0.00971	MP	R*
Radium-226	1.42	20.0		N	A
Strontium-90	U	8.0	-0.0184	MP	A
Thorium-228	U	4.0	0.0297	N	R*
Thorium-232	U	1.2	0.00	N	R*
		µg/L			
Total Uranium	6.26	20.0		MP	A
Organics		**µg/L**			
Bis(2-ethylhexyl)phthalate	U	6.0	5.0	N	A
Carbon disulfide	U	5.5	5.0	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
B = Lab qualifier (inorganic). Reported result is greater than the instrument detection level but less than the contract required detection limit.

[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

RE-INJECTION WELL 22107 (IW-8)
OPERATIONAL SUMMARY SHEET
JULY 2000

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

Hours in reporting period[a] = 746.42
Hours not injecting[b] = 546.00
Hours injecting[c] = 200.46
Operational percent[d] = 26.9

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
1/99	5.35	227
2/99	7.06	196
3/99	7.34	205
4/99	7.75	197
5/99	7.46	216
6/99	8.42	197
7/99	8.93	201
8/99	8.64	199
9/99	3.92	181
10/99	7.86	199
11/99	6.54	196
12/99	7.28	178
1/00	7.74	192
2/00	8.85	212
3/00	9.22	208
4/00	4.07	190
5/00	0	0
6/00	5.70	181
7/00	2.44	203

[a]First operational shift reading on July 1, 2000 to first operational shift reading on August 1, 2000.
[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]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)

TABLE 3

RE-INJECTION WELL 22108 (IW-9)
OPERATIONAL SUMMARY SHEET
JULY 2000

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

Hours in reporting period[a] = 746.30
Hours not injecting[b] = 609.00
Hours injecting[c] = 137.30
Operational percent[d] = 18.4

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
1/99	4.33	181
2/99	6.07	156
3/99	5.93	178
4/99	6.66	184
5/99	7.83	200
6/99	8.41	197
7/99	8.79	198
8/99	8.63	198
9/99	5.68	187
10/99	7.80	198
11/99	6.54	185
12/99	3.08	189
1/00	6.12	212
2/00	8.78	218
3/00	9.22	206
4/00	7.54	202
5/00	1.42	164
06/00	5.75	183
07/00	1.57	190

[a]First operational shift reading on July 1, 2000 to first operational shift reading on August 1, 2000.
[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]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)

TABLE 4

RE-INJECTION WELL 22109 (IW-10)
OPERATIONAL SUMMARY SHEET
JULY 2000

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

Hours in reporting period[a] = 734.58
Hours not injecting[b] = 520.00
Hours injecting[c] = 214.58
Operational percent[d] = 29.2

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
1/99	5.48	229
2/99	8.09	208
3/99	8.13	204
4/99	5.35	190
5/99	8.25	197
6/99	8.36	196
7/99	8.81	199
8/99	8.52	196
9/99	1.97	169
10/99	7.79	198
11/99	6.47	183
12/99	7.58	186
1/00	8.72	195
2/00	6.61	233
3/00	9.11	204
4/00	7.47	200
5/00	1.43	165
06/00	1.26	190
07/00	2.63	204

[a]First operational shift reading on July 1, 2000 to first operational shift reading on August 1, 2000.
[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]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)

TABLE 5

RE-INJECTION WELL 22240 (IW-11)
OPERATIONAL SUMMARY SHEET
JULY 2000

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

Hours in reporting period[a] = 746.33
Hours not injecting[b] = 415.00
Hours injecting[c] = 331.33
Operational percent[d] = 44.4

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
1/99	5.53	230
2/99	8.06	208
3/99	8.04	204
4/99	7.56	192
5/99	8.34	199
6/99	8.42	197
7/99	8.85	199
8/99	8.65	199
9/99	5.64	186
10/99	7.91	200
11/99	6.67	189
12/99	7.62	187
1/00	8.86	198
2/00	8.76	217
3/00	9.19	206
4/00	7.53	201
5/00	1.41	163
6/00	5.77	184
7/00	3.94	198

[a]First operational shift reading on July 1, 2000 to first operational shift reading on August 1, 2000.
[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]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)

TABLE 6

RE-INJECTION WELL 22111 (IW-12)
OPERATIONAL SUMMARY SHEET
JULY 2000

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

Hours in reporting period[a] = 746.37
Hours not injecting[b] = 629.00
Hours injecting[c] = 117.37
Operational percent[d] = 15.7

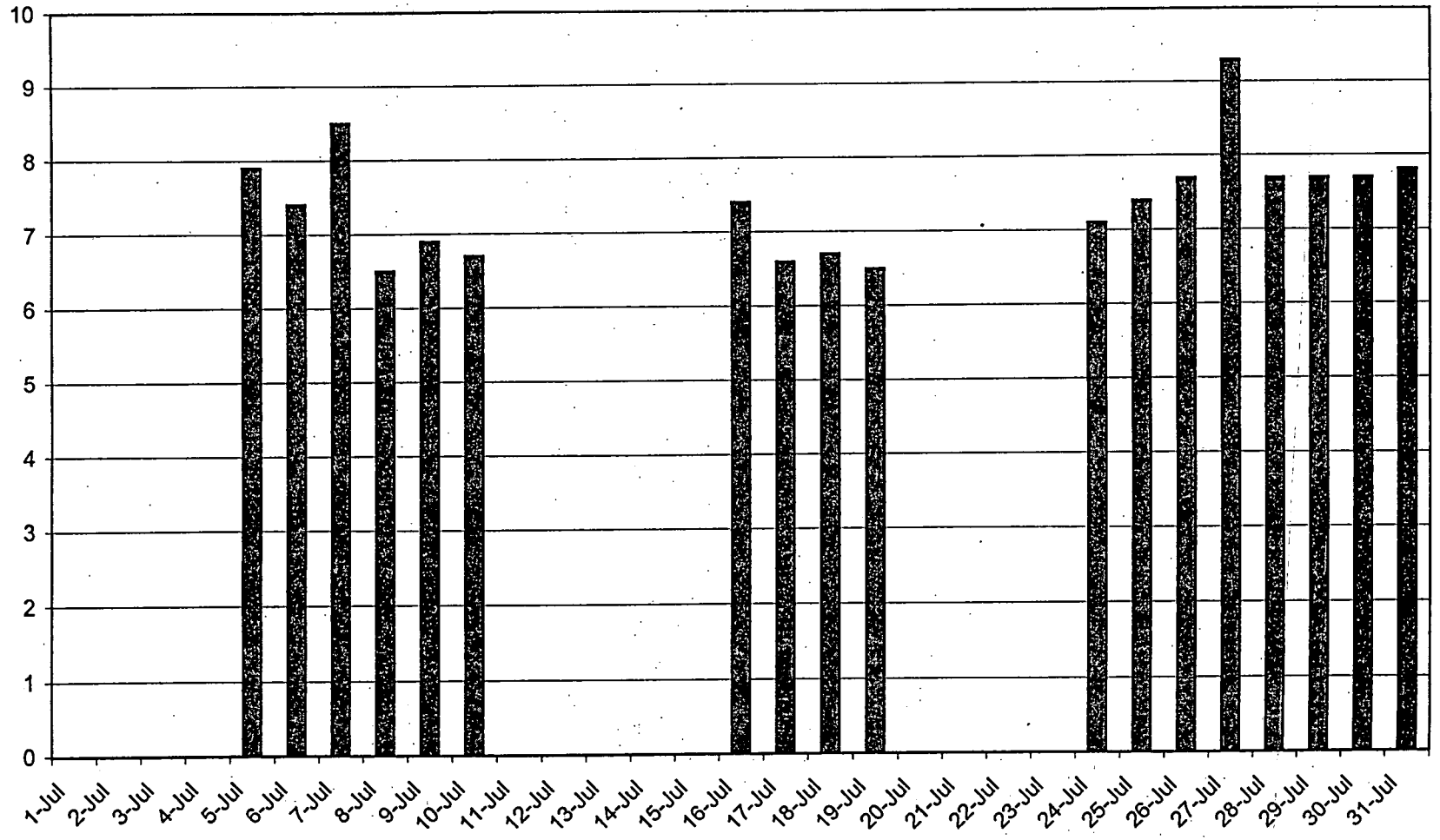
Target Injection Rate = 200 gpm

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
1/99	5.08	212
2/99	8.06	208
3/99	8.13	203
4/99	7.65	195
5/99	8.27	197
6/99	8.42	197
7/99	8.80	198
8/99	8.67	199
9/99	5.66	187
10/99	7.82	198
11/99	6.65	188
12/99	7.41	198
1/00	8.84	198
2/00	8.77	217
3/00	9.19	206
4/00	7.52	201
5/00	1.45	166
6/00	5.74	183
7/00	1.38	196

[a]First operational shift reading on July 1, 2000 to first operational shift reading on August 1, 2000.
[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]Summation of daily totalizer differences
[f]Million Gallons Injected/(Hours Injecting x 60)

Figure 1

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



Note: Down times are now discussed in the text.

july00 awwt expansion effluent Chart1 10/4/00 11:38 AM

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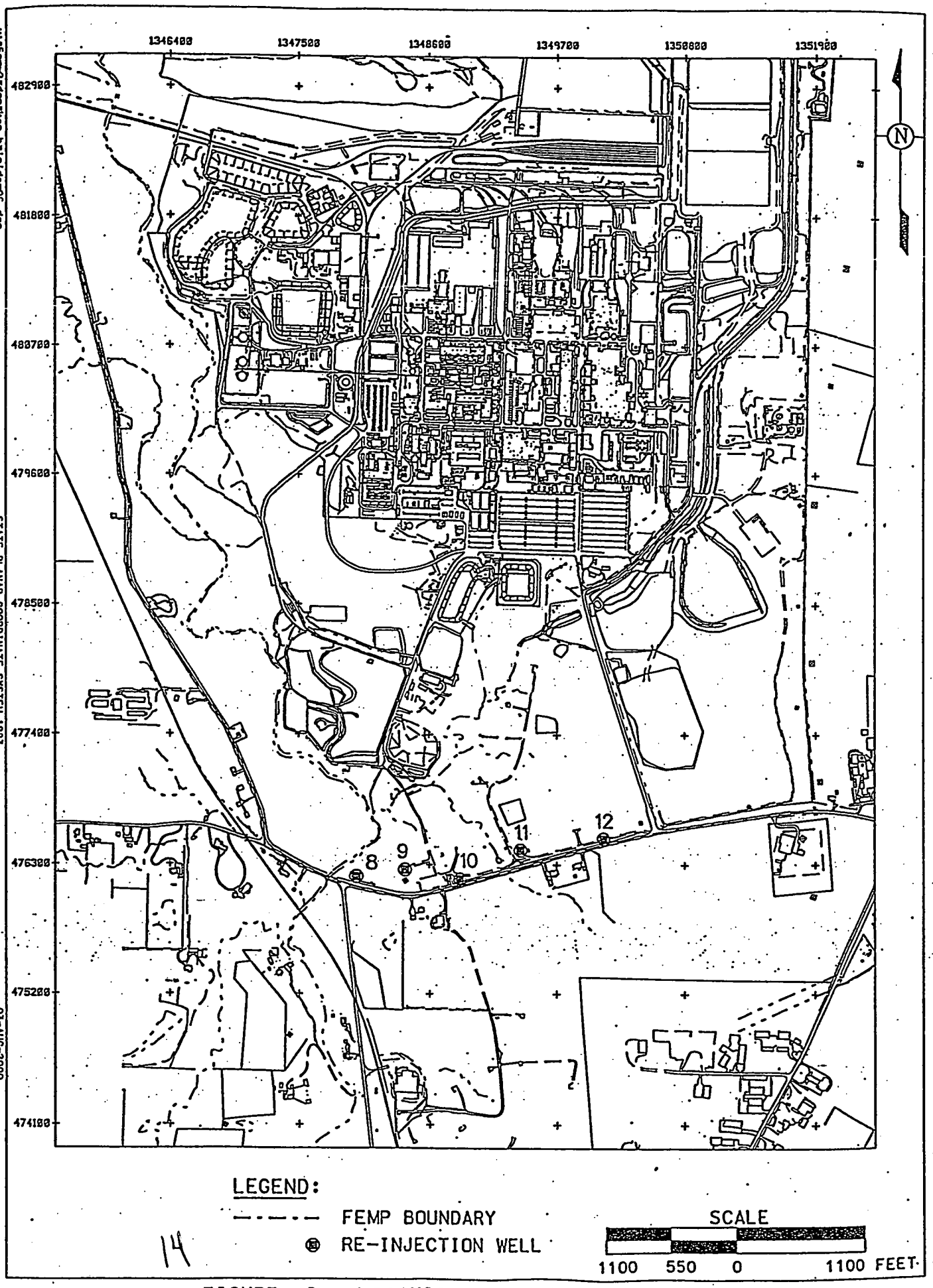
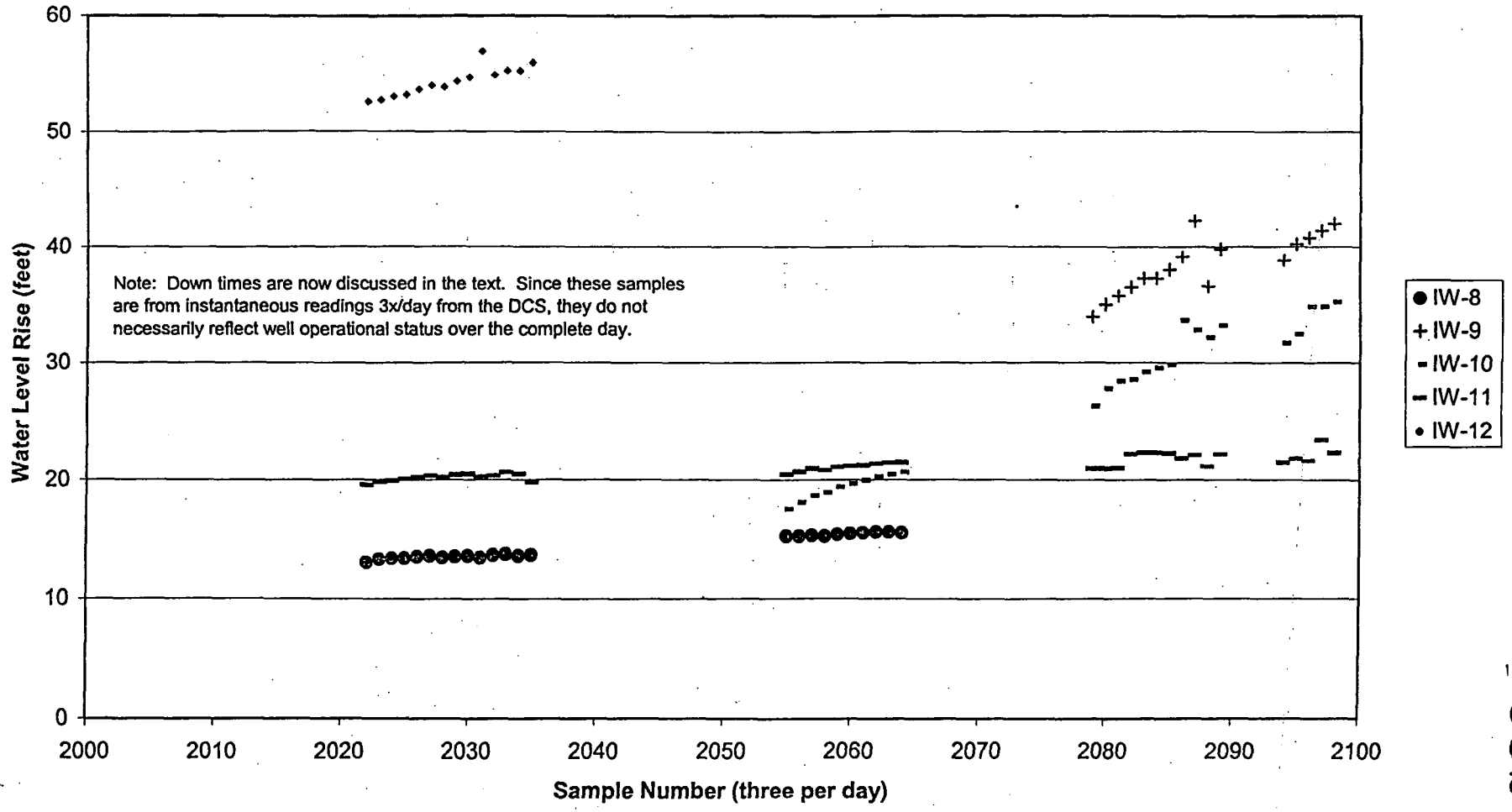


FIGURE 2. LOCATION OF RE-INJECTION WELLS

Figure 3

Re-Injection Wells, Water Level Rise
First Shift on July 1, 2000 to First Shift on August 1, 2000



700inj-tab Chart2 10/4/00 11:38 AM