Department of Energy
Office of Legacy Management

May 9, 2007

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. Thomas Schneider, Project Manager
Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

Subject: TRANSMITTAL OF RESPONSES TO OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE 2005 SITE ENVIRONMENTAL REPORT

References: 1) Letter, T. Schneider to J. Reising, "Ohio Environmental Protection Agency Comments on the 2005 Site Environmental Report and Summary," dated August 8, 2006

2) Letter, J. Saric to J. Reising, "2005 Site Environmental Report," dated July 6, 2006.

Enclosed for your review and approval are responses to Ohio Environmental Protection Agency (OEPA) comments on the 2005 Site Environmental Report (Reference 1). Note that the EPA found the information in the report to be adequate (Reference 2).

A previous version of these responses was submitted informally to OEPA and Geotrans (via email) on September 13, 2006. The attached responses incorporate several months of back-and-forth communication with Geotrans concerning an approach to how annual leachate collection system (LCS) monitoring results will be evaluated to decide if a monitoring constituent needs to be added to the to the site specific leak detection monitoring list for the Fernald On-Site Disposal Facility (OSDF).

If you have any questions regarding this matter, please call me at 513-648-3148.

Jane Powell

Jane Powell,
Fernald Site Manager
DOE-LM-20.1

Enclosures

c w/enclosure::
M. Cullerton, Tetra Tech
M. Murphy, USEPA-V, A-18J
T. Schneider, OEPA (3 copies of enclosure)
Project Record File FER030.1(A) (thru W. Sumner)

cc w/o enclosure:
K. Broberg, Stoller
B. Hertel, Stoller
F. Johnston, Stoller
G. Lupton, Stoller

OHIO ENVIRONMENTAL PROTECTION AGENCY
COMMENTS ON THE
2005 SITE ENVIRONMENTAL REPORT

FERNALD CLOSURE PROJECT
FERNALD, OHIO

MAY 2007

U.S. DEPARTMENT OF ENERGY

OHIO ENVIRONMENTAL PROTECTION AGENCY
COMMENT ON THE 2005 SITE ENVIRONMENTAL REPORT
APPENDICES A THROUGH D – MAY 2006

ORIGINAL COMMENTS:

1. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.2 Pg #: A.2-2 Line #: 17 Code: C
Original Comment #: 1
Comment: The text should note that although the bioaccumulation of manganese appears to be occurring around a couple of monitoring wells, confirmational testing has not been conducted to verify this assumption.
Response: Groundwater samples obtained in 2005 from direct push locations next to Monitoring Wells 2010 and 2648 confirm that manganese concentrations measured in Monitoring Wells 2010 and 2648 are considerably higher than manganese concentrations measured in direct push samples collected near the monitoring wells. Monitoring for manganese will continue in the Waste Storage Area and additional testing will be considered (including microbiological testing) should manganese concentrations in the area not respond to the remedy as predicted.
Action: No action required.

2. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.2 Pg #: A.2-3 Line #: 29 Code: C
Original Comment #: 2
Comment: Previous data in the clear well area indicates the presence of perched groundwater contamination. The observed high total uranium concentrations may, therefore, be related to seasonal perched groundwater conditions.
Response: Seasonal perched groundwater conditions could be the cause, but data is not conclusive. Groundwater conditions in the area where the former clear well was located will continue to be monitored.
Action: As stated in the response

3. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.2 Pg #: A.2-6 Line #: 24 Code: C
Original Comment #: 3
Comment: The area defined by direct push locations 12373(K) and 13269 is in the stagnation zone that was intensified by the discontinuance of re-injection along the fence line. The additional direct-push sampling effort noted in the text should focus on delineating the southward extent of the elevated concentrations. Comparison of the 100.7 µg/L concentration measured in GeoProbe 12196A measured in 2005 to the 0.7 concentration measured in 1996 shows that the current position of the plume's leading edge at this location is unknown.
Response: An objective of direct push sampling in 2006 is to delineate the southern extent of the elevated uranium concentration measured at Location 12196a in 2005.
Action: Delineate the southern extent of the uranium plume in the area of concern via the 2006 direct push sampling program.

4. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.2 Pg #: A.2-10 Line #: 13 Code: C
Original Comment #: 4
Comment: In order to evaluate the ability of the model to match the plume in all three dimensions, the residuals should be calculated for all monitoring wells, regardless of layer.
Response: Residuals for all monitoring wells were calculated and submitted as Attachment 3 to Responses to U.S. Environmental Protection Agency Comments and Revised Section 3,

Volume II of the Revised Legacy Management and Institutional Controls Plan, Revision 1, issued June 29, 2006. In that submittal, monitoring wells are grouped together by model layer, and layer specific descriptive statistics are provided. Attached, is a residual calculation that eliminates the model layer designations. This non-layer specific residual calculation indicates that the mean residual between observed concentrations and initial conditions in the groundwater model is 16.28 and the mean residual between the observed data collected during the second half of 2005 and the model predicted concentrations for April 2006 is 23.09.

Action: As stated in the response

5. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.2 Pg #: A.2-10 Line #: 23 Code: C
Original Comment #: 5

Comment: The residual calculation should use the simulated concentrations taken directly from the model, not model results that have been post-processed using kriging. Textual discussion can be used to explain the occurrence of large residuals, such as in the case of where steep concentration gradients exist. Kriging models by necessity require the specification of a number of additional parameters, over and above the parameters specified in the transport model. As a result, use of the kriging model as an intermediate step in the calculation of the transport model residuals may tend to obscure true trends in the residuals.

Response: The reported residuals were calculated using simulated concentrations predicted by the groundwater model. The Kriging discussion on Page A.2-10 was used to assign observed concentrations to the model grid to establish initial uranium concentration conditions for the groundwater model.

Action: No action required.

6. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.2 Pg #: A.2-10 Line #: 23 Code: C
Original Comment #: 6

Comment: A scaled symbol map with a simplified map of the plume would be useful to help with the spatial interpretation of the residuals.

Response: DOE agrees with the comment. Maps for each model layer are attached.

Action: As stated in the response

7. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.2 Pg #: A.2-10 Line #: 24 Code: C
Original Comment #: 7

Comment: As evidenced by the positive average residual for the two model runs, the model is typically under-predicting the true concentration. In addition, the amount of error increases with time, from 19.06 to 30.54 μg/L. This too-rapid of a decline in the simulated dissolved concentration is likely related to inaccurate assumptions regarding the transition of uranium from the sorbed to the dissolved phase.

Response: Concentration versus time plots for extraction wells are provided in Attachment A.1 of the 2005 Site Environmental Report. These plots display regression analyses of observed concentration data sets along with model predicted concentrations. The information displayed in these plots also indicates that the model is typically under-predicting observed concentration measurements. This uncertainty is being managed by plotting a predicted cleanup time-range for each monitoring and extraction well using the observed concentration trends. The range is defined by a regression analysis of the observed concentration data set, and a regression analysis of the 95 percent UCL of the observed data set. As indicated in the 2005 Site Environmental Report, the observed concentration trends for 75 percent of the monitoring wells appear to be on-target for cleanup, based on the model predicted cleanup dates defined for each groundwater module. Trending the observed concentration data, and

calculating concentration residuals between observed and modeled concentrations, will continue and results will be reported in the annual site environmental reports.

Action: As stated in the response.

8. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5-11 Line #: 15 Code: C
Original Comment #: 8

Comment: A more thoroughly documented evaluation of the annual LCS chemistry results is needed regarding consideration of possible adjustments to the leak detection monitoring parameter list. OAC 3745-27-10(D) provides guidance for the specification of alternative parameter lists. According to these regulations, a key factor to consider is the concentrations of Appendix I constituents in the leachate. The number of detected Appendix I constituents for the eight OSDF disposal cells is ranges from 21 to 35 and averages 27. All detected constituents should be used as leak detection monitoring parameters unless appropriate justification exists to exclude some of the parameters. This report, therefore, needs to document why any detected Appendix I parameter is not carried forward as a leak detection monitoring parameter.

Response: DOE agrees that a more thoroughly documented evaluation of the annual LCS chemistry results is needed regarding consideration of possible adjustments to the OSDF leak detection monitoring parameter lists.

Site-specific leak detection monitoring parameter lists have been developed for the OSDF (i.e., Initial Baseline, Refined Baseline). The process that was used to select OSDF site-specific leak detection indicator parameters for the Initial Baseline List is presented in Figure 3-1 of Appendix E of the Groundwater/Leak Detection and Leachate Monitoring Plan, Revision 2, Final. A copy of Figure 3-1 is attached to these comment responses. Information from the OSDF Waste Acceptance Criteria (WAC) development process was used to select 18 site-specific leak detection parameters for the Initial Baseline List. The 18 selected OSDF site-specific leak detection parameters consists of 14 primary leak detection parameters and 4 indicator leak detection. The Initial Baseline List complies with Ohio Solid Waste regulations OAC 3745-27-10(D)(2) and (3). Each year an annual sampling of the LCS is conducted to confirm the appropriateness of the Initial Baseline Sampling List in the event that the leachate composition is changing. The annual leachate grab sample is obtained and analyzed for parameters listed in Ohio Solid Waste regulation OAC 3745-27-10 and 19 (Appendix I and PCBs). Constituents listed in Appendix I of OAC 3745-27-10 are typical contaminants found in sanitary landfills.

Over the past several months DOE and Geotrans have been discussing ideas to develop an approach to determine how an annual LCS monitoring parameter will be added to the site specific leak detection monitoring list. The selection approach is presented in Attachment 3. The selection approach calls for any Appendix I or PCB constituent that has been sampled eight times and has a 25% detection rate to be considered a ***"potential"*** leak detection monitoring parameter. Incorporation to the site specific leak detection monitoring list will only be done if it can be demonstrated that adding the constituent would significantly enhance the early detection capability of the monitoring program.

Incorporation of a "potential" leak detection monitoring parameter to the site specific leak detection monitoring list will be based on a statistical test to determine if there is a significant difference between the potential site-specific parameter concentration and either the pre-design or background data sets that are specific to the Fernald site. Statistical tests proposed include a T-test, Wilcoxen Rank Sum and Quantile Test, and Poisson Predictions Limits Test. Use of a specific test depends upon dataset conditions presented in the attached flow chart. It is possible that some Appendix I or PCB constituents that have no site-specific

pre-design or background data will be identified as potential monitoring parameters. If this happens they will need to be considered on a case by case basis to determine if adding the constituent would significantly enhance the early detection capability of the monitoring program.

DOE would like to obtain EPA/OEPA concurrence on the proposed selection approach presented in the attached flow charts before proceeding further with any recommendations to modify the Initial Baseline Monitoring List. Preparation of the 2006 SER is underway. Schedule constraints for issuing the 2006 SER in June do not provide an adequate amount of time to resolve this issue and incorporate results in the 2006 SER.

Potential leak detection monitoring constituents will be identified in the 2006 SER based upon a review of data through December of 2006. Once it has been documented that the attached selection strategy adequately addresses EPA/OEPA concerns, DOE will complete the evaluation process and conduct the statistical tests. Recommendations for monitoring list adjustments will be presented to the EPA/OEPA as soon as they are available and they will also be reported in the 2007 SER. Any adjustments to the OSDF site specific leak detection parameter list would only be made with the approval of both the EPA and OEPA.

Action: As stated in the response.

9. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5-11 Line #: 15 Code: C
Original Comment #: 9

Comment: Please provide a reference for the source of the concentration data used to compute the perched water background concentration listed in the annual LCS sample summary information table for each cell (for example, for Cell 1, the concentrations listed in the column entitled "PW BACKGROUND" in Table A.5.1-3). Also, please indicate what statistical parameter is represented by this concentration and discuss the approach used for its calculation. Specifically, please note any assumptions regarding the statistical distribution of the data.

Response: "PW BACKGROUND" refers to perched water background values. The background groundwater information including statistical information (perched and aquifer) is provided in the May 1994, "Characterization of Background Water Quality for Streams and Groundwater". The referenced background data was used as part of the Operable Unit 5 Remedial Investigation and Feasibility Study Reports and the Operable Unit 5 Record of Decision (e.g., Table 5-3 of Operable Unit 5 Record of Decision – 95th Percentile of Type 1 Wells Background).

Action: A footnote will be added to future reports identifying the source of data.

10. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5.1-3 Line #: 24 Code: C
Original Comment #: 10

Comment: Please provide a reference for the source of the concentration data used to compute the groundwater background concentration listed in the annual LCS sample summary information table for each cell (for example, for Cell 1, the concentrations listed in the column entitled "GW BACKGROUND" in Table A.5.1-3). Also, please indicate what statistical parameter is represented by this concentration and discuss the approach used for its calculation. Specifically, please note any assumptions regarding the statistical distribution of the data.

Response: "GW BACKGROUND" refers to Great Miami Aquifer background values. Refer to Comment Response #9.

Action: Refer to Action #9.

11. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.

Section #: Attach. A.5 Pg #: A.5.1-3 Line #: 24 Code: C
Original Comment #: 11
Comment: Based on Table A.5.1-3, there are 27 constituents that have been detected in the Cell 1 LCS and are, therefore, potential leak detection monitoring constituents for this cell.
Response: Please refer to response to Comment # 8.
Action: Please refer to action to Comment #8.

12. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5.2-3 Line #: 5 Code: C
Original Comment #: 12
Comment: Based on Table A.5.2-3, there are 29 constituents that have been detected in the Cell 2 LCS and are, therefore, potential leak detection monitoring constituents for this cell.
Response: Please refer to response to Comment # 8.
Action: Please refer to action to Comment #8.

13. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5.3-6 Line #: 36 Code: C
Original Comment #: 13
Comment: Based on Table A.5.3-3, there are 35 constituents that have been detected in the Cell 3 LCS and are, therefore, potential leak detection monitoring constituents for this cell.
Response: Please refer to response to Comment # 8.
Action: Please refer to action to Comment #8.

14. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5.4-2 Line #: 32 Code: C
Original Comment #: 14
Comment: Based on Table A.5.4-3, there are 23 constituents that have been detected in the Cell 4 LCS and are, therefore, potential leak detection monitoring constituents for this cell.
Response: Please refer to response to Comment # 8.
Action: Please refer to action to Comment #8.

15. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5.5-2 Line #: 27 Code: C
Original Comment #: 15
Comment: Based on Table A.5.5-2, there are 21 constituents that have been detected in the Cell 5 LCS and are, therefore, potential leak detection monitoring constituents for this cell.
Response: Please refer to response to Comment # 8.
Action: Please refer to action to Comment #8.

16. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5.6-2 Line #: 26 Code: C
Original Comment #: 16
Comment: Based on Table A.5.6-2, there are 24 constituents that have been detected in the Cell 6 LCS and are, therefore, potential leak detection monitoring constituents for this cell.
Response: Please refer to response to Comment # 8.
Action: Please refer to action to Comment #8.

17. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5.7-3 Line #: 1 Code: C
Original Comment #: 17
Comment: Based on Table A.5.7-3, there are 31 constituents that have been detected in the Cell 7 LCS and are, therefore, potential leak detection monitoring constituents for this cell.
Response: Please refer to response to Comment # 8.
Action: Please refer to action to Comment #8.

18. Commenting Organization: Ohio EPA Commenter: GeoTrans, Inc.
Section #: Attach. A.5 Pg #: A.5.8-2 Line #: 12 Code: C
Original Comment #: 18

Comment: Based on Table A.5.8-2, there are 24 constituents that have been detected in the Cell 8 LCS and are, therefore, potential leak detection monitoring constituents for this cell.

Response: Please refer to response to Comment # 8.

Action: Please refer to action to Comment #8.

ATTACHMENT 1

(Reference Comment Response #4)

Residuals (Observed through May 2005) to (Modeled Initial Conditions)

Well ID	Model Layer	Observed Concentrations, May 2005 (µg/L)	Modeled Initial Concentrations (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
2009	13	22.50	22.20	0.30	0.30	3.11	3.10	0.01
2010	13	21.15	16.00	5.15	5.15	3.05	2.77	0.28
2014	13	5.68	7.20	-1.52	1.52	1.74	1.97	-0.24
2032	13	4.10	10.60	-6.50	6.50	1.41	2.36	-0.95
2055	13	10.50	7.30	3.20	3.20	2.35	1.99	0.36
2095	13	76.05	63.50	12.55	12.55	4.33	4.15	0.18
21033	13	10.90	7.60	3.30	3.30	2.39	2.03	0.36
2118	13	1.31	1.10	0.21	0.21	0.27	0.10	0.17
21192	13	9.48	24.20	-14.72	14.72	2.25	3.19	-0.94
2125	13	5.02	6.90	-1.89	1.89	1.61	1.93	-0.32
2128	13	13.55	3.20	10.35	10.35	2.61	1.16	1.44
23064	13	23.40	23.40	0.00	0.00	3.15	3.15	0.00
2389	13	17.80	9.70	8.10	8.10	2.88	2.27	0.61
2390	13	58.20	41.60	16.60	16.60	4.06	3.73	0.34
2396	13	0.86	1.20	-0.34	0.34	-0.15	0.18	-0.33
2397	13	370.50	71.40	299.10	299.10	5.91	4.27	1.65
2398	13	4.50	1.70	2.80	2.80	1.50	0.53	0.97
2550	13	41.00	42.50	-1.50	1.50	3.71	3.75	-0.04
2552	13	16.83	7.70	9.13	9.13	2.82	2.04	0.78
2553	13	10.70	10.70	0.00	0.00	2.37	2.37	0.00
2625	13	2.93	4.90	-1.97	1.97	1.08	1.59	-0.51
2648	13	25.10	17.80	7.30	7.30	3.22	2.88	0.34
2649	13	71.00	151.30	-80.30	80.30	4.26	5.02	-0.76
2880	13	10.56	3.60	6.96	6.96	2.36	1.28	1.08
2897	13	0.62	0.70	-0.08	0.08	-0.47	-0.36	-0.11
2898	13	8.21	5.80	2.41	2.41	2.10	1.76	0.35
2899	13	3.30	2.50	0.80	0.80	1.19	0.92	0.28
2900	13	17.90	17.90	0.00	0.00	2.88	2.88	0.00
82433_C1	13	4.99	2.80	2.19	2.19	1.61	1.03	0.58
83117_C1	13	850.00	462.30	387.70	387.70	6.75	6.14	0.61
83120_C1	13	211.00	183.30	27.70	27.70	5.35	5.21	0.14
83123_C1	13	33.30	35.10	-1.80	1.80	3.51	3.56	-0.05

Residuals (Observed through May 2005) to (Modeled Initial Conditions)

Well ID	Model Layer	Observed Concentrations, May 2005 (µg/L)	Modeled Initial Concentrations (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
83124_C1	13	776.00	501.20	274.80	274.80	6.65	6.22	0.44
83293_C1	13	2.61	2.00	0.61	0.61	0.96	0.69	0.27
83294_C1	13	102.00	20.80	81.20	81.20	4.62	3.03	1.59
83295_C1	13	3.25	5.50	-2.25	2.25	1.18	1.70	-0.53
83296_C1	13	93.60	51.50	42.10	42.10	4.54	3.94	0.60
2002	12	3.2	5	-1.8	1.8	1.2	1.6	-0.4
2007	12	5.8	5.9	-0.1	0.1	1.8	1.8	0.0
2008	12	25.1	20.8	4.3	4.3	3.2	3.0	0.2
2016	12	5.5	10.5	-5.0	5.0	1.7	2.4	-0.6
2017	12	6.0	6.1	-0.1	0.1	1.8	1.8	0.0
2045	12	111.9	90.1	21.8	21.8	4.7	4.5	0.2
2046	12	66.7	37.8	28.9	28.9	4.2	3.6	0.6
2048	12	6.0	28.7	-22.7	22.7	1.8	3.4	-1.6
2049	12	88.7	54.2	34.5	34.5	4.5	4.0	0.5
2054	12	2.7	3.3	-0.6	0.6	1.0	1.2	-0.2
2093	12	1.6	1.6	0.0	0.0	0.5	0.5	0.0
2106	12	8.9	9.9	-1.0	1.0	2.2	2.3	-0.1
2109	12	1.5	2	-0.5	0.5	0.4	0.7	-0.3
22200	12	0.7	0.7	0.0	0.0	-0.4	-0.4	-0.1
22203	12	1.9	1.9	0.0	0.0	0.6	0.6	0.0
22206	12	3.2	3.2	0.0	0.0	1.2	1.2	0.0
22207	12	0.6	0.8	-0.2	0.2	-0.5	-0.2	-0.3
22209	12	0.8	0.8	0.0	0.0	-0.2	-0.2	0.0
22212	12	2.2	1.1	1.1	1.1	0.8	0.1	0.7
22213	12	0.7	1.6	-0.9	0.9	-0.3	0.5	-0.8
23118	12	3.6	25.7	-22.1	22.1	1.3	3.2	-2.0
23271	12	77.0	16.9	60.1	60.1	4.3	2.8	1.5
23272	12	5.3	5.1	0.2	0.2	1.7	1.6	0.0
23273	12	241.5	203.7	37.8	37.8	5.5	5.3	0.2
23274	12	227.5	203.4	24.1	24.1	5.4	5.3	0.1
23275	12	132.5	150.3	-17.8	17.8	4.9	5.0	-0.1
23276	12	80.2	51	29.2	29.2	4.4	3.9	0.5

Residuals (Observed through May 2005) to (Modeled Initial Conditions)

Well ID	Model Layer	Observed Concentrations, May 2005 (µg/L)	Modeled Initial Concentrations (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
23277	12	8.6	10.3	-1.7	1.7	2.2	2.3	-0.2
23278	12	108.2	43.6	64.6	64.6	4.7	3.8	0.9
23279	12	6.0	9.4	-3.4	3.4	1.8	2.2	-0.4
23280	12	403.5	129.8	273.7	273.7	6.0	4.9	1.1
23281	12	190.5	321.7	-131.2	131.2	5.2	5.8	-0.5
23282	12	7.1	49.8	-42.7	42.7	2.0	3.9	-1.9
2385	12	300.0	92.3	207.7	207.7	5.7	4.5	1.2
2386	12	17.7	35.2	-17.5	17.5	2.9	3.6	-0.7
2387	12	53.9	46.4	7.5	7.5	4.0	3.8	0.1
2402	12	4.8	4.8	0.0	0.0	1.6	1.6	0.0
2434	12	1.4	1.3	0.1	0.1	0.3	0.3	0.1
2821	12	18.4	21.7	-3.3	3.3	2.9	3.1	-0.2
63116	12	19.9	4.5	15.4	15.4	3.0	1.5	1.5
63121	12	7.6	15	-7.4	7.4	2.0	2.7	-0.7
82433_C2	12	65.9	16.1	49.8	49.8	4.2	2.8	1.4
83117_C2	12	218.0	159.4	58.6	58.6	5.4	5.1	0.3
83120_C2	12	307.0	163.1	143.9	143.9	5.7	5.1	0.6
83123_C2	12	103.0	39.4	63.6	63.6	4.6	3.7	1.0
83124_C2	12	60.2	316.3	-256.1	256.1	4.1	5.8	-1.7
83293_C2	12	15.6	6.9	8.7	8.7	2.7	1.9	0.8
83294_C2	12	364.0	138.4	225.6	225.6	5.9	4.9	1.0
83295_C2	12	158.0	8.3	149.7	149.7	5.1	2.1	2.9
83296_C2	12	117.0	138.6	-21.6	21.6	4.8	4.9	-0.2
21063	11	1.0	1.0	0.0	0.0	0.0	0.0	0.0
2166	11	47.6	27.8	19.8	19.8	3.9	3.3	0.5
32766	11	52.7	52.5	0.2	0.2	4.0	4.0	0.0
32768	11	23.1	26.6	-3.6	3.6	3.1	3.3	-0.1
62408	11	65.8	65.9	-0.1	0.1	4.2	4.2	0.0
62433	11	417.0	303.0	114.0	114.0	6.0	5.7	0.3
63119	11	45.7	71.5	-25.8	25.8	3.8	4.3	-0.4
63122	11	67.4	32.1	35.3	35.3	4.2	3.5	0.7
63283	11	11.2	28.0	-16.8	16.8	2.4	3.3	-0.9

Residuals (Observed through May 2005) to (Modeled Initial Conditions)

Well ID	Model Layer	Observed Concentrations, May 2005 (µg/L)	Modeled Initial Concentrations (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
63284	11	29.4	25.3	4.1	4.1	3.4	3.2	0.2
63285	11	173.0	94.1	78.9	78.9	5.2	4.5	0.6
63286	11	0.81	1.5	-0.7	0.7	-0.2	0.4	-0.6
63287	11	225.5	91.9	133.6	133.6	5.4	4.5	0.9
63292	11	6.1	15.4	-9.3	9.3	1.8	2.7	-0.9
6880	11	75.7	60.8	14.9	14.9	4.3	4.1	0.2
6881	11	20.0	9.9	10.1	10.1	3.0	2.3	0.7
82433_C3	11	219.0	108.1	110.9	110.9	5.4	4.7	0.7
83117_C3	11	97.0	146.9	-49.9	49.9	4.6	5.0	-0.4
83120_C3	11	157.0	74.8	82.2	82.2	5.1	4.3	0.7
83123_C3	11	16.8	27.3	-10.5	10.5	2.8	3.3	-0.5
83124_C3	11	17.9	25.0	-7.1	7.1	2.9	3.2	-0.3
83293_C3	11	48.2	11.8	36.4	36.4	3.9	2.5	1.4
83294_C3	11	450.0	461.8	-11.8	11.8	6.1	6.1	0.0
83295_C3	11	147.0	79.1	67.9	67.9	5.0	4.4	0.6
83296_C3	11	52.0	83.1	-31.1	31.1	4.0	4.4	-0.5
3014	10	14.35	14.2	0.15	0.15	2.66	2.65	0.01
63288	10	102.7	66.4	36.25	36.25	4.63	4.20	0.44
63289	10	1.5	1.8	-0.29	0.29	0.42	0.59	-0.17
63290	10	0.7	4.1	-3.40	3.40	-0.36	1.41	-1.77
63291	10	53.0	53.0	-0.05	0.05	3.97	3.97	0.00
82433_C4	10	91.4	83.1	8.30	8.30	4.52	4.42	0.10
83117_C4	10	81.8	74.2	7.60	7.60	4.40	4.31	0.10
83120_C4	10	31.2	36.2	-5.00	5.00	3.44	3.59	-0.15
83123_C4	10	12.6	11.9	0.70	0.70	2.53	2.48	0.06
83124_C4	10	41.0	25.1	15.90	15.90	3.71	3.22	0.49
83293_C4	10	68.5	12.4	56.10	56.10	4.23	2.52	1.71
83294_C4	10	208.0	243.5	-35.50	35.50	5.34	5.50	-0.16
83295_C4	10	120.0	127.8	-7.80	7.80	4.79	4.85	-0.06
83296_C4	10	23.6	44.7	-21.10	21.10	3.16	3.80	-0.64
3054	9	1.0	0.5	0.50	0.50	0.00	-0.69	0.69
3055	9	0.3	0.3	-0.02	0.02	-1.26	-1.20	-0.05

Residuals (Observed through May 2005) to (Modeled Initial Conditions)

Well ID	Model Layer	Observed Concentrations, May 2005 (µg/L)	Modeled Initial Concentrations (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
82433_C5	9	2.7	3.8	-1.14	1.14	0.98	1.34	-0.36
83117_C5	9	4.3	14.6	-10.33	10.33	1.45	2.68	-1.23
83120_C5	9	0.9	3.3	-2.39	2.39	-0.09	1.19	-1.29
83123_C5	9	15.1	9.9	5.20	5.20	2.71	2.29	0.42
83124_C5	9	57.4	29.7	27.70	27.70	4.05	3.39	0.66
83293_C5	9	0.4	1.4	-1.00	1.00	-0.91	0.34	-1.25
83294_C5	9	22.5	47.4	-24.90	24.90	3.11	3.86	-0.75
83295_C5	9	155.0	30.8	124.20	124.20	5.04	3.43	1.62
83296_C5	9	19.7	29.8	-10.10	10.10	2.98	3.39	-0.41
3015	8	1.6	2.1	-0.5	0.5	0.4	0.7	-0.3
3045	8	1.5	1.3	0.2	0.2	0.4	0.3	0.1
3049	8	0.5	0.5	0.0	0.0	-0.6	-0.7	0.0
3069	8	129.0	66.4	62.6	62.6	4.9	4.2	0.7
3070	8	0.1	0.1	0.0	0.0	-2.2	-2.3	0.1
3095	8	25.6	14.3	11.3	11.3	3.2	2.7	0.6
3106	8	3.9	4.8	-0.9	0.9	1.4	1.6	-0.2
3125	8	37.6	30.1	7.5	7.5	3.6	3.4	0.2
3128	8	0.6	0.5	0.1	0.1	-0.6	-0.7	0.1
3385	8	3.0	1.4	1.6	1.6	1.1	0.3	0.8
3387	8	2.0	3.0	-1.0	1.0	0.7	1.1	-0.4
3390	8	26.5	24.1	2.4	2.4	3.3	3.2	0.1
3396	8	0.8	0.8	0.0	0.0	-0.2	-0.2	0.0
3397	8	2.6	1.5	1.1	1.1	1.0	0.4	0.6
3398	8	0.2	1.1	-0.9	0.9	-1.5	0.1	-1.6
3402	8	1.1	1.1	0.0	0.0	0.1	0.1	0.0
3550	8	3.1	2.2	0.9	0.9	1.1	0.8	0.3
3552	8	5.3	2.7	2.6	2.6	1.7	1.0	0.7
3636	8	0.4	0.4	0.0	0.0	-1.0	-0.9	0.0
3821	8	13.9	6.1	7.8	7.8	2.6	1.8	0.8
3880	8	0.9	1.3	-0.4	0.4	-0.1	0.3	-0.3
3897	8	0.4	0.4	0.0	0.0	-1.0	-0.9	-0.1
3898	8	0.6	0.6	0.0	0.0	-0.5	-0.5	0.0

Residuals (Observed through May 2005) to (Modeled Initial Conditions)

Well ID	Model Layer	Observed Concentrations, May 2005 (µg/L)	Modeled Initial Concentrations (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
82433_C6	8	0.8	1.1	-0.3	0.3	-0.2	0.1	-0.3
83293_C6	8	0.3	0.5	-0.2	0.2	-1.2	-0.7	-0.5
83294_C6	8	1.6	6.2	-4.6	4.6	0.5	1.8	-1.3
83295_C6	8	20.5	11.6	8.9	8.9	3.0	2.5	0.6
83296_C6	8	5.6	10.3	-4.7	4.7	1.7	2.3	-0.6
3046	7,6,4, & 2	2.16	1.80	0.36	0.36	0.77	0.59	0.2
3093	7,6,4, & 2	0.33	0.30	0.03	0.03	-1.10	-1.20	0.1
3899	7,6,4, & 2	1.06	1.10	-0.04	0.04	0.06	0.10	0.0
3900	7,6,4, & 2	0.10	0.10	0.00	0.00	-2.34	-2.30	0.0
83120_C6	7,6,4, & 2	0.65	0.70	-0.05	0.05	-0.43	-0.36	-0.1
83123_C6	7,6,4, & 2	9.53	6.40	3.13	3.13	2.25	1.86	0.4
83124_C6	7,6,4, & 2	38.60	26.70	11.90	11.90	3.65	3.28	0.4
83117_C6	7,6,4, & 2	1.19	0.01	1.18	1.18	0.17	-4.61	4.8
3032	7,6,4, & 2	6.44	0.01	6.43	6.43	1.86	-4.61	6.5
4125	7,6,4, & 2	1.73	0.01	1.72	1.72	0.55	-4.61	5.2
4398	7,6,4, & 2	1.00	0.01	0.99	0.99	0.00	-4.61	4.6
Average		**59.98**	**43.70**	**16.28**	**27.35**	**2.47**	**2.26**	**0.20**
Std Dev		**118.34**	**81.66**	**63.46**	**59.51**	**2.06**	**2.13**	**1.05**
Max		**850.00**	**501.20**	**387.70**	**387.70**	**6.75**	**6.22**	**6.47**
Min		**0.10**	**0.01**	**-256.10**	**0.00**	**-2.34**	**-4.61**	**-1.98**
Range		**849.90**	**501.19**	**643.80**	**387.70**	**9.09**	**10.82**	**8.44**

Residuals (Observed 2nd Half 2005) to (Model Predicted April 2006)

Well ID	Model Layer	Observed Concentrations (2nd half 05) (µg/L)	Model Predicted Concentrations (April 06) (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
2009	13	12.9	16.7	-3.8	3.8	2.6	2.8	-0.3
2010	13	12.7	15.4	-2.7	2.7	2.5	2.7	-0.2
2014	13	1.7	8.5	-6.8	6.8	0.6	2.1	-1.6
2095	13	76.2	58.8	17.4	17.4	4.3	4.1	0.3
21033	13	13.9	8	5.9	5.9	2.6	2.1	0.6
2125	13	3.2	8.4	-5.2	5.2	1.2	2.1	-1.0
2128	13	13.8	4	9.8	9.8	2.6	1.4	1.2
23064	13	19.1	23.6	-4.5	4.5	2.9	3.2	-0.2
2389	13	30.0	9.1	20.9	20.9	3.4	2.2	1.2
2390	13	39.5	44.1	-4.6	4.6	3.7	3.8	-0.1
2396	13	0.9	1.6	-0.7	0.7	-0.1	0.5	-0.5
2397	13	462.0	80	382.0	382.0	6.1	4.4	1.8
2398	13	3.1	1.7	1.4	1.4	1.1	0.5	0.6
2550	13	49.1	40.2	8.9	8.9	3.9	3.7	0.2
2552	13	17.0	8.1	8.9	8.9	2.8	2.1	0.7
2553	13	4.8	10.6	-5.8	5.8	1.6	2.4	-0.8
2625	13	2.4	5.1	-2.7	2.7	0.9	1.6	-0.7
2648	13	41.6	15.1	26.5	26.5	3.7	2.7	1.0
2649	13	15.2	171.2	-156.0	156.0	2.7	5.1	-2.4
2880	13	42.7	5.8	36.9	36.9	3.8	1.8	2.0
2897	13	0.8	0.7	0.1	0.1	-0.2	-0.4	0.1
2898	13	6.1	5.8	0.3	0.3	1.8	1.8	0.0
2899	13	3.5	2.5	1.0	1.0	1.2	0.9	0.3
2900	13	13.3	17.2	-3.9	3.9	2.6	2.8	-0.3
82433_C1	13	3.7	7.3	-3.7	3.7	1.3	2.0	-0.7
83117_C1	13	936.0	363.8	572.2	572.2	6.8	5.9	0.9
83124_C1	13	624.0	445.4	178.6	178.6	6.4	6.1	0.3
83293_C1	13	2.0	2.5	-0.5	0.5	0.7	0.9	-0.2
83294_C1	13	148.0	29	119.0	119.0	5.0	3.4	1.6
83295_C1	13	8.7	6	2.7	2.7	2.2	1.8	0.4
83296_C1	13	87.3	56.6	30.7	30.7	4.5	4.0	0.4
2002	12	2.67	7.4	-4.73	4.73	0.98	2.00	-1.02

Residuals (Observed 2nd Half 2005) to (Model Predicted April 2006)

Well ID	Model Layer	Observed Concentrations (2nd half 05) (µg/L)	Model Predicted Concentrations (April 06) (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
2008	12	20.2	18.8	1.4	1.4	3.01	2.93	0.07
2016	12	8.98	13.1	-4.12	4.12	2.19	2.57	-0.38
2017	12	4.95	6.1	-1.15	1.15	1.60	1.81	-0.21
2045	12	96.6	67.5	29.1	29.1	4.57	4.21	0.36
2046	12	61.8	30.8	31	31	4.12	3.43	0.70
2048	12	3.71	33.1	-29.39	29.39	1.31	3.50	-2.19
2049	12	59.2	55.1	4.1	4.1	4.08	4.01	0.07
2093	12	1.69	1.5	0.19	0.19	0.52	0.41	0.12
2106	12	7.37	10.5	-3.13	3.13	2.00	2.35	-0.35
23118	12	2.77	22.8	-20.03	20.03	1.02	3.13	-2.11
23271	12	102	15.8	86.2	86.2	4.62	2.76	1.86
23272	12	2.93	4.6	-1.67	1.67	1.08	1.53	-0.45
23273	12	402	115.4	286.6	286.6	6.00	4.75	1.25
23274	12	141	133.1	7.9	7.9	4.95	4.89	0.06
23275	12	119	118.5	0.5	0.5	4.78	4.77	0.00
23276	12	79.1	58.4	20.7	20.7	4.37	4.07	0.30
23277	12	6.76	9.6	-2.84	2.84	1.91	2.26	-0.35
23278	12	91.7	30.6	61.1	61.1	4.52	3.42	1.10
23279	12	2.66	16.3	-13.64	13.64	0.98	2.79	-1.81
23280	12	184	84.1	99.9	99.9	5.21	4.43	0.78
23281	12	154	99	55	55	5.04	4.60	0.44
23282	12	6.2	46.1	-39.9	39.9	1.82	3.83	-2.01
2385	12	272	76.5	195.5	195.5	5.61	4.34	1.27
2386	12	17.3	56.2	-38.9	38.9	2.85	4.03	-1.18
2387	12	108	36.3	71.7	71.7	4.68	3.59	1.09
2402	12	5.48	5.1	0.38	0.38	1.70	1.63	0.07
2821	12	14.2	17.2	-3	3	2.65	2.84	-0.19
63116	12	16	14.9	1.1	1.1	2.77	2.70	0.07
82433_C2	12	55.8	38.1	17.7	17.7	4.02	3.64	0.38
83117_C2	12	138	150.8	-12.8	12.8	4.93	5.02	-0.09
83124_C2	12	66.5	197	-130.5	130.5	4.20	5.28	-1.09
83293_C2	12	15.2	7.4	7.8	7.8	2.72	2.00	0.72

Residuals (Observed 2nd Half 2005) to (Model Predicted April 2006)

Well ID	Model Layer	Observed Concentrations (2nd half 05) (µg/L)	Model Predicted Concentrations (April 06) (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
83294_C2	12	457	127	330	330	6.12	4.84	1.28
83295_C2	12	165	26.2	138.8	138.8	5.11	3.27	1.84
83296_C2	12	45.4	86.8	-41.4	41.4	3.82	4.46	-0.65
21063	11	1.41	1.0	0.4	0.4	0.3	0.0	0.3
2166	11	50.10	19.6	30.5	30.5	3.9	3.0	0.9
32766	11	41.50	34.4	7.1	7.1	3.7	3.5	0.2
32768	11	15.90	24.9	-9.0	9.0	2.8	3.2	-0.4
62408	11	57.70	25.3	32.4	32.4	4.1	3.2	0.8
62433	11	315.00	83.8	231.2	231.2	5.8	4.4	1.3
63119	11	35.70	44.9	-9.2	9.2	3.6	3.8	-0.2
63283	11	5.53	38.5	-33.0	33.0	1.7	3.7	-1.9
63284	11	16.10	18.0	-1.9	1.9	2.8	2.9	-0.1
63285	11	235.00	61.3	173.7	173.7	5.5	4.1	1.3
63286	11	0.60	2.4	-1.8	1.8	-0.5	0.9	-1.4
63287	11	175.00	35.6	139.4	139.4	5.2	3.6	1.6
63292	11	3.32	19.1	-15.8	15.8	1.2	2.9	-1.7
6880	11	67.90	34.0	33.9	33.9	4.2	3.5	0.7
6881	11	17.50	9.4	8.1	8.1	2.9	2.2	0.6
82433_C3	11	207.00	53.6	153.4	153.4	5.3	4.0	1.4
83117_C3	11	82.20	87.4	-5.2	5.2	4.4	4.5	-0.1
83124_C3	11	11.10	67.2	-56.1	56.1	2.4	4.2	-1.8
83293_C3	11	41.30	10.9	30.4	30.4	3.7	2.4	1.3
83294_C3	11	330.00	164.2	165.8	165.8	5.8	5.1	0.7
83295_C3	11	175.00	73.7	101.3	101.3	5.2	4.3	0.9
83296_C3	11	16.50	65.8	-49.3	49.3	2.8	4.2	-1.4
3014	10	7.31	14.00	-6.69	6.69	1.99	2.64	-0.65
63288	10	68.50	23.2	45.30	45.30	4.23	3.14	1.08
63289	10	1.02	2.7	-1.68	1.68	0.02	0.99	-0.97
63290	10	0.82	3.2	-2.39	2.39	-0.20	1.16	-1.37
63291	10	42.50	48.1	-5.60	5.60	3.75	3.87	-0.12
82433_C4	10	48.80	37.1	11.70	11.70	3.89	3.61	0.27
83117_C4	10	76.40	46.9	29.50	29.50	4.34	3.85	0.49

Residuals (Observed 2nd Half 2005) to (Model Predicted April 2006)

Well ID	Model Layer	Observed Concentrations (2nd half 05) (µg/L)	Model Predicted Concentrations (April 06) (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
83124_C4	10	54.30	29.7	24.60	24.60	3.99	3.39	0.60
83293_C4	10	41.10	8.6	32.50	32.50	3.72	2.15	1.56
83294_C4	10	100.00	100.8	-0.80	0.80	4.61	4.61	-0.01
83295_C4	10	77.20	83.3	-6.10	6.10	4.35	4.42	-0.08
83296_C4	10	37.40	45.3	-7.90	7.90	3.62	3.81	-0.19
82433_C5	9	3.28	18.5	-15.22	15.22	1.19	2.92	-1.73
83117_C5	9	3.89	21.4	-17.51	17.51	1.36	3.06	-1.70
83124_C5	9	24.40	25.2	-0.80	0.80	3.19	3.23	-0.03
83293_C5	9	1.18	4.0	-2.82	2.82	0.17	1.39	-1.22
83294_C5	9	0.01	50.7	-50.69	50.69	-4.61	3.93	-8.53
83295_C5	9	79.50	44.2	35.30	35.30	4.38	3.79	0.59
83296_C5	9	25.90	30.4	-4.50	4.50	3.25	3.41	-0.16
3015	8	0.85	3.6	-2.8	2.8	-0.2	1.3	-1.4
3045	8	2.65	2.5	0.2	0.2	1.0	0.9	0.1
3049	8	0.56	1.4	-0.8	0.8	-0.6	0.3	-0.9
3069	8	87.00	39.2	47.8	47.8	4.5	3.7	0.8
3070	8	0.21	0.1	0.1	0.1	-1.5	-2.3	0.8
3095	8	39.10	14.6	24.5	24.5	3.7	2.7	1.0
3106	8	4.14	5.0	-0.9	0.9	1.4	1.6	-0.2
3125	8	21.00	22.4	-1.4	1.4	3.0	3.1	-0.1
3128	8	0.38	0.6	-0.2	0.2	-1.0	-0.5	-0.5
3385	8	2.22	2.4	-0.2	0.2	0.8	0.9	-0.1
3387	8	2.18	3.8	-1.6	1.6	0.8	1.3	-0.6
3390	8	21.20	21.7	-0.5	0.5	3.1	3.1	0.0
3396	8	1.36	1.6	-0.2	0.2	0.3	0.5	-0.2
3397	8	0.55	2.7	-2.1	2.1	-0.6	1.0	-1.6
3398	8	0.51	1.1	-0.6	0.6	-0.7	0.1	-0.8
3402	8	6.00	1.2	4.8	4.8	1.8	0.2	1.6
3550	8	3.09	2.7	0.4	0.4	1.1	1.0	0.1
3552	8	0.56	2.3	-1.7	1.7	-0.6	0.8	-1.4
3636	8	0.36	0.5	-0.1	0.1	-1.0	-0.7	-0.3
3821	8	10.00	6.2	3.8	3.8	2.3	1.8	0.5

Residuals (Observed 2nd Half 2005) to (Model Predicted April 2006)

Well ID	Model Layer	Observed Concentrations (2nd half 05) (µg/L)	Model Predicted Concentrations (April 06) (µg/L)	Concentration Residuals (µg/L)	Absolute Value of Residuals (µg/L)	Ln of Observed Concentrations (µg/L)	Ln of Modeled Concentrations (µg/L)	Ln Concentration Residuals (µg/L)
3880	8	0.02	5.7	-5.7	5.7	-3.8	1.7	-5.6
3897	8	0.44	0.4	0.0	0.0	-0.8	-0.9	0.1
3898	8	0.72	0.6	0.1	0.1	-0.3	-0.5	0.2
82433_C6	8	1.21	9.1	-7.9	7.9	0.2	2.2	-2.0
83293_C6	8	0.98	1.6	-0.6	0.6	0.0	0.5	-0.5
83294_C6	8	1.45	29.1	-27.7	27.7	0.4	3.4	-3.0
83295_C6	8	16.40	17.2	-0.8	0.8	2.8	2.8	0.0
83296_C6	8	4.33	15.6	-11.3	11.3	1.5	2.7	-1.3
3046	7,6,4, & 2	2.99	2.2	0.8	0.8	1.10	0.79	0.31
3093	7,6,4, & 2	0.37	0.2	0.2	0.2	-0.99	-1.61	0.62
3899	7,6,4, & 2	0.83	0.5	0.3	0.3	-0.19	-0.69	0.51
3900	7,6,4, & 2	0.35	0.1	0.2	0.2	-1.06	-2.30	1.24
83124_C6	7,6,4, & 2	35.70	16	19.7	19.7	3.58	2.77	0.80
83117_C6	7,6,4, & 2	1.11	1.5	-0.4	0.4	0.10	0.41	-0.30
3032	7,6,4, & 2	7.22	0.2	7.0	7.0	1.98	-1.61	3.59
4125	7,6,4, & 2	1.32	0.1	1.2	1.2	0.28	-2.30	2.58
4398	7,6,4, & 2	0.05	0.01	0.0	0.0	-3.02	-4.61	1.59
Average		**58.67**	**35.58**	**23.09**	**35.77**	**2.42**	**2.48**	**-0.06**
Std Dev		**121.32**	**58.03**	**81.82**	**77.09**	**2.15**	**1.81**	**1.36**
Max		**936.00**	**445.40**	**572.20**	**572.20**	**6.84**	**6.10**	**3.59**
Min		**0.01**	**0.01**	**-156.00**	**0.04**	**-4.61**	**-4.61**	**-8.53**
Range		**935.99**	**445.39**	**728.20**	**572.17**	**11.45**	**10.70**	**12.12**

ATTACHMENT 2

(Reference Comment Response #6)

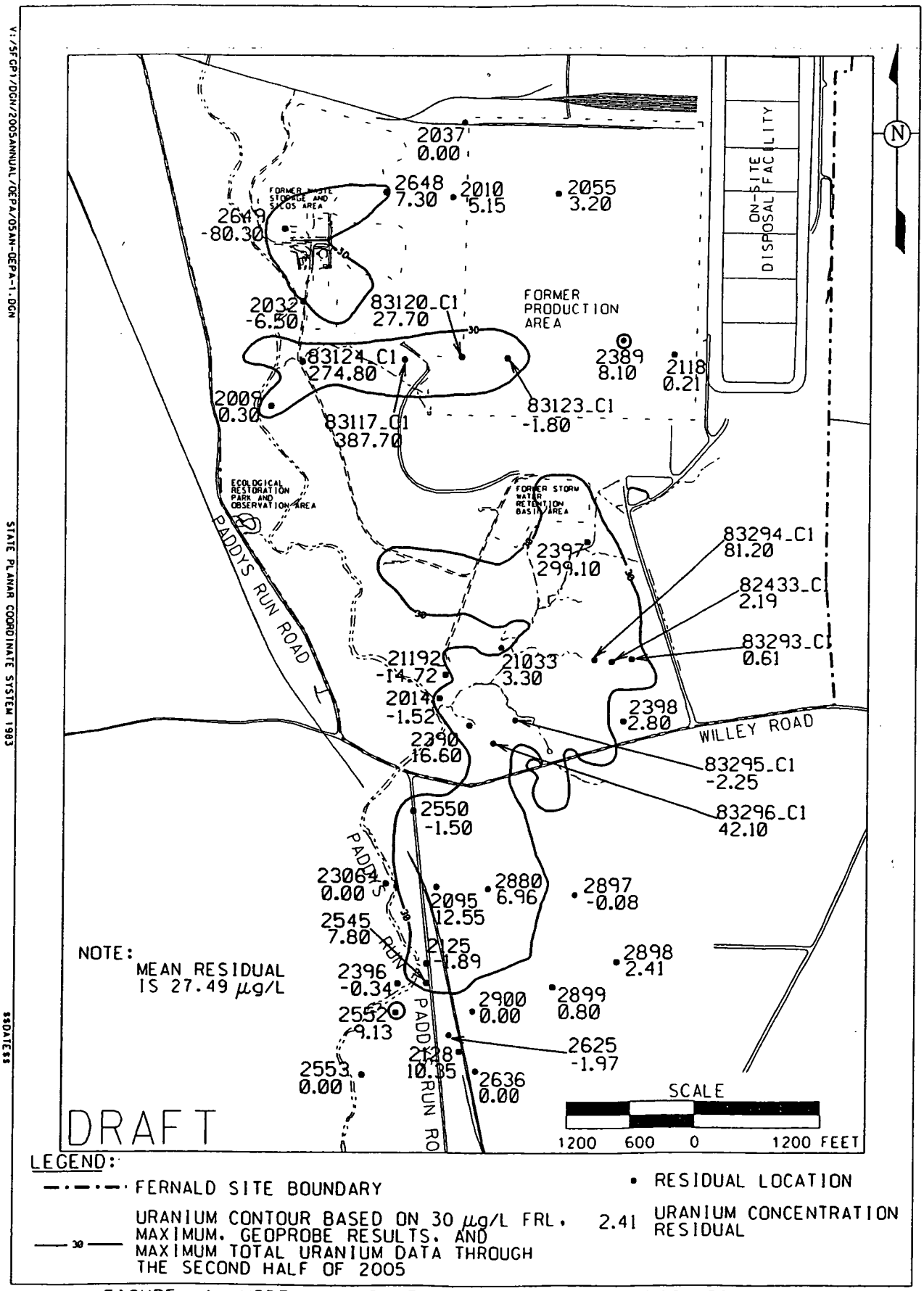


FIGURE 1. MODEL LAYER 13 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (MAY, 2005) VERSES MODELED INITIAL CONCENTRATIONS

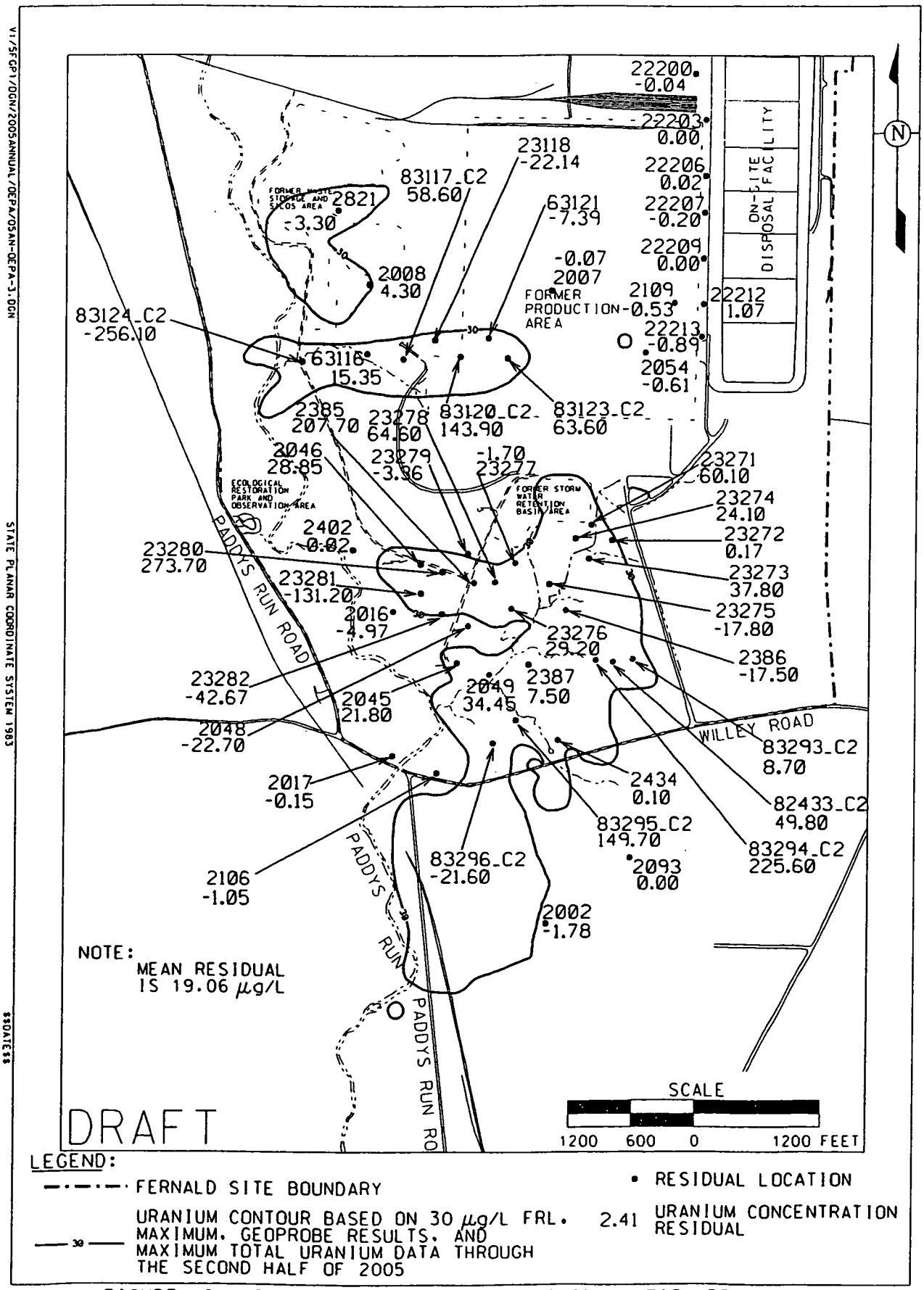


FIGURE 2. MODEL LAYER 12 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (MAY, 2005) VERSES MODELED INITIAL CONCENTRATIONS

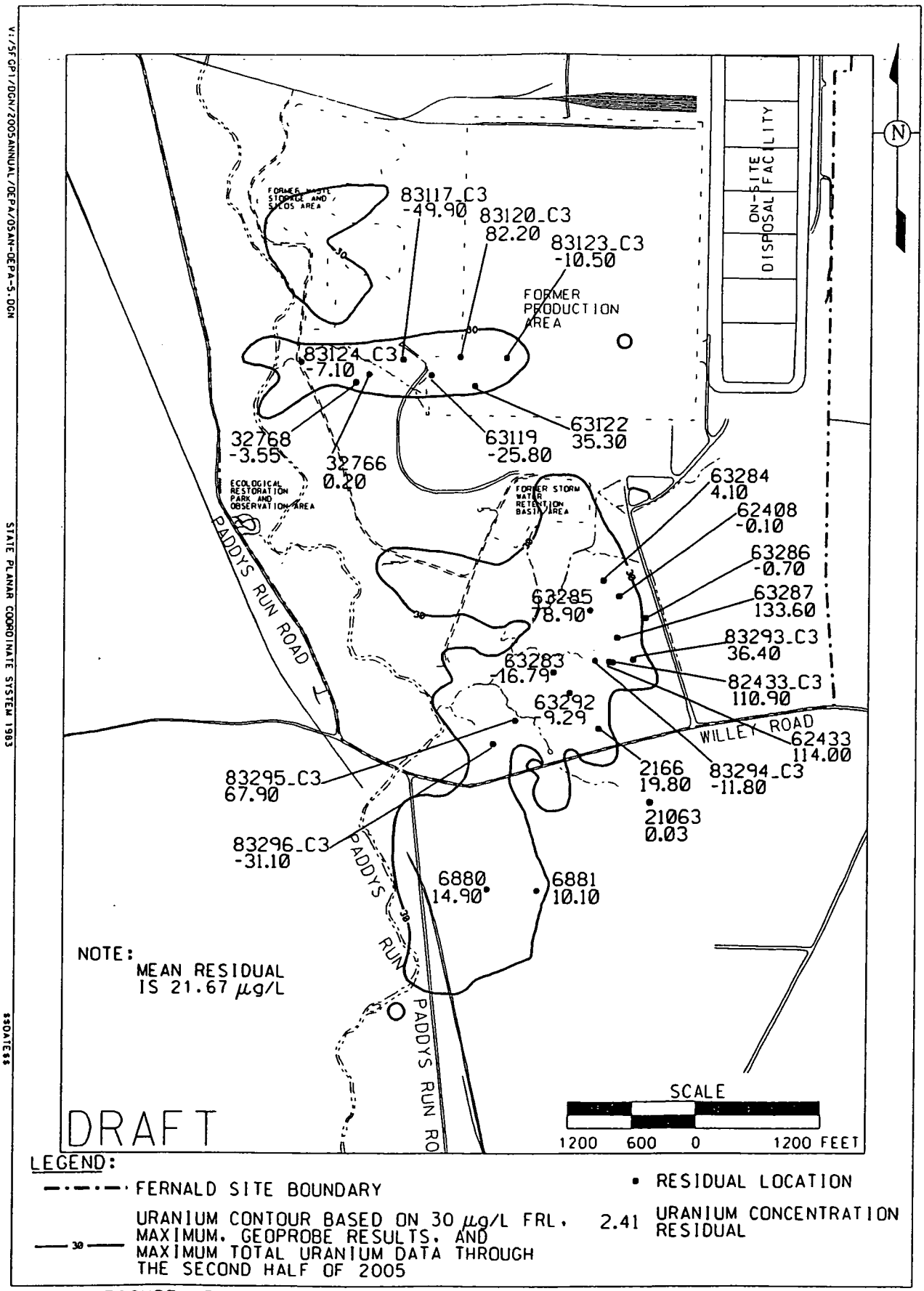
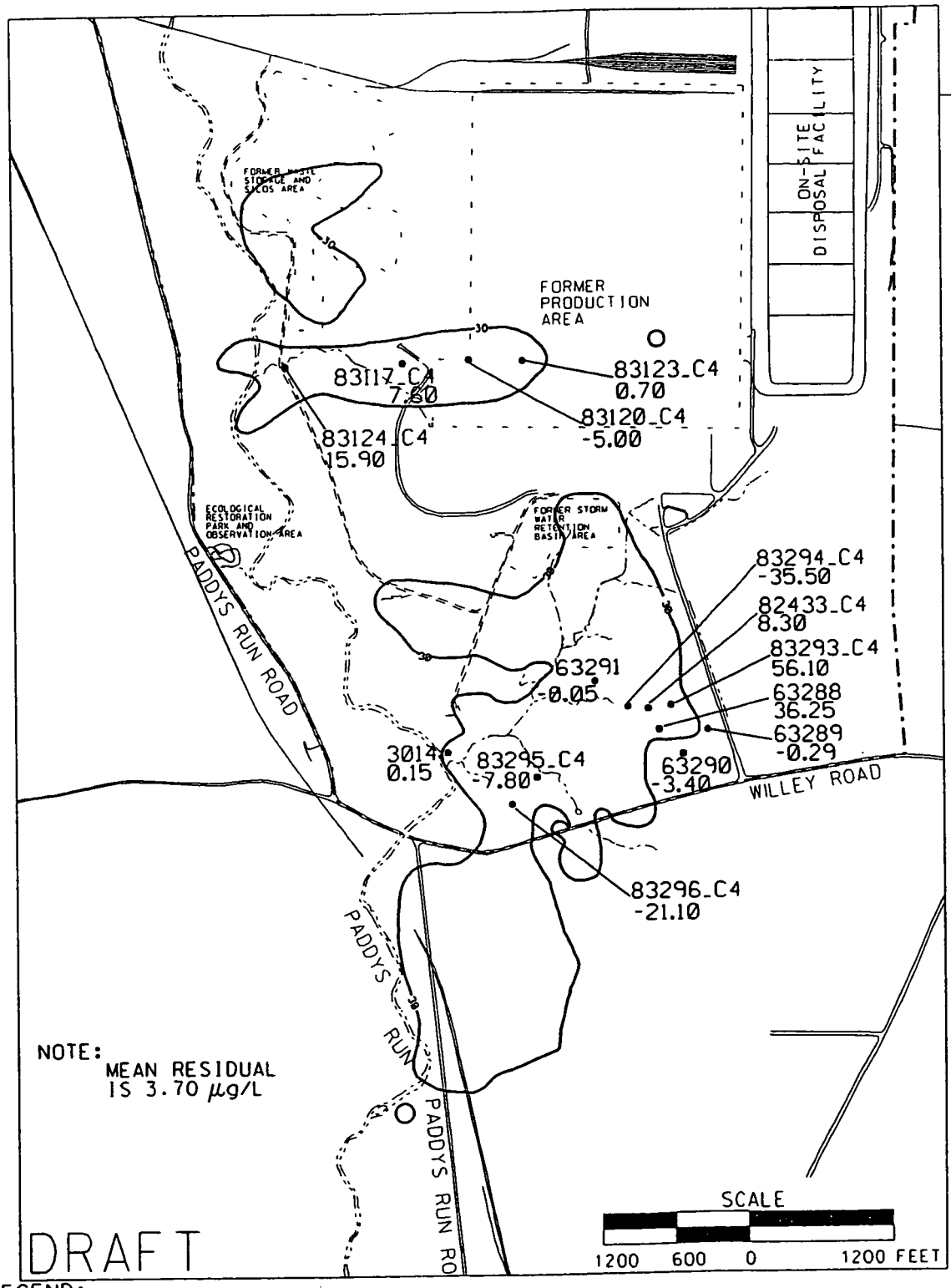


FIGURE 3. MODEL LAYER 11 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (MAY, 2005) VERSES MODELED INITIAL CONCENTRATIONS



LEGEND:

-·-·- FERNALD SITE BOUNDARY

—30— URANIUM CONTOUR BASED ON 30 µg/L FRL, MAXIMUM, GEOPROBE RESULTS, AND MAXIMUM TOTAL URANIUM DATA THROUGH THE SECOND HALF OF 2005

• RESIDUAL LOCATION

2.41 URANIUM CONCENTRATION RESIDUAL

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STATE PLANAR COORDINATE SYSTEM 1983

$$DATE$$

FIGURE 4. MODEL LAYER 10 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (MAY, 2005) VERSES MODELED INITIAL CONCENTRATIONS

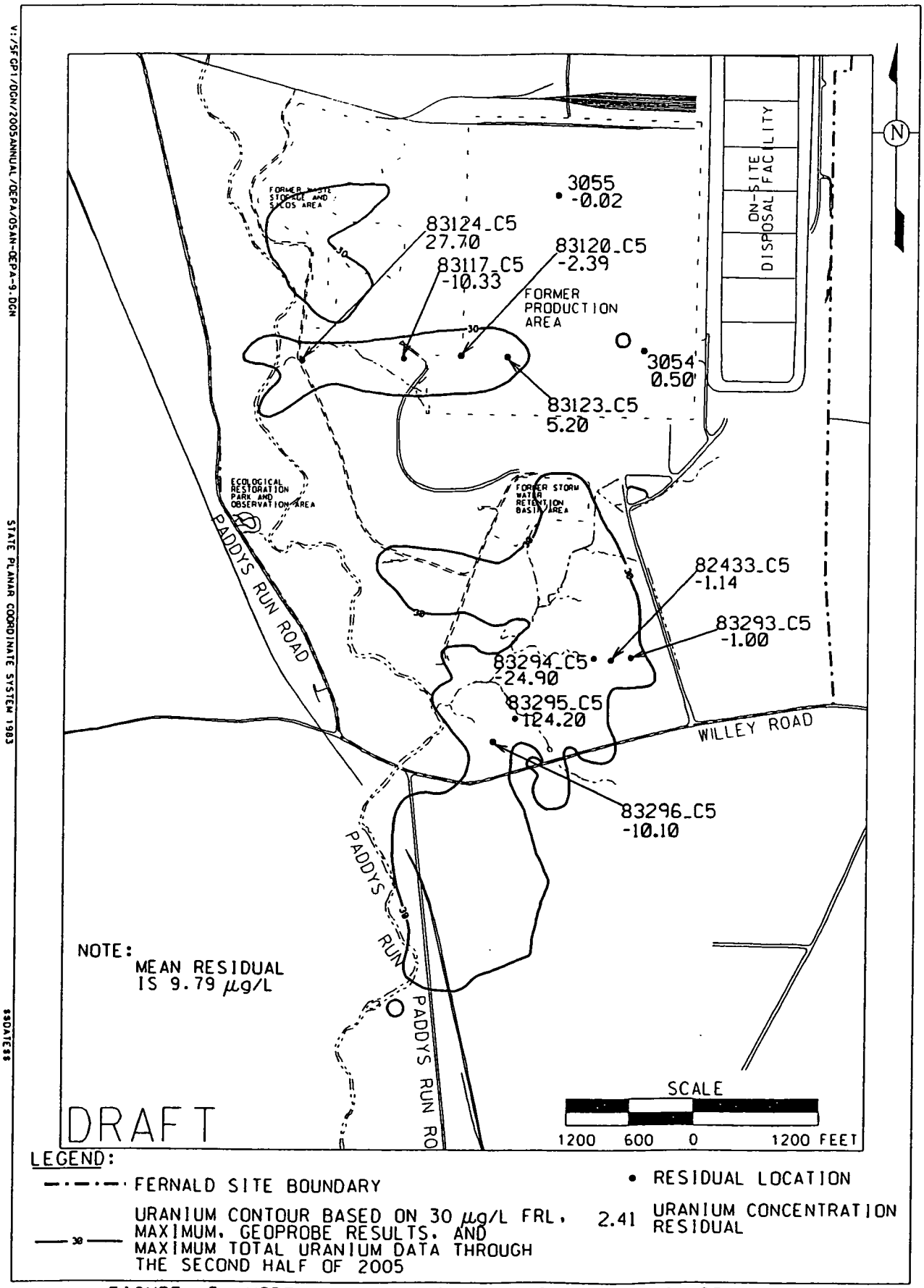


FIGURE 5. MODEL LAYER 9 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (MAY, 2005) VERSES MODELED INITIAL CONCENTRATIONS

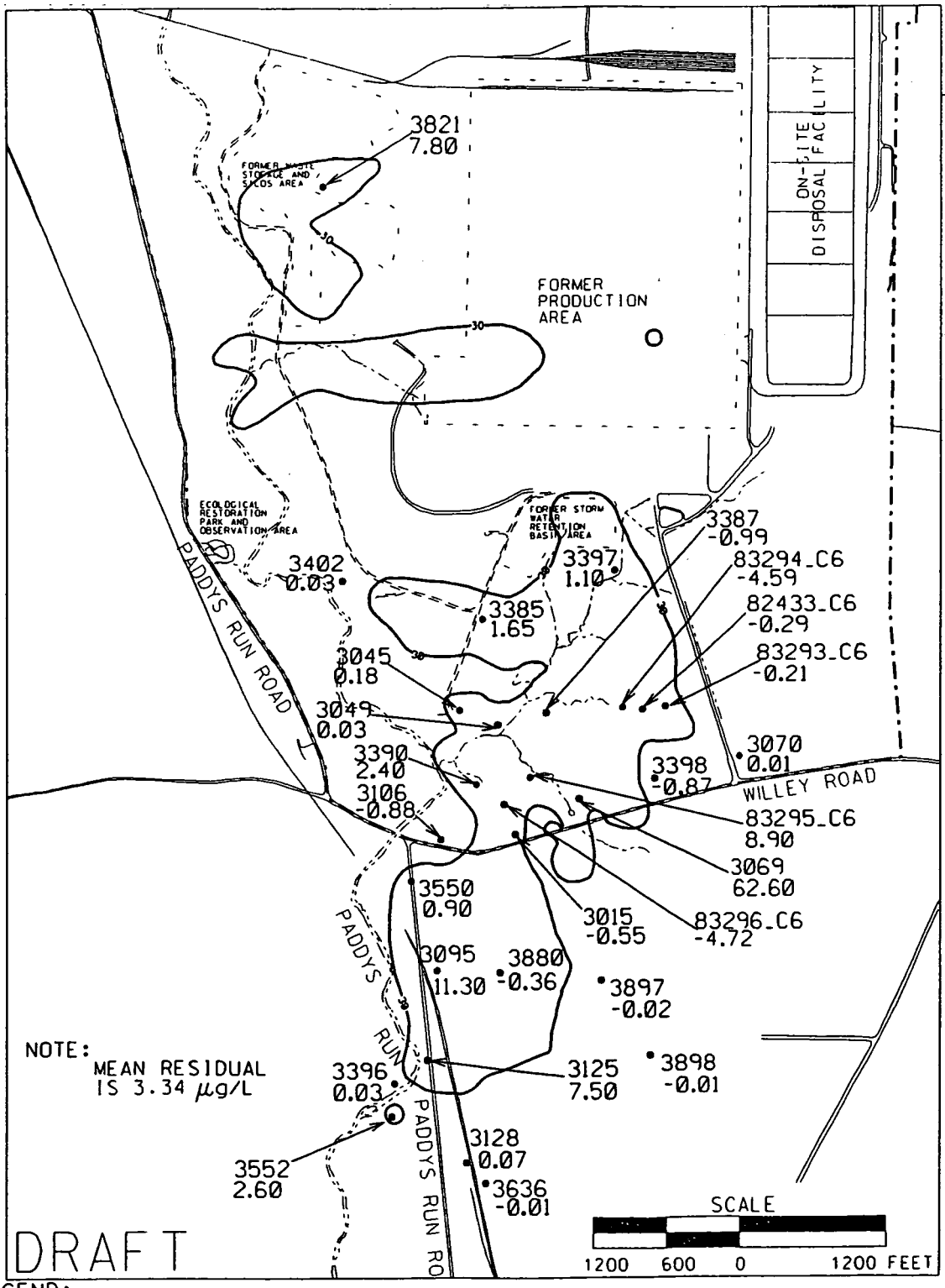


FIGURE 6. MODEL LAYER 8 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (MAY, 2005) VERSES MODELED INITIAL CONCENTRATIONS

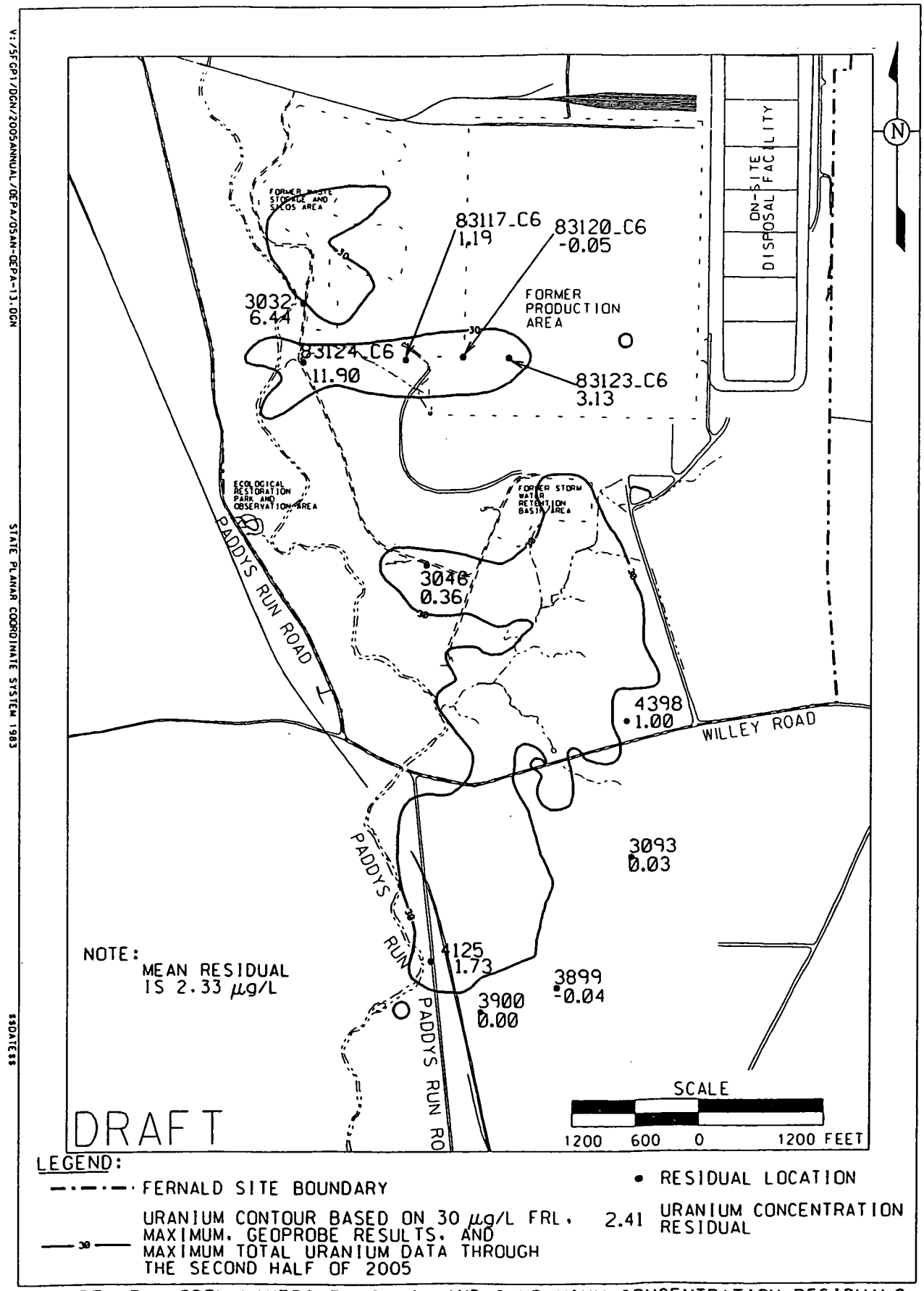
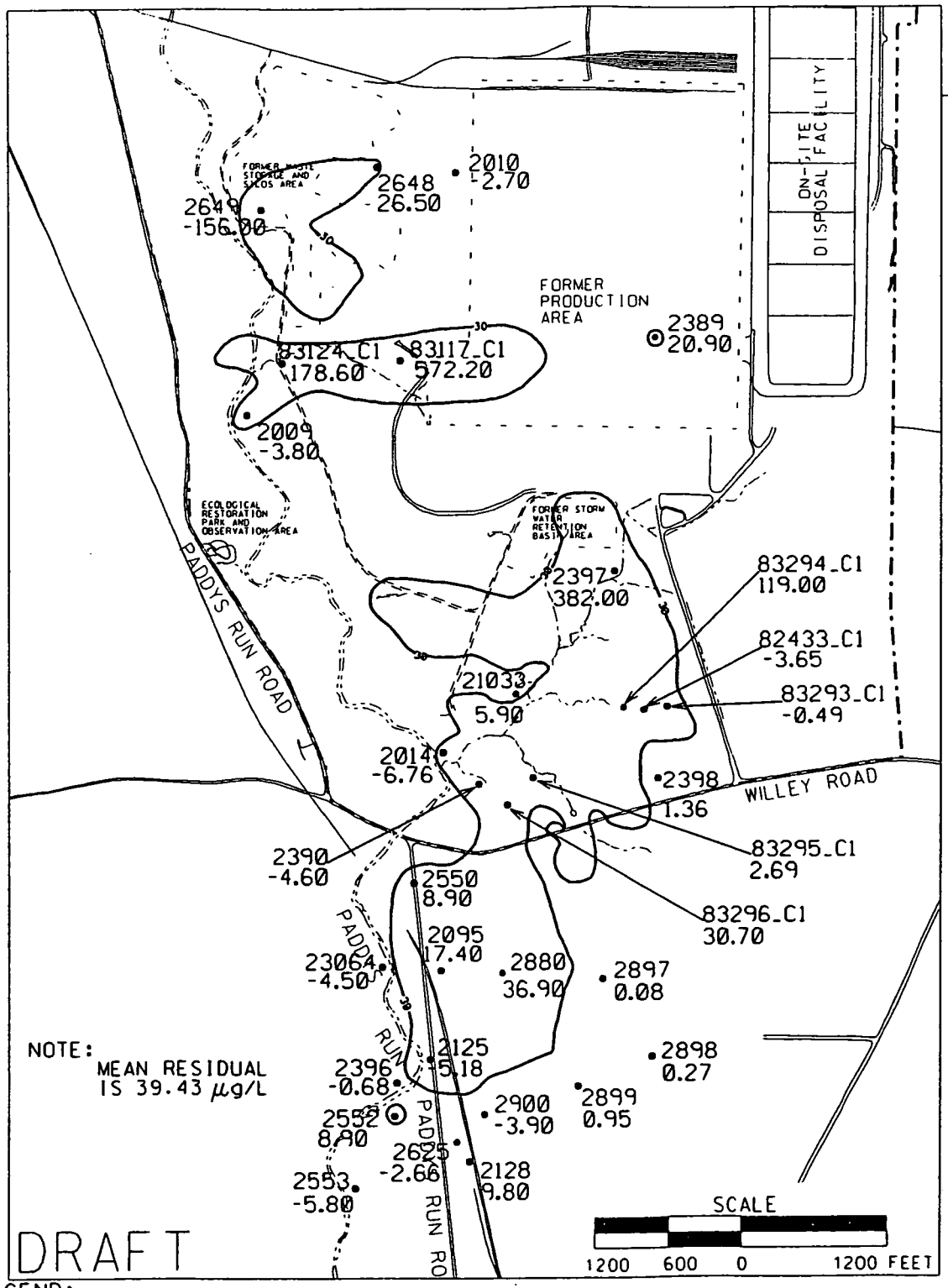


FIGURE 7. MODEL LAYERS 7, 6, 4, AND 2 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (MAY, 2005) VERSES MODELED INITIAL CONCENTRATIONS



LEGEND:

—·—·— FERNALD SITE BOUNDARY

—— 30 —— URANIUM CONTOUR BASED ON 30 µg/L FRL, MAXIMUM, GEOPROBE RESULTS, AND MAXIMUM TOTAL URANIUM DATA THROUGH THE SECOND HALF OF 2005

• RESIDUAL LOCATION

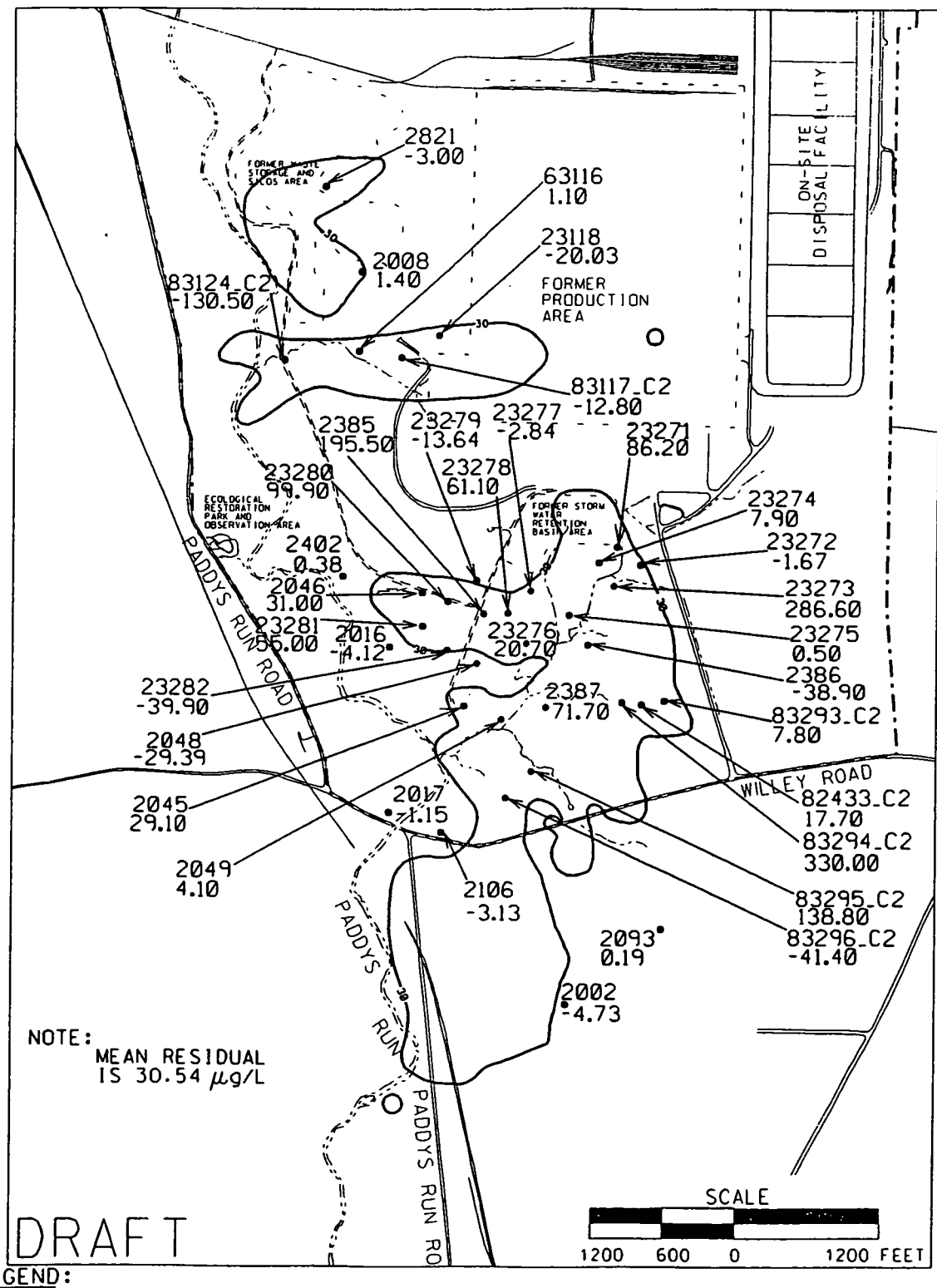
2.41 URANIUM CONCENTRATION RESIDUAL

FIGURE 8. MODEL LAYER 13 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (SECOND HALF, 2005) VERSES MODELED PREDICTED CONCENTRATIONS (APRIL, 2006)

V:/SFGP1/DGN/2005ANNUAL/OEPA/OSAN-OEPA-2.DGN

STATE PLANAR COORDINATE SYSTEM 1983

$$DATE$$



LEGEND:

—·—·— FERNALD SITE BOUNDARY

—— 30 —— URANIUM CONTOUR BASED ON 30 μg/L FRL, MAXIMUM, GEOPROBE RESULTS, AND MAXIMUM TOTAL URANIUM DATA THROUGH THE SECOND HALF OF 2005

• RESIDUAL LOCATION

2.41 URANIUM CONCENTRATION RESIDUAL

FIGURE 9. MODEL LAYER 12 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (SECOND HALF, 2005) VERSES MODELED PREDICTED CONCENTRATIONS (APRIL, 2006)

V:/SFGP1/DGN/2005ANNUAL/GEPA/05AN-GEPA-4.DGN

STATE PLANAR COORDINATE SYSTEM 1983

$$DATE$$

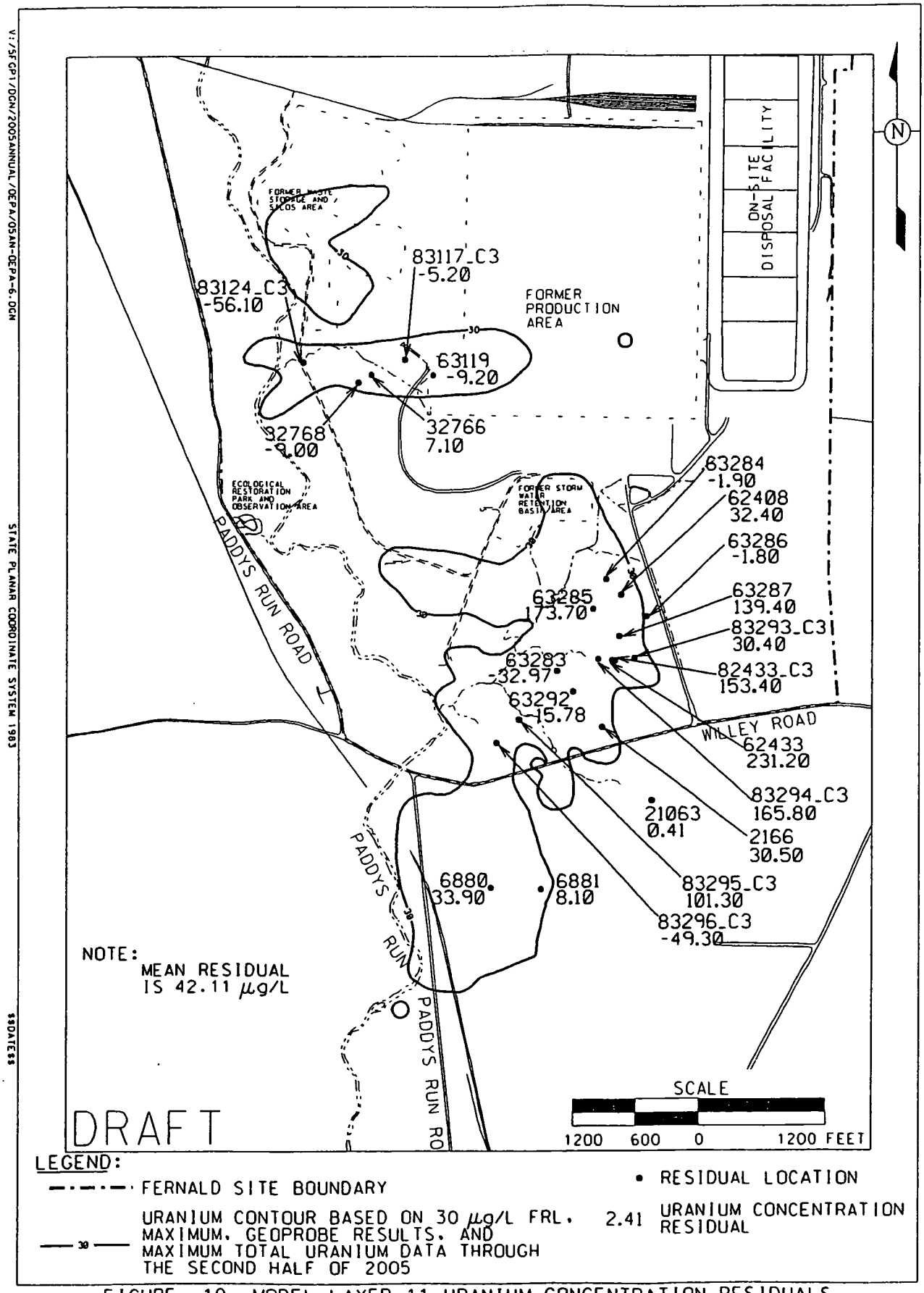
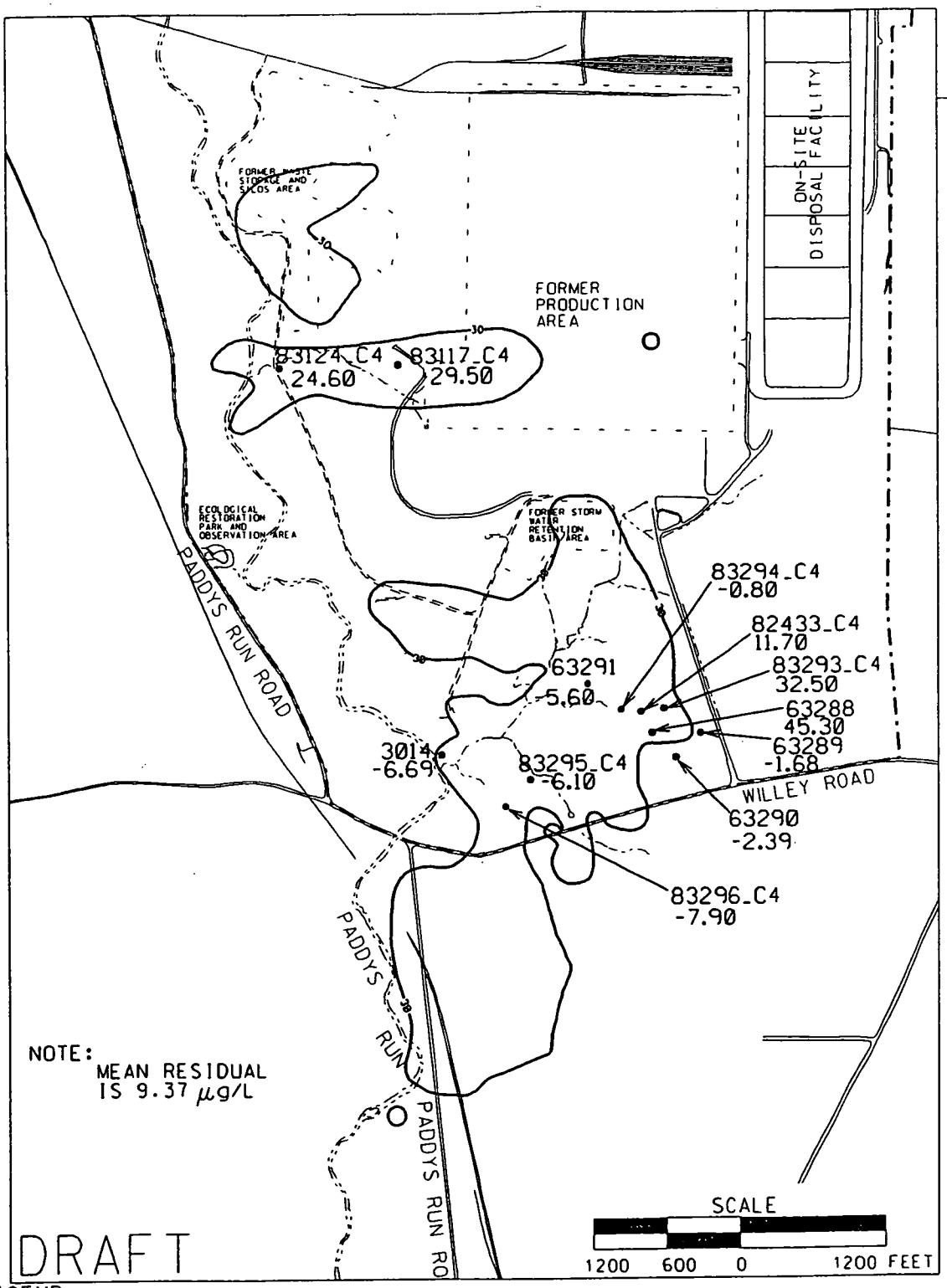


FIGURE 10. MODEL LAYER 11 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (SECOND HALF, 2005) VERSES MODELED PREDICTED CONCENTRATIONS (APRIL, 2006)



LEGEND:

—·—·— FERNALD SITE BOUNDARY

—— 30 —— URANIUM CONTOUR BASED ON 30 µg/L FRL, MAXIMUM, GEOPROBE RESULTS, AND MAXIMUM TOTAL URANIUM DATA THROUGH THE SECOND HALF OF 2005

• RESIDUAL LOCATION

2.41 URANIUM CONCENTRATION RESIDUAL

V:/SFCP1/DGN/2005ANNUAL/OEPA/OSAN-OEPA-8.DGN

STATE PLANAR COORDINATE SYSTEM 1983

$$DATE$$

FIGURE 11. MODEL LAYER 10 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (SECOND HALF, 2005) VERSES MODELED PREDICTED CONCENTRATIONS (APRIL, 2006)

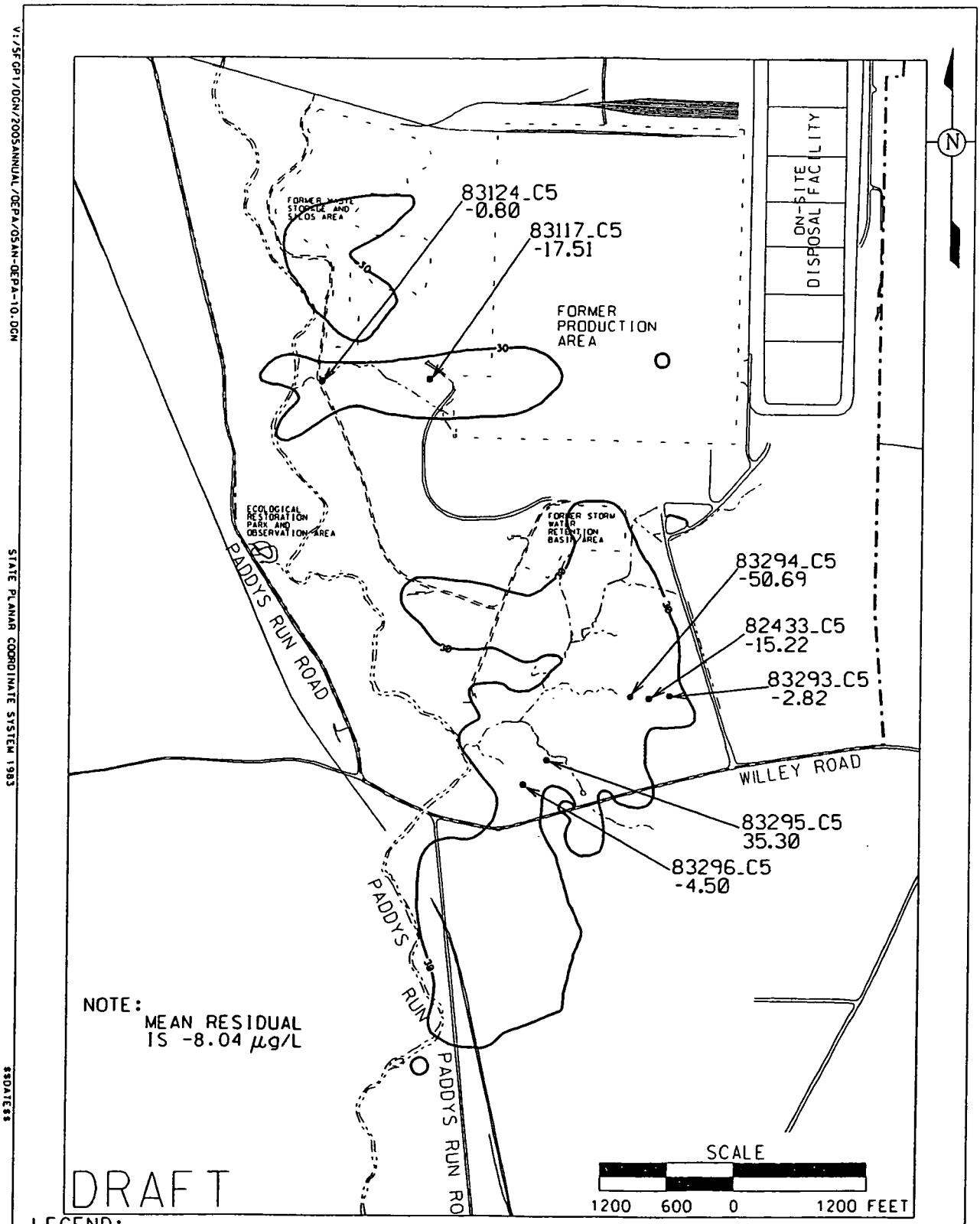


FIGURE 12. MODEL LAYER 9 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (SECOND HALF, 2005) VERSES MODELED PREDICTED CONCENTRATIONS (APRIL, 2006)

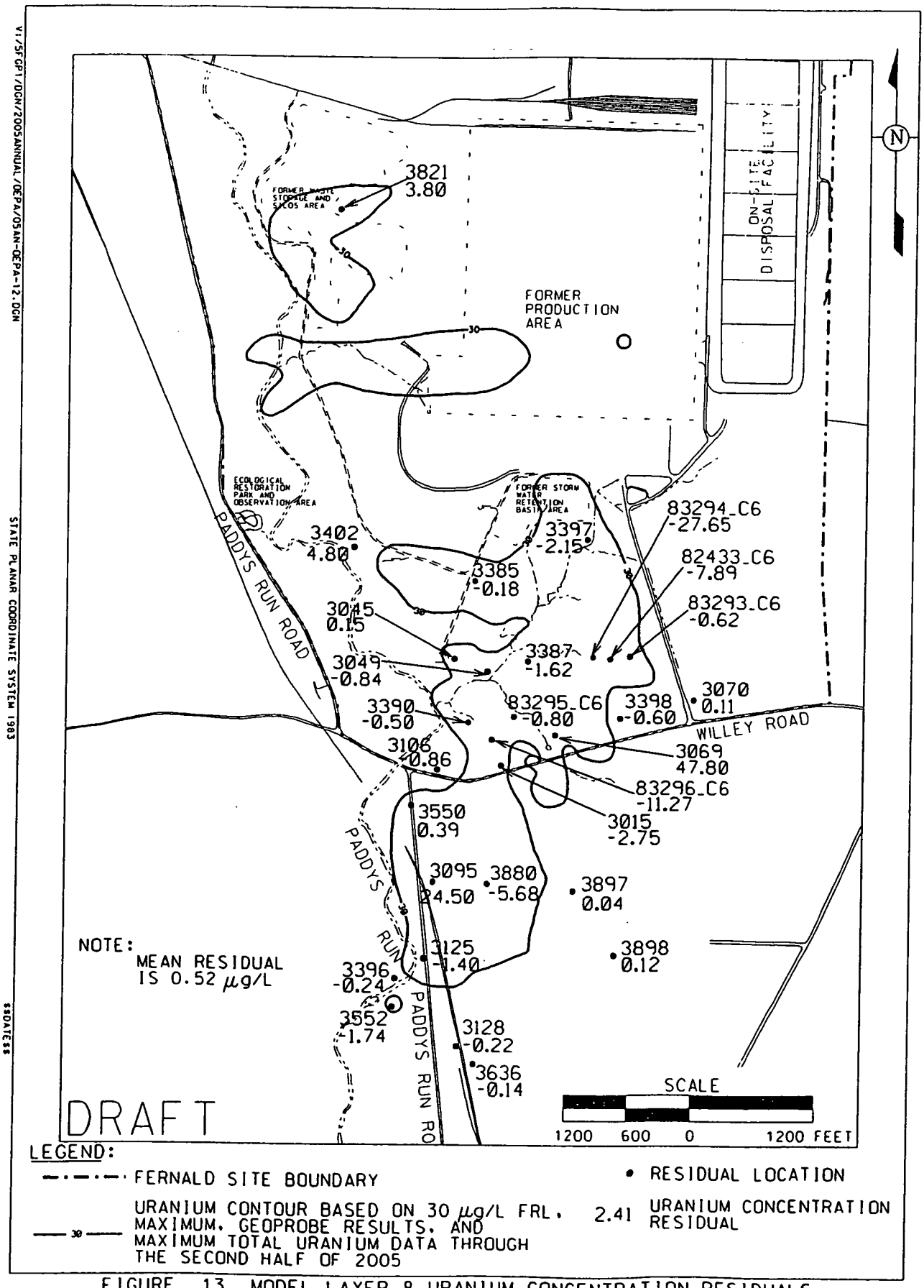


FIGURE 13. MODEL LAYER 8 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (SECOND HALF, 2005) VERSES MODELED PREDICTED CONCENTRATIONS (APRIL, 2006)

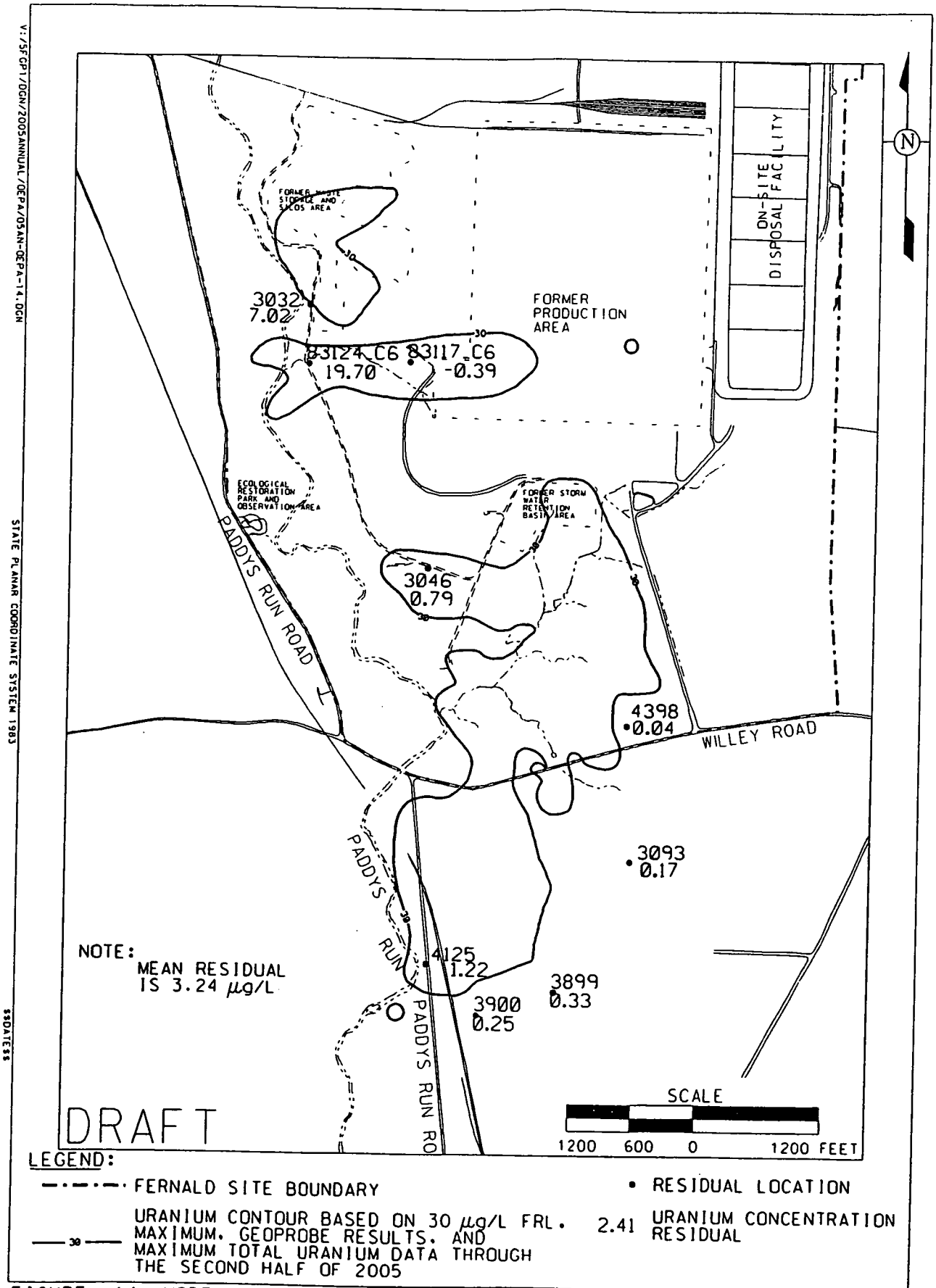


FIGURE 14. MODEL LAYERS 7. 6. 4. AND 2 URANIUM CONCENTRATION RESIDUALS. OBSERVED CONCENTRATION (SECOND HALF. 2005) VERSES MODELED PREDICTED CONCENTRATIONS (APRIL. 2006)

ATTACHMENT 3

(Reference Comment Responses #8 and #11 – #18)

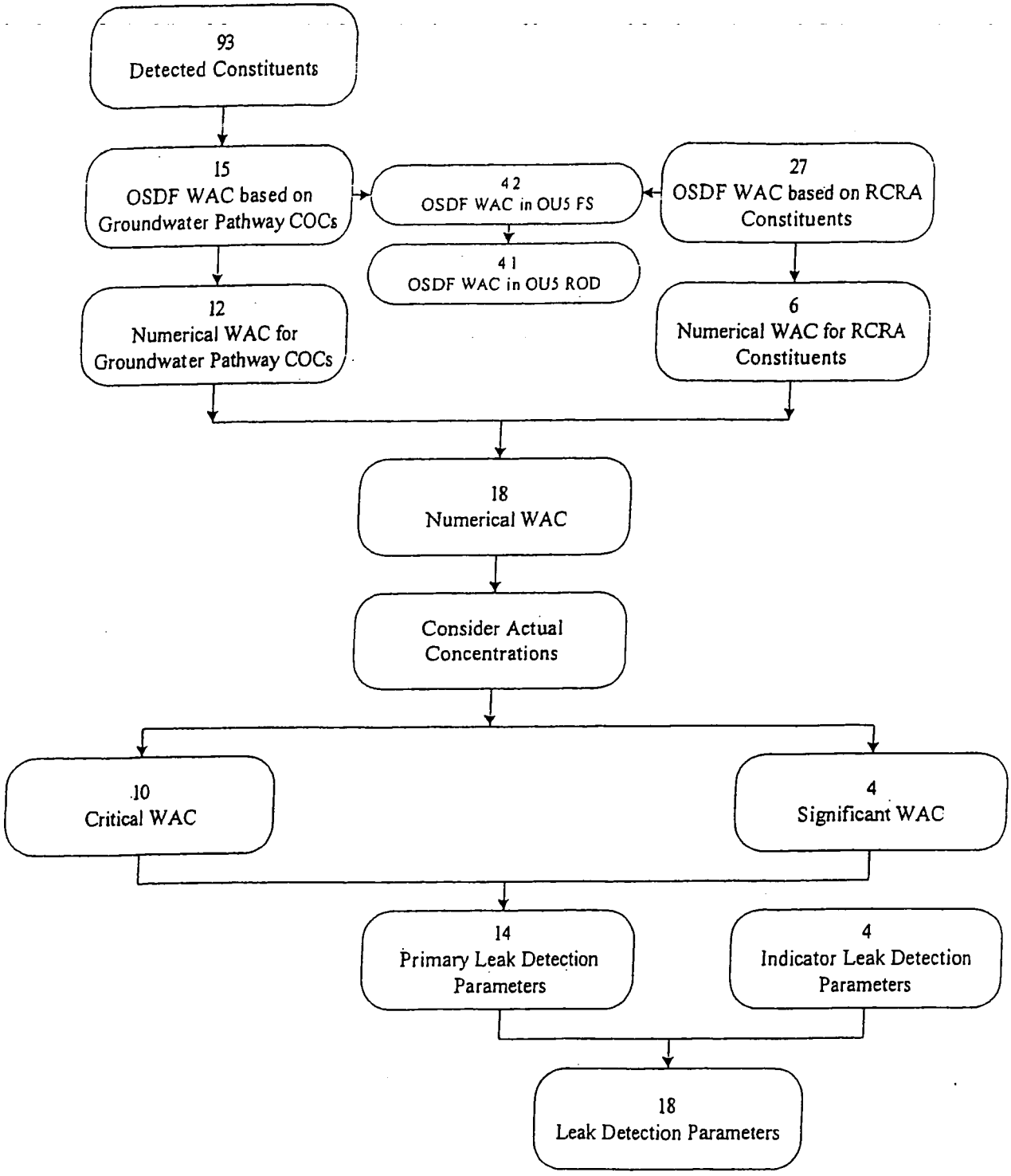
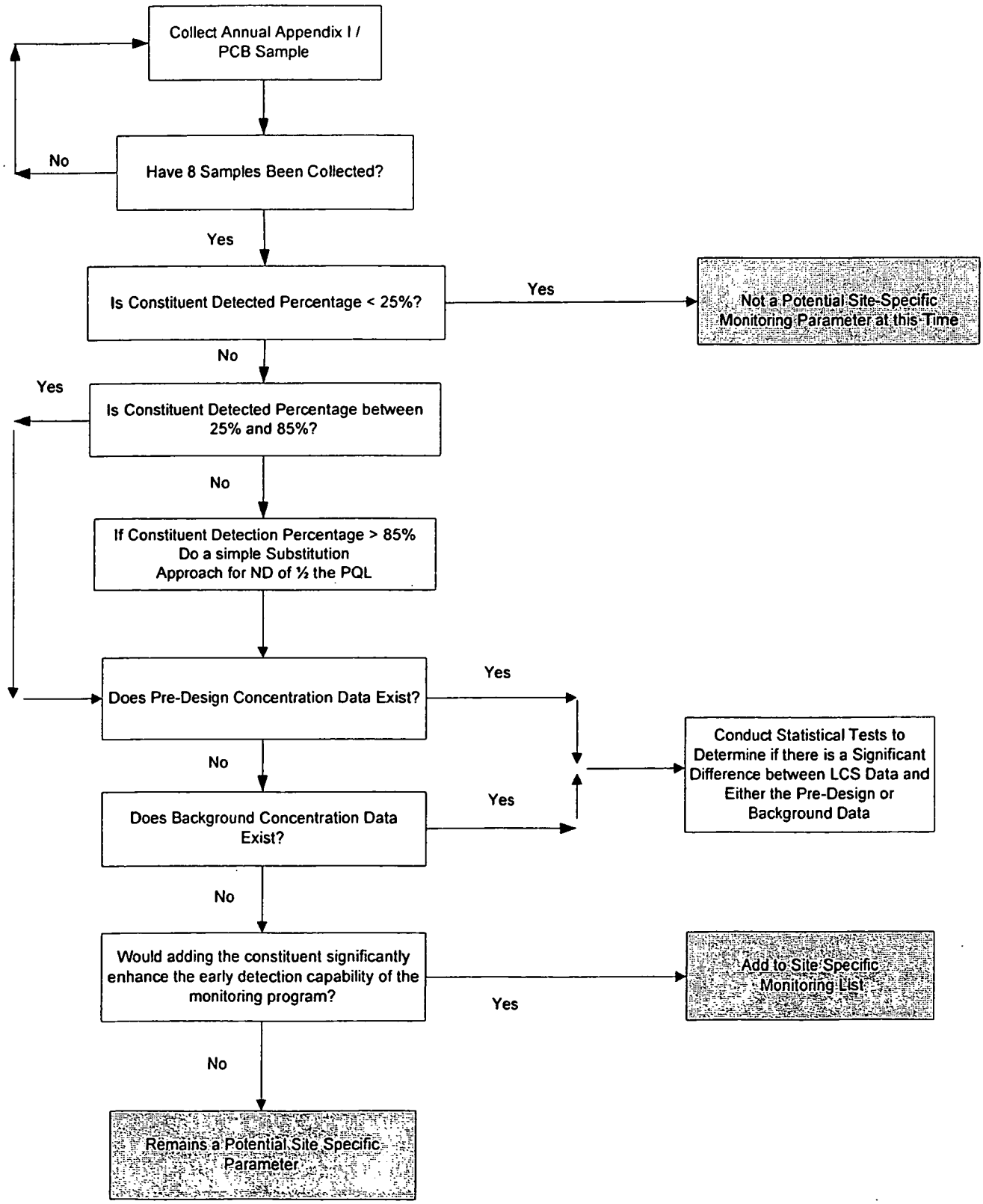
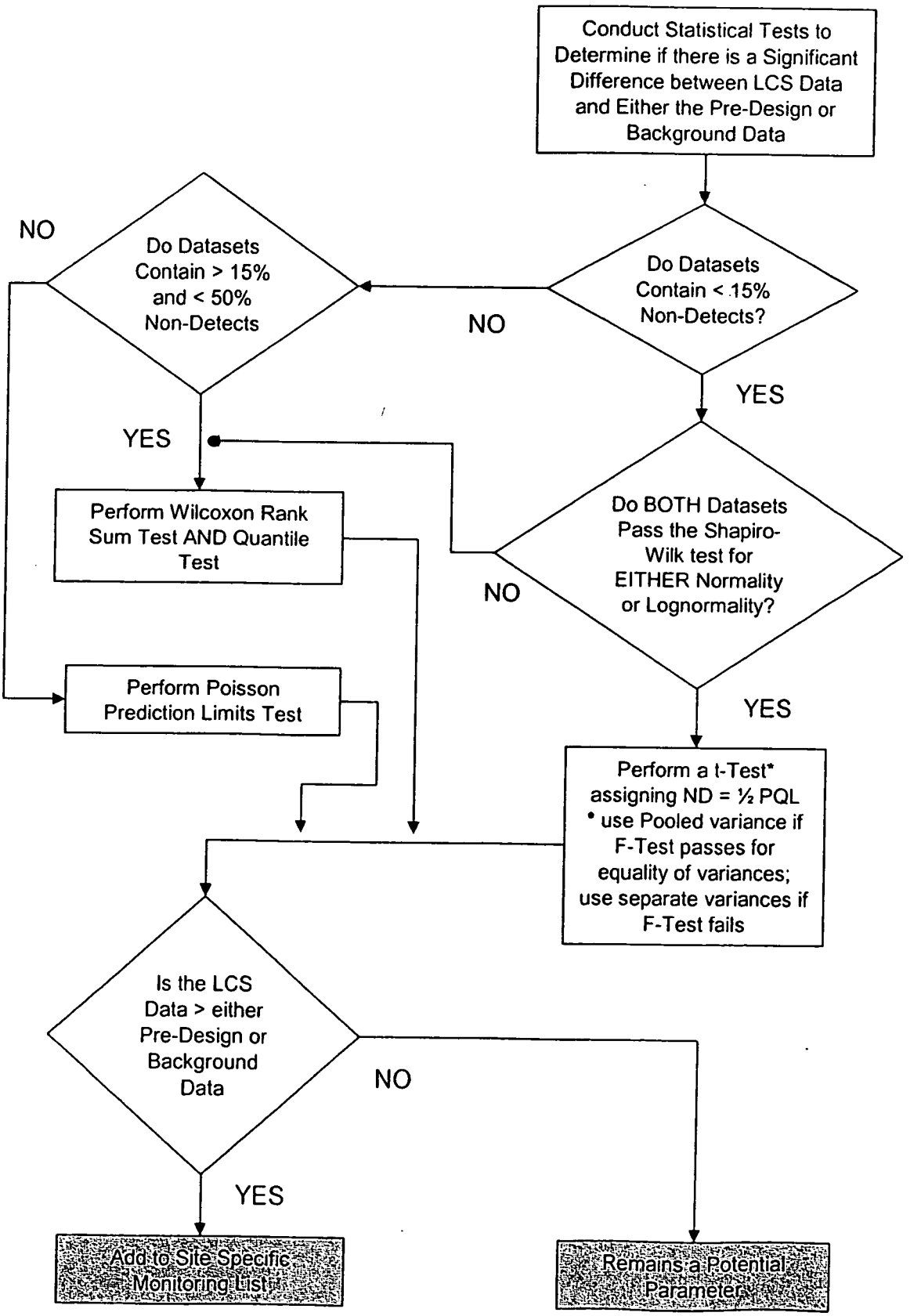


FIGURE 3-1. GROUNDWATER/LEAK DETECTION PARAMETER SLECTION PROCESS

OSDF Site-Specific Leachate Monitoring Parameter Selection Approach



OSDF Site Specific Leachate Monitoring Parameter Selection Approach (Continued)