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ADDENDUM TO RI/FS WORK PLAN REVISION 3 - ADDITIONAL 24 MONITORING WELLS AND 8 BORINGS

12/20/88

DOE-126-89
DOE-ORO USEPA
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ADDENDUM

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Department of Energy
Oak Ridge Operations
P.O. Box 2001
Oak Ridge, Tennessee 37831—

December 20, 1988

DOE-126-89

Mr. William Muno
U. S. Environmental Protection Agency
Region V-5HR-12
230 South Dearborn St.
Chicago, IL 60604

Dear Mr. Muno:

ADDENDUM TO RI/FS WORK PLAN REVISION 3 - ADDITIONAL 24 MONITORING WELLS AND 8 BORINGS

This correspondence transmits, for your concurrence, an addendum to the RI/FS Work Plan Revision 3 for the installation of twenty-four (24) additional monitoring wells and the completion of eight (8) borings. Five more monitoring wells have also been incorporated into the addendum as contingency wells. The contingency wells will be installed only in the event that elevated uranium concentrations are detected in the identified wells in the addendum.

Please note that this addition to the scope of work has resulted in a revision to the RI/FS Work Plan Revision 3 schedule to provide for the installation of the wells and borings. This revised schedule reflecting the new scope of work for the subject Addendum has already been submitted to Basil Constanelos for review via DOE letter no. 279-89, dated December 9, 1988.

If you have any questions regarding this matter, please contact Mary Stone, of my staff, at FTS 774-6656 or (513) 738-6656.

Sincerely,

Ray Hansen for

James A. Reafsnyder
Site Manager

DP-84:Stone

Enclosure:
Installation Plan for Additional Wells

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cc w/o enclosure:
C. McCord, USEPA-5
G. Mitchell, OEPA/Dayton
R. Bendula, OEPA/Dayton
M. Wilson, SE-31, ORO
L. C. Bogar, WMCO
C. R. Conner, WMCO

INSTALLATION PLAN FOR ADDITIONAL WELLS

FOR THE

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

FERNALD, OHIO

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RI/FS
DOCUMENT CHANGE REQUEST

This form is used to initiate and update RI/FS plans and procedures, only.

SAFETY	
YES ☐	NO ☒
INVOLVED	

REQUEST NO:
Completed by: _____ Revision/ Issue Date: _____
DO NOT WRITE IN THIS BLOCK

REQUESTOR Timothy L. Ellenberger PHONE NO.: 738-3100 DATE October 19, 1988
DOCUMENT TITLE Work Plan DOCUMENT NUMBER N/A
SECTION/PARAGRAPH/PAGE NO.: Sec. 4.2.1.3; pg. 23 of 48; Sec. 4.2.1.4, pg. 41 of 98
ISSUE DATE January 1987 LATEST REVISION DATE March 1988

JUSTIFICATION

Justification for the location of the wells is provided in the attached "Installation Plan for Additional Wells" dated October 1988.

CONTENT OF CHANGE

Increase the number of wells to be installed on site by 24. Increase the number of borings to be drilled by 8. Revise project schedule to provide for the installation of the 24 additional wells.

CANCELLATION INSTRUCTIONS

CANCEL DOCUMENT NO.: N/A
Reason for cancellation:

REQUIRED APPROVALS

R T Wilde 10-19-88	Dennis A. Carr 10-20-88
ASI PROJECT DIRECTOR/DATE	WMCO PROJECT MGR./DATE
[signature] for M. Nicole	
ASI QA OFFICER/DATE	WMCO IMPACT ASSESS. MGR./DATE
Joseph Silverstein Oct 19, 1988	H. E. Richardson 10/20/88
IT PROJECT DIR./DATE	WMCO QA OFFICER/DATE
Timothy L. Ellenberger 19 Oct 88	
IT QA OFFICER/DATE	DOE COTR/DATE

TO BE COMPLETED BY DOE

A. PRIOR EPA NOTIFICATION REQUIRED ? YES ____ NO ____
B. PRIOR EPA APPROVAL REQUIRED ? YES ____ NO ____
C. IMMEDIATE IMPLEMENTATION. YES ____ NO ____

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INSTALLATION PLAN FOR ADDITIONAL WELLS

FOR THE

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

FERNALD, OHIO

INSTALLATION PLAN FOR ADDITIONAL WELLS FOR THE RI/FS

1.0 INTRODUCTION

This plan covers the installation of additional wells in three areas:

- Wells that are required to complete the monitoring network on the down gradient east side of the facility.
- Wells that will define the western and southern limits of the plume under the Waste Storage Area, which was identified with the initial drilling program.
- On-site wells to define the sources of the plume migrating off of the southern edge of the FMPC and determine the lateral and vertical extent of the plume.

The drilling plan is based on a review of the data from the first quarterly round of water sampling and the monthly water level data. The selection of these wells has taken into consideration the historical data for the site and discussions with the United States and Ohio EPAs.

The data from the first quarterly monitor well sampling verify that the initial wells installed for the RI/FS are in locations that have added valuable information regarding the extent, location, and concentration of contaminant plumes beneath the FMPC. Plumes that had been previously identified have been confirmed, and the shape and distribution of these plumes has been refined. The data indicate that there are two uranium plumes under the FMPC. One plume is centered under, and appears to originate from, the Waste Storage Area. This plume is moving east toward the Production Area. The second plume is located under the southwestern portion

of the FMPC. The source of this plume is less clearly-defined. The source could be historical releases from the storm water runoff or leaching from either the South Field, old flyash area or the current flyash pile. The source could be all three areas contributing individually, either at various times or collectively.

The results of the sampling also indicate that there is a need for additional wells to refine the location of the boundaries of the plumes, determine the extent of vertical migration, and delineate the extent of some source areas. Besides the monitoring well data, these recommendations are based on discussions with both the United States and Ohio EPAs that occurred on August 23, 1988 and recent findings in the Plant 6 area.

Table 1 lists the wells and summary reasons for their installation. Figure 1 shows the location of the 24 wells that are proposed to be installed. In addition to the 24 wells, five contingency wells are described in this document. The decision to install these wells will be made on the basis of data gathered from the installation of the 24 wells. Table 2 provides a listing of the contingency wells and the basis for the decision for their installation. Figure 2 shows the locations of both the 24 and the five contingency wells.

2.0 EAST OF THE PRODUCTION AREA

Three 2000-series Argonne wells (numbers 2053, 2054, and 2055, respectively) will be installed in the Production Area. These wells will identify the influence of the activities in the Production Area on the upper part of the sand and gravel aquifer. These three wells will also help determine the magnitude and eastward extent of the plume moving from the Waste Storage Area.

In conjunction with these wells, two additional 2000-series wells will be installed on the east side of Plant 6 to determine whether or not operations in Plant 6 have contaminated the sand and gravel aquifer. One well, number 2109, will be located on the east side of Plant 6 down gradient of the pickeling area. The other, number 2118, will be located near the south east corner of Plant 6. A 1000-series well, 1064, will be installed to monitor the till east of Plant 6.

If elevated uranium concentrations are found in the 2000-series wells adjacent to Plant 6, an additional well cluster consisting of a 1000-, a 2000-, and a 3000-series well, will be installed east of Plant 6 as shown in Figure 2. The exact location of the cluster will be determined by the concentration of uranium in the wells and the local water table gradient.

Three 4000-series wells will be added to the eastern portion of the FMPC. Wells 4013, 4064, and 4067 will monitor the deep part of the sand and gravel aquifer along the eastern boarder of the FMPC. If these wells detect elevated uranium contamination, an additional 4000-series well will be installed at location 51.

Well 4010 will be installed at location 10 to determine whether or not there are elevated concentrations of uranium in the deep part of the aquifer moving from the Waste Storage Area.

3.0 WEST AND SOUTH OF THE WASTE STORAGE AREA

A new well cluster will be installed 800 feet west of Cluster 34. These wells, numbers 2108 and 3108, will be located on the west side of Paddy's Run. The purpose of this cluster is to determine the western boundary of the plume that is associated with the Waste Storage Area. Similarly, a new cluster, consisting of Wells 2107 and 3107, will be installed 700 feet west-northwest of Well 1047.

This cluster will provide information to help determine whether or not the plume from the Waste Storage Area is connected to the plume south of the flyash piles.

Wells 2046 and 2047 will be installed to determine whether or not uranium is in the sand and gravel aquifer. Uranium was found in the till in both Wells 1046 and 1047.

4.0 SOUTH OF THE FLYASH PILES

The presence of a plume in the area south of the flyash piles has been confirmed. There is, however, a considerable amount of uncertainty as to the source or sources of the plume, as well as to the distribution of the plume. The center axis of the plume has a north-south orientation. The location of the axis appears to shift to the west with depth when the 2000- and 3000-series well data are compared.

The active flyash pile and the stream carrying the storm water runoff from the Production Area are also possible sources. In order to better define the southern plume in this area, Wells 2048 and 2045 will be installed at the location of Wells 1048 and 1045, Wells 3065 and 3049 will be installed at locations 65 and 49, and Wells 4014 and 4016 will be installed at existing locations 14 and 16. Because of the westward shift in the location of the plume with depth, a new well cluster, consisting of Wells 2106 and 3106, will be installed on the south edge of the FMPC property, half-way between locations 15 and 17.

5.0 WELL INSTALLATION AND SUBSURFACE SOIL SAMPLING

Subsurface soil samples will be collected during drilling under the same procedures as are described in the RI/FS Work Plan Revision 3. Well construction and well materials, as well as field screening for radionuclides and organic contaminants, will also be the same as specified in the Work Plan.

After well construction and development, water samples will be collected and analyzed as part of the current quarterly sampling program. Some wells may be completed in time to be included in the third quarterly sampling scheduled to begin the week of October 17, 1988. Most of the wells will be available for the fourth quarterly sampling, which is scheduled to begin in January of 1989. Wells that are not completed by the end of the fourth quarterly sampling will be sampled as they are completed as if they were included in the fourth quarterly sampling. The 24 wells installed as part of this program will be sampled again in April 1989, regardless of the time they were completed, so that there are two samples from each well. Two samples are the minimum number required to have any confidence in the accuracy of the results of the sample.

6.0 SOIL BORINGS AROUND PLANT 6

All borings will be drilled using hollow stem augers. Continuous split spoon samples will be collected in each boring. The general rule for installing a boring will be to drill and sample to a depth of 20 feet or the first water bearing unit. If a water bearing sand is encountered, the boring will be drilled until either a clay or a total depth of 20 feet is reached. There will be a strict limit on the depth of a hollow stem auger boring in order to prevent the possibility of a boring penetrating the till and draining contaminated water to the sand and gravel aquifer.

Figure 1 shows the location of the eight borings that will be drilled around Plant 6. These borings will indicate the extent of the contamination in the vicinity of Plant 6. Previous investigations have found contamination under the building at the pickeling area and at the south end of the building where a former sump leak occurred and was repaired. In the area south of Plant 6, borings are being placed to determine the extent of residual contamination from the sump leak. Contamination was known to have

reached the sewer south of the plant, but there was no attempt to determine the extent of the contamination at the time. If these borings indicate a significant area of elevated uranium concentrations, an additional 1000-series well will be installed south of Plant 6 and north of the parking lots, as indicated in Figure 2 as Well 1119.

6.1 Borings that Encounter Water

All borings that encounter water will be completed as a two-inch diameter piezometer constructed of PVC. The PVC screen will be installed to extend over the thickness of the water bearing unit. A gravel pack will be placed around the screen, and the boring will be sealed with Volclay grout in the same way that wells are completed. The piezometer will be protected with a steel protective housing similar to the ones used for the RI/FS wells.

The piezometer will allow water levels to be collected to interpret the local perched water table in the glacial till. The piezometers will also permit future sampling for uranium analyses. Our experience to date with wells in the till in the Production and Waste Storage Areas indicates that these wells generally do not yield sufficient quantities of water to allow for an extensive analytical program with each sampling event. Therefore, the following logic will be used to determine what analyses will be performed on samples from each piezometer. Uranium will be of first priority, since it is the most likely contaminant to be found. One sample will be collected for total and isotopic uranium. If there is either visible staining, a sheen on the water in the piezometer, or HNu readings to suggest that organic contaminants are present, a sample will be collected for HSL volatile organic analysis.

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Borings that do not encounter water will be back-filled with Volclay grout. All cuttings will be drummed at the boring location. Disposition of the cuttings will be based on analytical results of samples from that boring.

6.2 Soil Sample Intervals in Borings

Samples will be collected and described by a geologist in accordance with the procedures in the RI/FS Work Plan Revision 3. Samples will be sent for analysis for total uranium for the 0.0 to 0.5 foot, 2.0 to 2.5 foot, and 5.0 to 5.5 foot intervals, as well as at five foot intervals until either water or the end of the boring is reached. All split spoon samples will be archived in order to be available for later analysis to refine the vertical extent of contamination in any given boring.

No soil samples will be taken from below the water table for chemical analysis. There is no rationale for taking soil samples from below the water table for chemical analysis. The results from such samples simply indicate something about the ground water contamination. It is far more useful to properly collect a water sample in order to evaluate a ground water problem.

7.0 GROUND WATER QUALITY SAMPLING

Ground water quality samples will be collected from each of the 24 wells. The timing of the sampling will vary to support the data evaluation that must be completed in order to determine whether or not any or all of the five contingent wells will be installed. Water samples will be collected from the three 2000-series wells installed near Plant 6 as soon as the wells are developed. These samples will be submitted for total uranium and the general ground water parameters as specified in the RI/FS Work Plan. The data from these three well samples will be used along with the information gathered during drilling the wells and borings to determine whether or not the additional cluster east of Plant 6 is

necessary, as well as whether or not the 1000-series well south of Plant 6 is necessary. Similarly, ground water samples will be taken from the three 4000-series wells that will be installed along the eastern side of the Production area. The samples will be analyzed for total uranium and general water quality parameters as specified in the RI/FS Work Plan. Data from these analyses will be used to determine whether or not an additional 4000-series well at location 051 is necessary.

All 24 wells will be completed in time to be included in the fourth quarterly water sampling as specified in the RI/FS Work Plan. The fourth quarterly sampling will begin in early January 1989 and be completed in early February 1989. Unless unfavorable weather significantly delays the drilling, all 24 wells will be installed and developed by the end of January. All of the 24 wells will be sampled a second time two months after the initial sampling to provide at least two data points for each well. In both samplings, the analysis will be the same as that specified for the fourth quarterly sampling in the RI/FS Work Plan Revision 3.

ADDITIONAL 24 WELLS

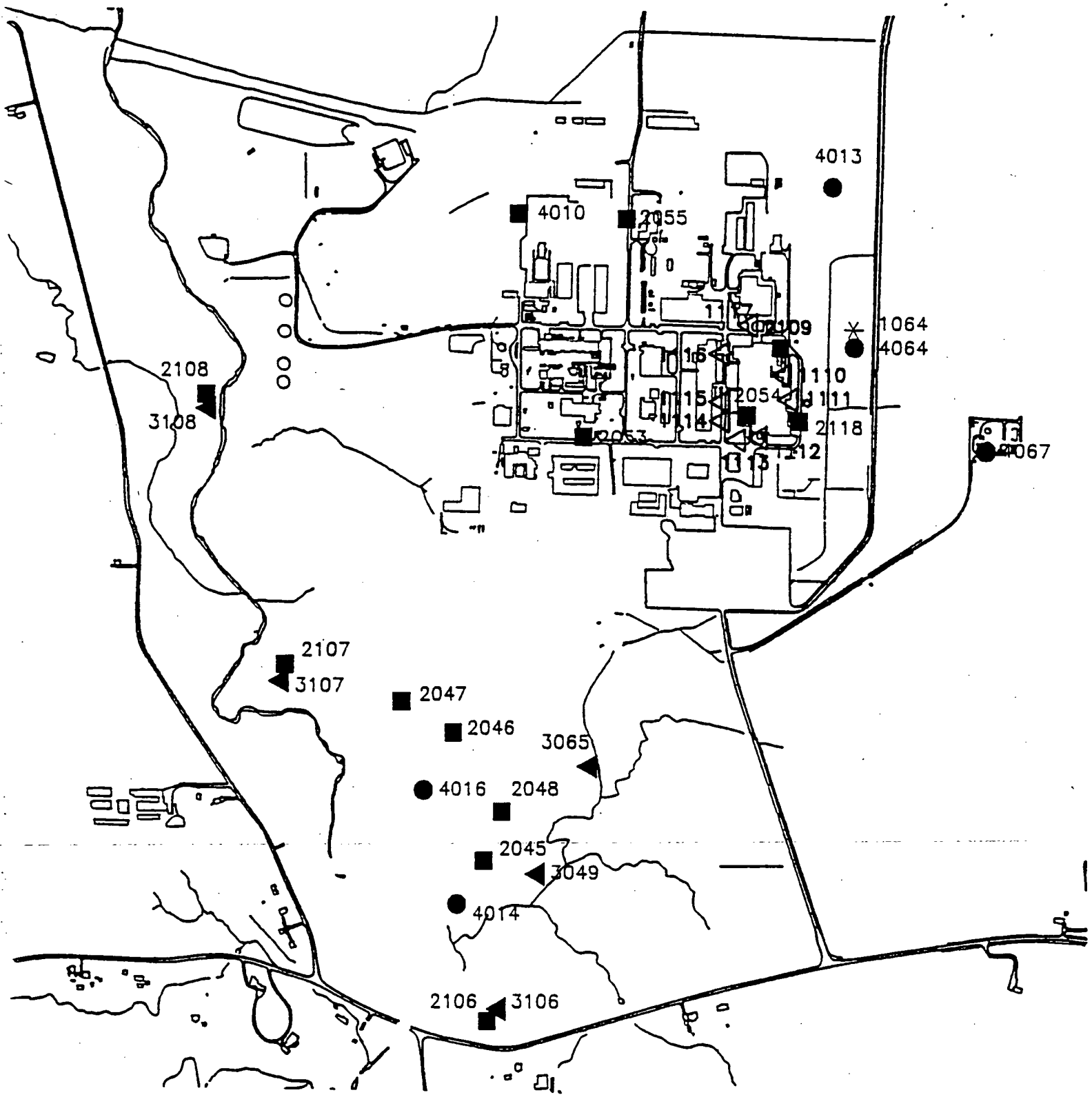
Table 1

Well Number/Series	Reason
Argonne A/2053 B/2054 Argonne C/2055	Monitor upper sand and gravel Argonne aquifer just down gradient of the waste pit area. Also, shallow wells in these areas show elevated uranium concentrations.
2109	Down gradient of Plant 6.
2118	Southeast of Plant 6.
4013 4064 4067	Monitor deep sand and gravel aquifer down gradient of the waste pit area and between the production area and the deep pumping to east.
1064	Monitor till northeast of Plant 6.
2018 3018	Monitor sand and gravel aquifer just up gradient of the site and west of Site the contaminated wells.
2107 3107	Monitor ground water that may be infiltrating along Paddy's Run and flowing southeast.
2046 2047	Monitor top of S&G aquifer beneath contaminated area.
4016	Monitor deep sand and gravel aquifer to determine the vertical extent of contamination.
2048 2045 3065 3049 4014	Evaluate the vertical extent of contamination in a known contaminated area.
2106 3106	Evaluate the area directly south of known contamination.
4010	Determine whether or not elevated concentrations of uranium are in the deep part of the aquifer downgradient of the Waste Storage Area.

CONTINGENCY WELLS

Table 2

Well Number/Series	Reason
1000-, 2000-, 3000-Cluster East of Plant 6	To determine the down gradient extent of a plume if one is found adjacent to Plant 6.
1000-Series South of Plant 6	To determine the southern extent of the plume if one is found south of Plant 6.
4051	To determine the eastern extent of the plume if one is found in Wells 4013, 4064, or 4067.

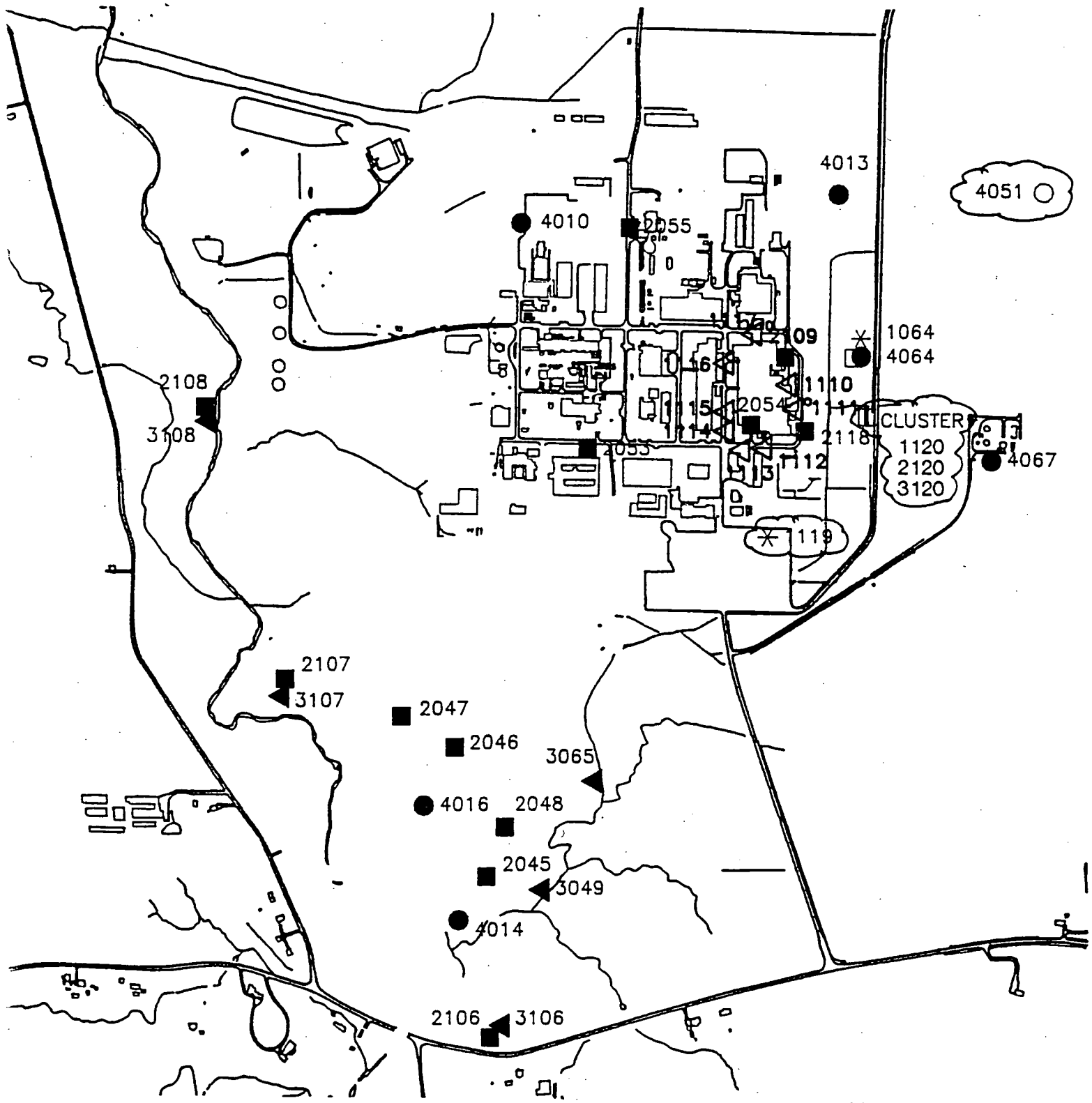


PROPOSED 24 ADDITIONAL
ON SITE WELLS

FIGURE 1

◁ BORING

✳ 1000 SERIES
■ 2000 SERIES
◀ 3000 SERIES
● 4000 SERIES



PROPOSED 24 ADDITIONAL
ON SITE WELLS

AND 5 CONTINGENCY WELLS

FIGURE 2

◁ BORING

✳ 1000 SERIES
■ 2000 SERIES
◀ 3000 SERIES
● 4000 SERIES
CONTINGENCY WELLS