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REMOVAL SITE EVALUATION KC-2 WAREHOUSE/WELL #67

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RSE

REMOVAL SITE EVALUATION
KC-2 WAREHOUSE/WELL #67

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1.0 Introduction

In 1986 the Department of Energy (DOE) and the United States Environmental Protection Agency (U.S. EPA) entered into a Federal Facility Compliance Agreement (FFCA), which included provisions to remediate the Fernald Environmental Management Project (FEMP) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Production activities at the FEMP (formerly the Feed Materials Production Center) ceased in 1989 as resources were shifted to environmental remediation. The provisions of the 1986 FFCA relating to Remedial Investigation/Feasibility Study (RI/FS) and Remedial Action were amended in 1990 with the signing of a Consent Agreement under CERCLA sections 120 ad 106(a). The Consent Agreement established five Operable Units (OUs) to facilitate remediation. In 1991, the DOE and the U.S.EPA amended the Consent Agreement to revise remediation schedules, rescope the Operable Units, and identify additional removal actions. Also, in 1992, DOE contracted with the Fernald Environmental Restoration Management Corporation (FERMCO) as the Environmental Restoration Management Contractor (ERMC) to oversee restoration of the FEMP. FERMCO replaced the previous site management contractor, Westinghouse Environmental Management Company of Ohio (WEMCO), in December 1992. Under FERMCO, the five OU management organizations were renamed CERCLA/RCRA Units (CRUs).

This Removal Site Evaluation (RSE) has been completed by the DOE under Sections 104, 106(a) and 120(a)(1) of CERCLA and is consistent with 40 CFR 300.410 of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). This RSE documents the events that led up to the discovery and subsequent investigation of Well #67, which is located within the KC-2 Warehouse and subsequent sampling of groundwater and sediment contained in the well.

2.0 KC-2 Warehouse

The KC-2 Warehouse (Building #63) is located on the north side of the site's former production area. It is positioned several hundred feet away from any other major building and lies approximately six feet south of the northern boundary of the production area (See Figure 1). The building consists of eight bays of various sizes (See Figure 2). Each bay is separated by an eight inch interior concrete wall. The floor is concrete slab on earth, and the roof consists of unprotected metal decking on steel bar joists. Bays #1-7 are completely enclosed with concrete block walls. Bay #8 is basically open at its north and south ends, except that the open ends are covered with tarpaulins over chain link fencing to within one foot of the floor. The entire building occupies 28,372 square feet. Bay #2 is approximately 60 feet by 80 feet square. The warehouse has no mechanical ventilation. The KC-2 warehouse was constructed in 1957. This warehouse was used by Maintenance and

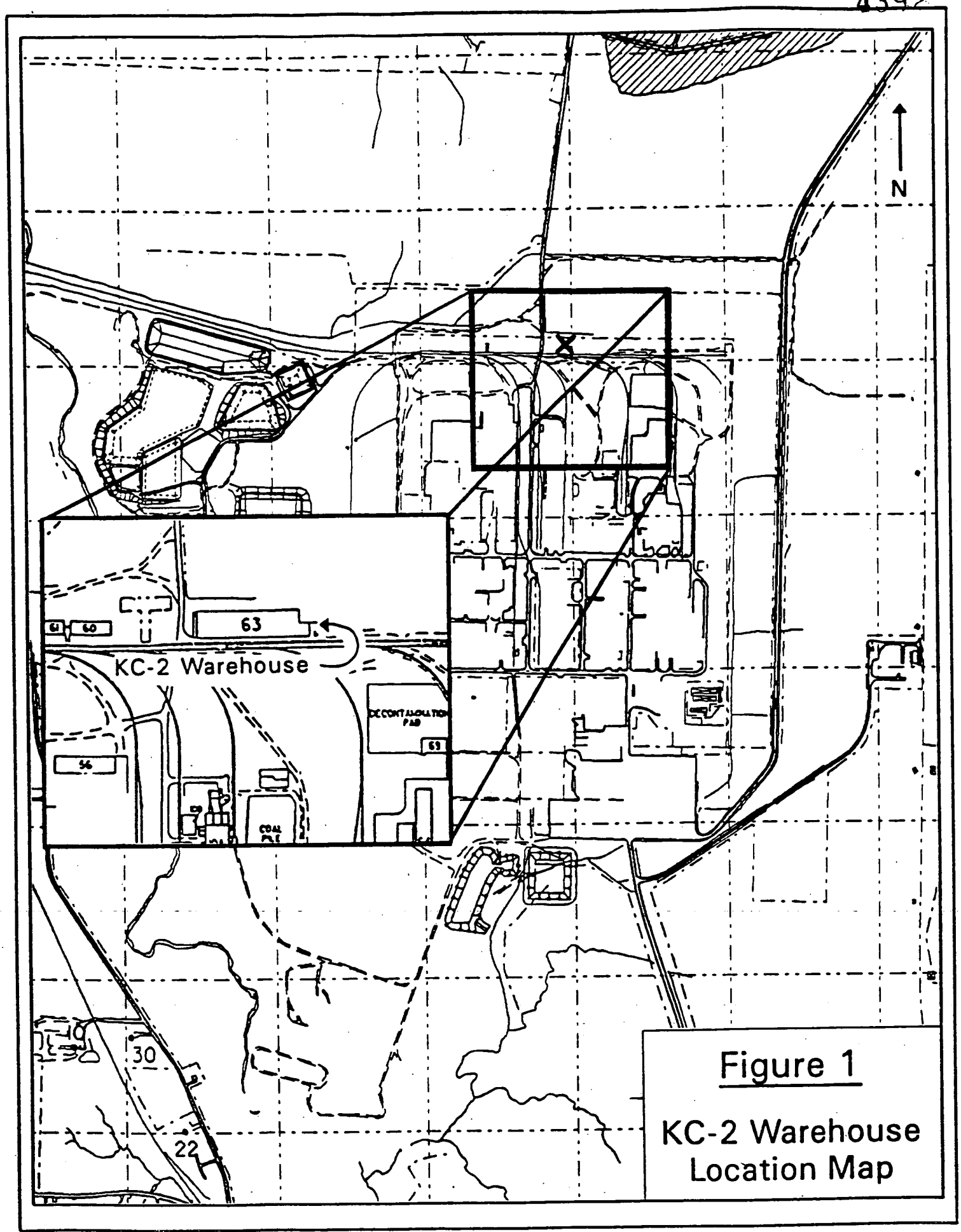
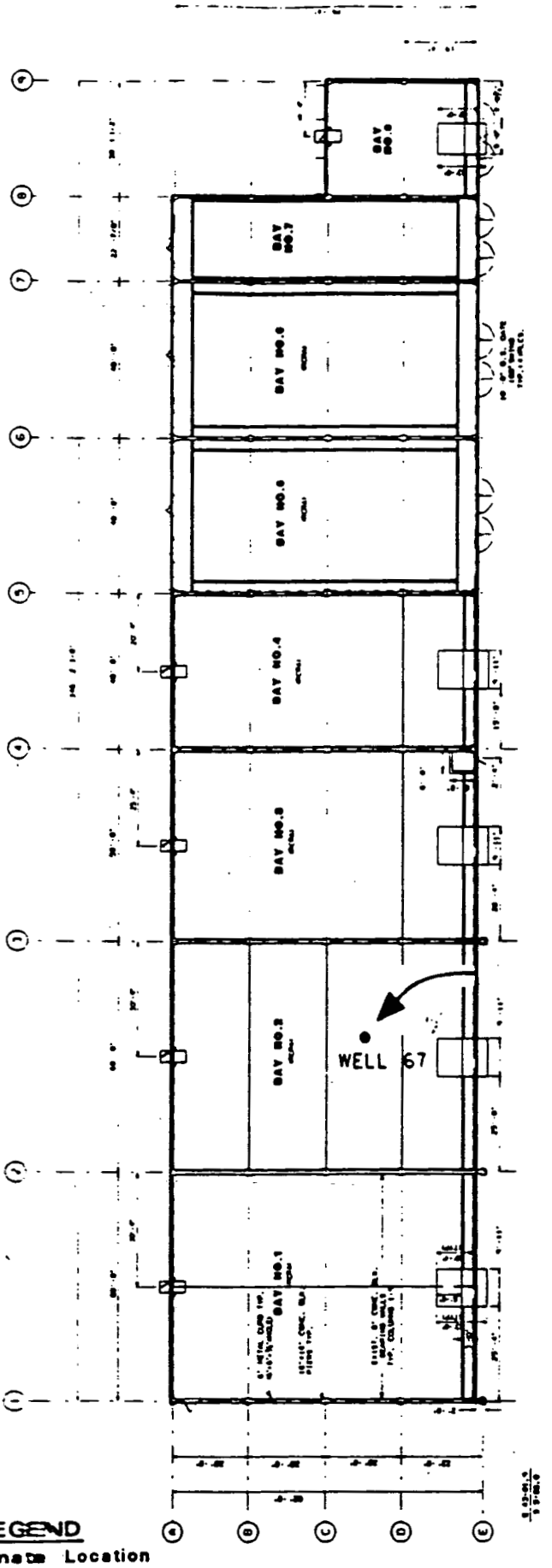


Figure 1

KC-2 Warehouse Location Map

FIGURE 2

KC-2 Warehouse
Floor Plan



LEGEND

● Approximate Location of Well #67

Stores to house either new or reconditioned equipment (motors, piping, spare parts, etc.).

Bay #1 is currently being used to store returned samples from various sampling projects. These samples are being stored on herculite in a diked area. Bays #2, 3, 4 and 8 has been used for storage of maintenance equipment. This equipment was removed as part of the RCRA short-term storage project discussed in Section 3.0 of this document. Bays #5, 6 and 7 are currently being used as hazardous waste storage areas.

3.0 Events Leading to Assessment of Well #67

On May 29, 1992 a short-term storage plan and schedule was submitted by the DOE to the Ohio Environmental Protection Agency (OEPA) to address a shortage of storage space for recently characterized RCRA hazardous waste streams. DOE submitted a revised short-term storage schedule to OEPA on December 1, 1992. The plan identified the KC-2 Warehouse revised schedule, which called for upgrading and placement of containers of newly determined RCRA wastes into the KC-2 Warehouse by March 15,1993.

In early October of 1992, during removal of the maintenance equipment from Bay 2, a yellow painted six inch diameter pipe (which was later determined to be Well #67) was discovered protruding approximately 15 inches out of the floor (See Figure 2). An investigation was initiated to determine the function of the pipe. Drawings of the building did not reference the presence of the pipe, nor was the function of the pipe known to anyone contacted.

On October 27, 1992, the pipe was cut flush with the floor. When the pipe was cut it was observed to continue some depth below the floor. A tape measure was lowered into the pipe to a depth of 100 feet without reaching the bottom of the hole. Water was encountered at a depth of 69 feet. A plate was welded over the opening of the pipe flush with the concrete surface, and sealed with caulking material. The floor over the pipe was then covered with a sealant coating.

On November 4, 1992 a construction meeting was held to discuss floor coating issues. The topic of the sealed pipe was brought up, and it was decided to contact WEMCO Groundwater Programs. A review of Groundwater Programs records identified the pipe as Well #67. Following the identification of Well #67, the Assistant Emergency Duty Officer (AEDO) was notified at 0900 hours on November 4, 1992 and the incident was recorded as a loggable event (#92-11-434).

It was determined that Well #67 was installed in 1951 as a "test" well which provided lithologic and hydrologic data of the subsurface for the northern section of

the production area during the initial pre-construction site evaluation. There is no documentation of well usage since its construction. A review of the historical well installation records indicate that the well is constructed of six inch diameter steel casing with a five inch diameter steel screened section. The drilling log indicates that this well was installed to a depth of 218 feet below ground surface. However this information cannot be confirmed with field measurements. No information on the screened depth interval is currently available. The well installation records for this well are not complete. Therefore, references have been made to records from similar wells installed during the same time period by the Layne-Ohio Company.

4.0 Identification of Source Terms

A groundwater sample was collected from Well #67 on January 4, 1993, by Groundwater Monitoring on-site personnel and sent to DataChem Laboratories for analysis of constituents listed in 40 CFR 264 Appendix IX (Hazardous Constituents). During the sampling event a groundwater elevation measurement was collected and a down-hole camera survey was performed. Approximately 40 feet of sediment was discovered in the bottom of Well #67 based on limited well records and the down-hole camera inspection that was performed on January 4, 1993. Based on this information, a request for sampling was submitted to both Groundwater Monitoring and Site Media Sampling on January 12, 1993 for the sampling and analysis of groundwater for radionuclides and sediment samples for metals and radionuclides.

The total depth of the well was measured to be 178 feet below ground surface. This reading was 40 feet less than the total depth recorded in the well installation records. This information would therefore indicate that there is approximately 0.3 cubic yards of solid material (sediment) within the well bore. The origin of this material has not been determined.

The down-hole camera survey of the well revealed that the inside casing surface and joints were in good condition. In addition, the camera survey confirmed the deposition of material at 178 feet below ground surface.

On January 13, 1993 Groundwater Monitoring and Site Media Sampling technicians arrived at the KC-2 Warehouse to sample the sediment and groundwater from Well #67. During the purging process for the sampling of Well #67, pumping difficulties occurred because of low recharge in the well. The sampling technicians completed the sampling process manually with a bailer. Upon completion of the sampling, Well #67 was inspected a second time with the down-hole video camera.

After completion of the well video inspection, a second groundwater sample was taken and attempts were made to collect a sample of the sediment in the bottom of the well. Initially a coring auger with single direction valves suspended on nylon rope

was used to attempt to collect a sediment sample. The coring auger was lowered 150 feet into the well and allowed to free fall 28 feet to the sediment. After retrieval of the coring auger, it was determined that the material in the well was more compact than initially expected. A coring drive tube with stainless steel inserts was then used to collect a sample repeating the same methodology as was used with the coring auger. An insufficient sample was collected. The sampling crew then attempted to collect a sample of the sediment by dropping the sampling tube from different elevations in the well casing. At one point the sampling tube was dropped from the top of the well casing with no success. A drive tube and slam hammer combination was then lowered into the well with nylon rope. Using the slam hammer to drive the sampling device into the sediment and obtain a sufficient amount of sample was also unsuccessful.

With each of the above sampling attempts, small amounts of material was collected. This material consisted of a "very dark gray clay-like material with tissue-like fragments," as noted by the sampling technicians in the sampling log. The sediment found in the well at this depth was not consistent with the soil at this depth. One hundred and sixty two grams of sample was collected. Approximately five to ten grams of the sample was the dark gray "sediment" with the remainder being the water. The sample was collected and submitted to Sampling Receiving Lab for analysis.

A summary of the results of groundwater analysis for samples collected on January 4 and 13, 1993 is presented in Table 1 and analysis of sediment samples collected on January 13, 1993 are presented in Table 2.

5.0 Evaluation of the Magnitude of the Potential Threat

The analytical results did not indicate the presence of organic contamination, above practical detection limits, in the groundwater samples. Volatile Organic analysis was not conducted on the sediment samples because of insufficient sample volume.

Total metals analysis of the groundwater samples indicated that Arsenic, Cadmium, Chromium, Lead and Thallium concentrations were above the Maximum Contaminant Levels (MCL's) for these metals. Metals analysis on the sediment samples indicate that Arsenic, Cadmium, Chromium, and Lead concentrations were all above the Toxic Characteristic Level for the sediment samples; however, these samples were analyzed for "totals" and not by using the Toxic Characteristic Leaching Procedure (TCLP). It should be reiterated that the sediment sample was collected from the top of the sediment column and that this sample may not be representative of the entire sediment column.

Radionuclide analysis of groundwater from the well exhibited elevated levels of Total

Uranium. A Total Uranium Concentration of 2400 ug/L was detected, compared to the EPA proposed MCL of 20 ug/L. Because Well #67 is installed in the Great Miami Aquifer the Total Uranium values collected from 4000 series wells in 1992 were examined for comparison. The well with the next highest Total Uranium value is Well #4013. This well is located east of the production area and east/southeast of the KC-2 Warehouse (see Figure 3). The highest Total Uranium result as reported in the 1991 Annual Site Environmental Report for Well #4013 was 44 ug/L.

6.0 Assessment of the Need for a Removal Action

Pursuant to 40 CFR 300.410, the DOE has evaluated the appropriateness of a Removal Site Action. Of the eight factors for determining the appropriateness of a Removal Action presented in 40 CFR 300.415(b)(2), the follow sections are deemed appropriate, (b)(2)(ii) "Actual or potential contamination of drinking water supplies or sensitive ecosystems;" and section (b)(2)(viii) "Other situations or factors that may pose threats to public health or welfare or the environment." apply in this situation. Because of the elevated metals in the sediment and groundwater, and the elevated Total Uranium levels in the groundwater, a Removal Action is warranted. Secondly, the KC-2 Warehouse is currently used as a RCRA storage facility. Therefore a Removal Action for Well #67 is also necessary to meet Part B permitting requirements.

7.0 APPROPRIATENESS OF A RESPONSE

If it is determined that a response action is appropriate due to potential exposure to or threat of release of contaminants or hazardous substances, a removal action to address the existing conditions and the possibility of releases to the environment may be required. All documentation relevant to removal action implementation will be included in the CERCLA Administrative Record.

If a planning period of less than six months exists prior to initiation of a response, DOE will issue an Action Memorandum. The Action Memorandum will describe the selected response and provide supporting documentation for the decision.

If it is determined that there is a planning period greater than six months before a response is initiated, DOE will issue an Engineering Evaluation/Cost Analysis (EE/CA) approval memorandum. This memorandum is to be used to document the threat to public health and the environment and to evaluate viable alternative response actions.

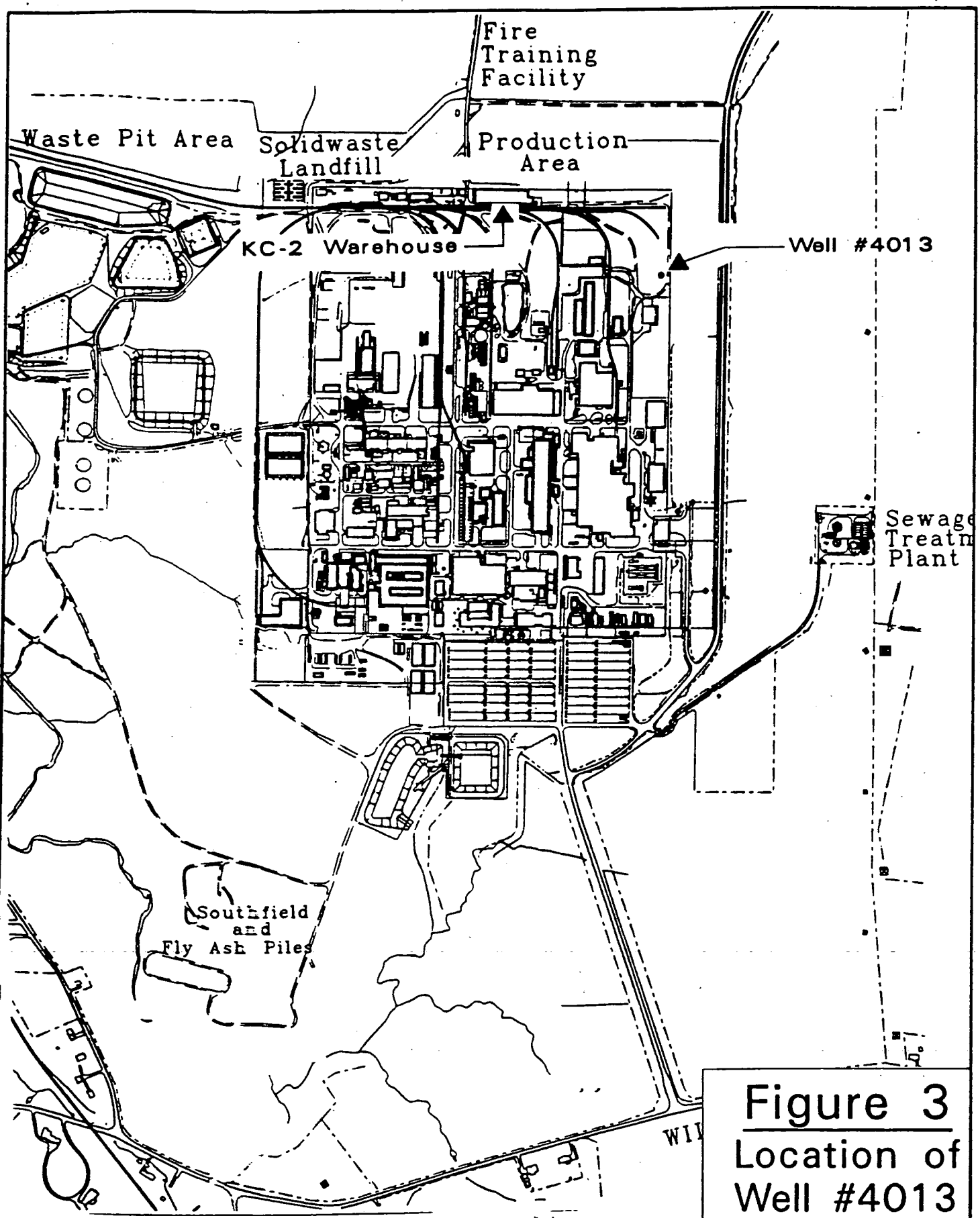


Figure 3
Location of
Well #4013

TABLE 1

Tables 1 and 2 are summaries of groundwater and sediment sample analysis results for Well #67, located in the KC-2 Warehouse. Groundwater samples collected on January 4, 1993 were analyzed for constituents listed under 40 CFR 264 App. IX, and groundwater samples collected on January 13, 1993 were analyzed for Total Uranium. The sediment samples collected on January 13,1993 from the surface of the sediment, and were analyzed for metals and radiochemical analytes. **It should be noted that this assessment is preliminary, as the data has not been validated.**

GROUNDWATER SAMPLE DETECTIONS WELL #67/KC-2 WAREHOUSE				
Parameter	SW-846 Method	Result (ug/L)	MCL (ug/L)	Comments
Sulfides	9030	6000	NA	PQL = 10,000 ug/L (Unvalidated)
VOCs				
Acetone	8240	9.4	NA	PQL = 100 ug/L (Unvalidated)
Xylene	8240	4.3	10,000	PQL = 5 ug/L (Unvalidated)
Metals		Total/Dissol.		
Arsenic	7060	97/ND	50.0	(Unvalidated)
Cadmium	7131	6.1/ND	5.0	(Unvalidated)
Lead	7421	3800/11	15.0	(Unvalidated)
Mercury	7470	0.9/ND	2.0	(Unvalidated)
Barium	6010	670/240	2,000	(Unvalidated)
Cobalt	6010	90/ND	NA	(Unvalidated)
Copper	6010	340/ND	1,300	(Unvalidated)
Chromium	6010	240/ND	100.0	(Unvalidated)
Nickel	6010	310/ND	100.0	(Unvalidated)
Zinc	6010	700/ND	NA	(Unvalidated)
Vanadium	6010	190/ND	NA	(Unvalidated)
Thallium	6010	1800/ND	2.0	(Unvalidated)
Total-U		2400/NA	20*	(Unvalidated)

NOTES:
MCL - Maximum Contaminant Level.
PQL - Practical Quantitation Limit.
ND - Not Detected.
NA - Not Applicable.
ug/L - Microgram per liter (ppb).
* - This is a proposed MCL.

TABLE 2

SEDIMENT SAMPLE DETECTIONS WELL #67/KC-2 WAREHOUSE				
Parameter	SW-846 Method	Result (mg/Kg)	TC (mg/L)	Comments
Metals				
Arsenic	7060	6.5	5.0	(Unvalidated)
Barium	6010	56	100	(Unvalidated)
Cadmium	6010	1.2	1.0	(Unvalidated)
Chromium	6010	46	5.0	(Unvalidated)
Lead	6010/7421	330/330	5.0	(Unvalidated)
Mercury	7470	<0.2	0.2	(Unvalidated)
Selenium	7740	0.04	1.0	(Unvalidated)
Silver	6010	2.4	5.0	(Unvalidated)
Radiological				
Total-Th	XRF AnL	23 ppm dry	NA	(Unvalidated)
Total-U	XRF AnL	<11 ppm dry	NA	(Unvalidated)
Alpha Activity	ISO RAD	32 pCi/g	NA	(Unvalidated)
Beta Activity	ISO RAD	19 pCi/g	NA	(Unvalidated)
Major Gamma Activity	ISO RAD			Uranium and Thorium daughters
K40		11.9 pCi/g	NA	(Unvalidated)
Th228		1.1 pCi/g	NA	(Unvalidated)
Ac228		0.7 pCi/g	NA	(Unvalidated)
Ra224		1.1 pCi/g	NA	(Unvalidated)
Th234		5.5 pCi/g	NA	(Unvalidated)
Pa234m		10.7 pCi/g	NA	(Unvalidated)
Ra226		1.9 pCi/g	NA	(Unvalidated)
Pb214		0.7 pCi/g	NA	(Unvalidated)
Bi214		0.8 pCi/g	NA	(Unvalidated)
U235		0.5 pCi/g	NA	(Unvalidated)

NOTES:
TC - Toxic Characteristic Limits.
ND - Not Detected.
NA - Not Applicable.
mg/Kg - milligrams per kilogram (ppm)
mg/L - milligrams per liter (ppm)
pCi/g - picocuries per gram