

ATTACHMENT A

**Environmental Baseline Survey Report
for the Title Transfer of Parcel ED-9
at the East Tennessee Technology Park,
Oak Ridge, Tennessee**



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contributed to the preparation of this document and should not
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DOE Contract No. DE-AC05-98OR22700

Job No. 23900

RJ-10-0029

June 1, 2010

Mr. Steve Cooke
Office of Assistant Manager for Nuclear Fuel Supply
U. S. Department of Energy
Oak Ridge Operations Office
Post Office Box 2001
Oak Ridge, Tennessee 37831

Dear Mr. Cooke:

DE-AC05-98OR22700 – Environmental Baseline Survey (EBS) Report for the Title Transfer of Parcel ED-9 at the East Tennessee Technology Park, Oak Ridge, Tennessee (DOE/OR/01-2379), and Covenant Deferral Request (DOE/OR/01-2380) – Final Concurred Copy

The Bechtel Jacobs Company LLC (BJC) is pleased to transmit eighteen copies of the Environmental Baseline Survey (EBS) Report for the title transfer of Parcel ED-9 at the East Tennessee Technology Park, Oak Ridge, Tennessee, and Covenant Deferral Request (CDR). The documents have been revised in response to comments received from the U.S. Environmental Protection Agency (EPA) Region 4, Tennessee Department of Environmental Conservation (TDEC), Department of Energy (DOE) and the public. This version has been prepared for regulatory approval and concurrence.

The EBS Report for Parcel ED-9 and CDR were prepared pursuant to CERCLA 120(h) to facilitate property transfer by DOE in accordance with CERCLA 120(h)(3)(c). In addition to this process and the documents referenced therein, BJC received guidance and instruction from DOE throughout the research and documentation and these elements of content have also been incorporated. The risk based approach to DOE's transfers intends to document that the facilities proposed for transfer are sufficiently protective per the protocols in use by the program, with the concurrence of EPA Region 4, the State of Tennessee, and DOE-HQ.

Only a limited distribution will be made at this time as future versions will be prepared. A more complete distribution may be made once the full transfer process has been completed. The process is considered complete after DOE-HQ approves the transfer and a required Congressional notification process has been concluded.

If you would like additional hard copies, please let me know and they will be prepared for you. Please send copies of correspondence pertaining to this document to me at ETTP, Building K-1580, Room 313, Mail Stop 7169.

If you have any questions regarding this material, please do not hesitate to contact me at (865) 241-5194.

Sincerely,

Mary F. Blevins
Regulatory Affairs Manager
Reindustrialization Program

MFB:ldd

Enclosures: As stated

Mr. Steve Cooke

Page 2

RI-10-0029

June 1, 2010

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**Environmental Baseline Survey Report
for the Title Transfer of Parcel ED-9
at the East Tennessee Technology Park,
Oak Ridge, Tennessee**

Date Issued—May 2010

**Prepared by
Science Applications International Corporation
Oak Ridge, Tennessee
under subcontract 23900-BA-PR007U
under work release 0012**

**Prepared for the
U. S. Department of Energy
Office of Nuclear Fuel Supply**

**BECHTEL JACOBS COMPANY LLC
managing the
Environmental Management Activities at the
East Tennessee Technology Park
Y-12 National Security Complex Oak Ridge National Laboratory
under contract DE-AC05-98OR22700
for the
U. S. DEPARTMENT OF ENERGY**

This report has been prepared by Science Applications International Corporation (SAIC) for the sole and exclusive use of Bechtel Jacobs Company LLC (BJC) and the U. S. Department of Energy. Any other person or entity obtaining, using, or relying on this report hereby acknowledges that they do so at their own risk, and that SAIC shall have no responsibility or liability for the consequences thereof. This report is prepared by SAIC in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) 120(h)(1) and (3)(c) requirements.

This report is intended to be used in its entirety. Excerpts, which are taken out-of-context, run the risk of being misinterpreted and are, therefore, not representative of the findings of this assessment. Opinions and recommendations presented in this report apply only to site conditions and features as they existed at the time of the site visit, and those inferred from information observed or available at that time, and cannot be applied to conditions and features of which SAIC is unaware and has not had the opportunity to evaluate.

The results of this report are based on record reviews, site reconnaissance, interviews, and the radiological report reviewed and approved by BJC. SAIC has not made, nor has it been asked to make, any independent investigation concerning the accuracy, reliability, or completeness of such information.

All sources of information on which SAIC has relied in making its conclusions are identified in Chap. 8 of this report. Any information, regardless of its source, not listed in Chap. 8 has not been evaluated or relied upon by SAIC in the context of this report.

CONTENTS

FIGURES.....	vii
TABLES	vii
ABBREVIATIONS	ix
EXECUTIVE SUMMARY	xi
CONCLUSIONS.....	xiii
1. PROPERTY IDENTIFICATION	1-1
2. TITLE SEARCH.....	2-1
3. FEDERAL RECORDS SEARCH AND REGULATORY SUMMARY	3-1
3.1 FEDERAL RECORDS SEARCH	3-1
3.2 REGULATORY SUMMARY	3-2
3.2.1 Background.....	3-2
3.2.2 The EM DVS Protocol and Parcel ED-9	3-3
3.2.3 Actions Taken Within the ED-9 Exposure Units	3-3
4. PAST AND PRESENT ACTIVITIES	4-1
4.1 PAST AND PRESENT ACTIVITIES FOR THE REAL PROPERTY PROPOSED FOR TRANSFER	4-1
4.2 PAST AND PRESENT ACTIVITIES FOR THE ADJACENT PROPERTY	4-1
4.3 HYDROGEOLOGIC ENVIRONMENT.....	4-2
5. RESULTS OF VISUAL AND PHYSICAL INSPECTIONS.....	5-1
5.1 VISUAL AND PHYSICAL INSPECTIONS OF THE PROPERTY FOR TRANSFER	5-1
5.2 VISUAL AND PHYSICAL INSPECTIONS OF ADJACENT PROPERTY	5-1
6. SAMPLING RESULTS.....	6-1
7. RISK EVALUATION	7-1
8. REFERENCES	8-1
APPENDIX A REAL ESTATE ACQUISITION LETTER	A-1
APPENDIX B STUDY AREA MAP FROM RECORDS SEARCH	B-1
APPENDIX C PCCR APPROVAL LETTERS.....	C-1

FIGURES

1.1	Location map of the Parcel ED-9 Study Area.....	1-2
1.2	Map of the Parcel ED-9 Study Area footprint.	1-3
1.3	Detailed map of tract ED-9C.	1-4
1.4	Aerial photograph of existing buildings and buildings formerly located in the eastern portion tracts ED-9A and ED-9B of Parcel ED-9, circa 2008.....	1-5
1.5	Aerial photograph of tract ED-9C showing approximate locations of former facilities.....	1-6
4.1	Hydrogeology of Parcel ED-9.	4-3
5.1	View of tract ED-9A following completion of remedial actions.	5-1

TABLES

3.1	Parcel ED-9 (Zone 1, EUs Z1-04 and Z1-06, and Zone 2, EU Z2-33) FFA sites and summary of CERCLA decisions.....	3-4
7.1	Parcel ED-9 risk evaluation results.....	7-2

ABBREVIATIONS

bgs	below ground surface
BJC	Bechtel Jacobs Company LLC
CDR	Covenant Deferral Request
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	contaminant of concern
COE	U. S. Army Corps of Engineers
CROET	Community Reuse Organization of East Tennessee
DCE	dichloroethene
DOE	U. S. Department of Energy
DVS	Dynamic Verification Strategy
EBS	environmental baseline survey
ELCR	excess lifetime cancer risk
EM	Environmental Management
EPA	U. S. Environmental Protection Agency
ETTP	East Tennessee Technology Park
EU	exposure unit
FFA	Federal Facility Agreement
FY	fiscal year
HI	hazard index
MCL	maximum contaminant level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan)
NFA	No Further Action
ORGDP	Oak Ridge Gaseous Diffusion Plant
ORO	Oak Ridge Office
ORR	Oak Ridge Reservation
PCCR	Phased Construction Completion Report
PCE	tetrachloroethene
RA	remedial action
RAO	remedial action objective
RL	remediation level
ROD	Record of Decision
SAIC	Science Applications International Corporation
TCE	trichloroethene
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
VOC	volatile organic compound
µg/L	microgram per liter

EXECUTIVE SUMMARY

This environmental baseline survey (EBS) report documents the baseline environmental conditions of the U. S. Department of Energy's (DOE's) Parcel ED-9 at the East Tennessee Technology Park (ETTP). Parcel ED-9 consists of about 13 acres that DOE proposes to transfer to Heritage Center, LLC (hereafter referred to as "Heritage Center"), a subsidiary of the Community Reuse Organization of East Tennessee (CROET). The 13 acres include two tracts of land, referred to as ED-9A (7.06 acres) and ED-9B (5.02 acres), and a third tract consisting of about 900 linear feet of paved road and adjacent right-of-way, referred to as ED-9C (0.98 acres). Transfer of the title to ED-9 will be by deed under a Covenant Deferral Request (CDR) pursuant to Section 120(h)(3)(C) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). This report provides a summary of information to support the transfer of this government-owned property at ETTP to a non-federal entity.

This EBS is based upon the requirements of Sect. 120(h) of CERCLA and relies upon regulatory agency-approved documentation in three Phased Construction Completion Reports (PCCRs) for environmental data evaluation and human health risk evaluation. The PCCRs used for source information are:

- *Phased Construction Completion Report for the K-1007 Ponds Area and Powerhouse Area in Zone 1 at East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2294&D2), August 2006;
- *Fiscal Year 2007 Phased Construction Completion Report for the Zone 2 Soils, Slabs, and Subsurface Structures at East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2723&D2), September 2007; and
- *Fiscal Year 2008 Phased Construction Completion Report for EU Z2-33 in Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2368&D2/R1), August 2009.

The No Further Action (NFA) determinations documented in the referenced PCCRs were reached using the Environmental Management (EM) Program's Dynamic Verification Strategy (DVS) protocol (DOE 2007a), a process designed to facilitate real-time decision-making. This process is in use for remedial action (RA) decision-making across the ETTP, which has been divided into Zones 1 and 2 and further subdivided into Geographic Areas, then Groups, then Exposure Units (EUs). For consistency with the EM nomenclature, this EBS will use the EU as the basis for discussion.

Building K-1225 is located within the footprint of the ED-9B tract, but this building is not included in the proposed Parcel ED-9 transfer. The K-1225 building was transferred to CROET previously. All of the acreage in ED-9 is located within either Zone 1 or Zone 2 of the ETTP. Tract ED-9C occupies portions of the Zone 1 EUs Z1-04 and Z1-06 and a very small portion of Zone 2 EU Z2-15. The acreage in tracts ED-9A and ED-9B is located within the Zone 2 EU Z2-33. In order to provide context and a tie-in with the EM Program's status for the EUs, this EBS provides regulatory details for the EUs in Chap. 3 and technical details for the EUs in Chap. 6.

Zone 1 and 2 remedial action objectives were developed by the DVS to support the future use of ETTP as a mixed use/commercial industrial park. Therefore, remediation criteria were designed for the protection of the future industrial worker under the assumption that the worker normally would not have the potential for exposure to soils at depths below 10 ft below ground surface (bgs). Accordingly, land use controls have been established to prevent disturbance of soils below 10 ft deep and to restrict future land use to industrial/commercial activities.

The DVS process and the preparation of this report included visual and physical inspections of the property and adjacent properties, a detailed records search, sampling and analysis of soils, radiological walkover surveys, and a risk evaluation. Resources evaluated as part of the records search included Federal Government records, title documents, aerial photographs that may reflect prior uses, and interviews with current and former employees¹ involved in the operations on the real property to identify any areas on the property where hazardous substances and petroleum products, or their derivatives, and acutely hazardous wastes were stored for one year or more, known to have been released, or disposed of. The following is a summary of the findings of the evaluation that was performed:

- One groundwater plume containing low concentrations of volatile organic compounds (VOCs) is located in the subsurface of ED-9A and ED-9B. The VOCs tetrachloroethene (PCE) and trichloroethene (TCE) have occurred above a federal drinking water maximum contaminant level and TDEC domestic water supply criteria in groundwater samples collected from some of the monitoring wells present within the ED-9 transfer footprint. The source of the contamination has not been determined. Although the source of this plume has not been determined, the presence of groundwater contamination beneath the parcel is considered to be a release. A groundwater plume has not been identified beneath ED-9C.
- Based on the results of the DVS process, one Federal Facilities Agreement (FFA) site (K-1015-A Laundry Pit) located within ED-9 required RA. The completed RA resulted in a No Further Action (NFA) decision for this FFA site. Sampling and analysis at the other five FFA sites located within the EU components of ED-9 resulted in NFA decisions. RAs performed at the K-1015-A Laundry Pit included removal of the pit and a small amount of adjacent soil. Additional RAs completed within EU Z2-33 consisted of removal of six acid dilution pits and a small volume of soil at the pit, which was located southwest of the former K-1004-A building; removal of inlet piping to two of the six dilution pits; in-place closure of the acid dilution pit located immediately west of Bldg. K-1006; and removal of contaminated surface soils south of former Bldg. K-1004-J. Following completion of the RAs, NFA decisions were reached for EU Z2-33, including the FFA sites.
- Data and risk evaluations were conducted to allow for unrestricted industrial use to 10 ft bgs. Consistent with the DVS process (DOE 2007a), contamination anywhere within the 0- to 10-ft interval had an equal weighting in the risk evaluation (i.e., all soil in the interval was presumed to be equally accessible to an industrial worker).

Based on the results of the DVS evaluation, including analytical results for soil samples and radiological walkover survey results, and the RAs completed, the vast majority of ED-9 (EU Z1-04, Z1-06, and Z2-33) has been recommended for unrestricted industrial use to 10 ft bgs. Although characterization of EU Z2-15 has not been completed under the DVS process, only about 30 ft of paved road extends into this EU, and the land bordering the east and west sides of this segment of road has already been transferred under the approved ED-5 East and ED-5 West CDRs. In addition to data supporting the regulator-approved CDRs for the adjacent property, DOE conducted a search of the site files and reviewed historic aerial photos of this area. The review indicates there is no evidence of prior use of the 30-ft segment of ED-9C located in EU Z2-15 that would have introduced contamination. Therefore, DOE has determined that this segment is also suitable for transfer.

¹ BJC 2005. Personal communications with Bob Kiser and Bobby Beasley (currently or formerly employed at the East Tennessee Technology Park) in July and October, respectively.

CONCLUSIONS

Based on the U. S. Department of Energy's (DOE's) review of the existing information, including discussions and interviews referenced herein, and evaluation of the data gathered in preparation of the environmental baseline survey for Parcel ED-9, DOE recommends the following:

- Because of the uncertainty associated with the nature of the on-site groundwater and the need to evaluate and possibly address groundwater in the future, DOE recommends that the transfer of Parcel ED-9 be achieved by a covenant deferral per the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Sect. 120(h)(3)(C).

LAND USE RESTRICTIONS

Land use restrictions are an important component of a CERCLA covenant deferral; they help to ensure that transfer of the property is protective for the intended use. The restrictions that will apply to Parcel ED-9 are summarized below. Full details are found in Sect. 6.1 of the Covenant Deferral Request (CDR).

1. The property shall not be developed in a manner that is inconsistent with the land use assumptions of "industrial use" contained in the approved applicable Records of Decision (RODs) for Zone 1 and Zone 2 [*Record of Decision for Interim Actions in Zone 1, East Tennessee Technology Park, Oak Ridge, Tennessee*, DOE/OR/01-1997&D2 (DOE 2002b), and *Record of Decision for Soil, Buried Waste, and Subsurface Structure Actions in Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee*, DOE/OR/01-2161&D2 (DOE 2005a)].
2. Development of the property must comply with all applicable federal, state, and local laws and regulations with respect to any present or future development of the property.
3. All structures, facilities, and improvements requiring a water supply shall be required to be connected to an approved water system for any and all usage. Extraction, consumption, exposure, or use, in any way, of the groundwater underlying the property is prohibited without the prior written approval of DOE, the U. S. Environmental Protection Agency (EPA) Region 4, and the Tennessee Department of Environment and Conservation (TDEC).
4. Disturbance of any portion of the property deeper than 10 ft bgs without the prior written approval of DOE, EPA, and TDEC is prohibited.
5. Disturbance of the ground surface on the transferred property is also prohibited unless the transferee complies with the site process for obtaining an excavation penetration permit. The excavation and penetration permit program will be retained by DOE until it has been determined that all necessary soil remediation on the property has been taken.
6. In order to ensure that the vapor intrusion pathway [i.e., the migration of volatile organic compounds (VOCs) in contaminated groundwater] does not contribute to an unacceptable risk to human health, DOE will address the potential for vapor intrusion in the East Tennessee Technology Park final Sitewide ROD, which is scheduled to be signed by September 30, 2013, and will take interim protective measures to ensure protectiveness until the ROD is signed. Any new building or structure built on the property that is intended to be occupied by workers 8 hours or more per scheduled work day, or by public visitors, must be designed and constructed to minimize potential exposure to VOC

vapors, including the use of engineered barriers as noted in the Quitclaim Deed. A waiver from this requirement may be sought from the EPA, TDEC, and DOE based on alternative commitments or new information. No buildings are included in the transfer of ED-9.

7. DOE reserves the right of access to all portions of the property for environmental investigation, remediation, or other corrective action.

RESPONSE TO REGULATOR COMMENTS ON THE ENVIRONMENTAL BASELINE SURVEY REPORT FOR LAND PARCEL ED-9

A preliminary draft of the ED-9 CDR was submitted to the regulators for review in September 2008. DOE received conditional approval of the risk evaluation from EPA Region 4 on October 30, 2008, with the recommendation that EPA approval for the Phased Construction Completion Report (PCCR) for the exposure unit in which ED-9 is located should be received prior to EPA's approval of the ED-9 CDR. Approval for the PCCR was received on September 28, 2009. A copy of EPA's approval letter is included in Appendix C of this EBS as pp. C-3 and C-4.

DOE submitted the CDR and EBS for regulator review on December 29, 2009. DOE received comments from EPA Region 4 on February 22, 2010. EPA requested that DOE remove from the transfer documents any property that is not being transferred imminently. EPA also requested additional information about the road proposed for transfer and about any occupied buildings included in the proposed transfer. The full text of the comments and responses is provided in Sect. 7.1 of the CDR.

On February 22, 2010, DOE received notice from the Tennessee Department of Environment and Conservation (TDEC) that TDEC did not have comments on the ED-9 documents.

RESPONSE TO PUBLIC COMMENTS

The CDR and EBS were available for public review from March 25, 2010, until April 26, 2010, and the availability of the documents for review was announced in four area newspapers and in the online version of one of the papers. One comment with editorial suggestions was received from a private citizen, and a question about the transfer of the roadway designated as ED-9C was received from the Citizen's Advisory Panel of the Oak Ridge Reservation Local Oversight Committee. The comments and DOE's responses are provided in Sect. 7.2 of the CDR.

1. PROPERTY IDENTIFICATION

Land Parcel ED-9, the property discussed in this Environmental Baseline Survey (EBS), is located in the south-central portion of the East Tennessee Technology Park (ETTP) [formerly the Oak Ridge Gaseous Diffusion Plant (ORGDP) and later the K-25 Site] on the Oak Ridge Reservation (ORR) in Roane County, Tennessee. Parcel ED-9 consists of 13 acres to be transferred to Heritage Center, LLC (hereafter referred to as "Heritage Center"). The 13 acres include two tracts of land, referred to as ED-9A (7.06 acres) and ED-9B (5.02 acres), separated by a roadway, and a third tract consisting of approximately 900 linear feet of paved road and adjacent right-of-way (ROW), referred to as ED-9C (0.98 acre).

Figure 1.1 is a map showing the relationship of Parcel ED-9 to ETTP. Figure 1.2 shows the boundaries of the ED-9 transfer footprint, and Fig. 1.3 is a detailed map of tract ED-9C, showing the associated exposure units (EUs) and the adjacent land parcels ED-5 East and ED-5 West. Figure 1.4 is an aerial photograph showing the condition of tracts ED-9A and ED-9B and the locations of buildings that were formerly located within this portion of the parcel that had been demolished as of 2008.² Figure 1.5 is an aerial photograph of tract ED-9C, which connects Contractor's Road with South Perimeter Road, showing the location of former facilities in the vicinity of this tract. Tract ED-9C serves as the boundary between Land Parcels ED-5 East and ED-5 West. Both of these land parcels were previously transferred to Heritage Center. Past and present operations at Parcel ED-9 are described in more detail in Chap. 4 of this report.

Building K-1225 is located within the footprint of land tract ED-9B, but this building is not included in the proposed Parcel ED-9 transfer. The K-1225 building was transferred to the Community Reuse Organization of East Tennessee (CROET) previously.

Preparation of this report and the Phased Construction Completion Reports (PCCRs) relied on for information in this report included visual and physical inspections of the property and adjacent properties, a detailed records search, sampling and analysis of soils, radiological walkover surveys, and a risk evaluation. Resources evaluated as part of the records search included the review of government records, title documents, and aerial photos and interviews with current and former employees³ involved in the operations on the real property to identify any areas on the property where hazardous substances and petroleum products, or their derivatives, and acutely hazardous wastes have been known to have been released. Pertinent information from this research is included as a notification in the deed [found in Sect. 6.2, Exhibit D, paragraph A of the Covenant Deferral Request (CDR)].

² The aerial photograph pre-dates the removal in 2009 of the K-1550 Engineering Office Trailers.

³ BJC 2005. Personal communications with Bob Kiser and Bobby Beasley (currently or formerly employed at the East Tennessee Technology Park) in July and October, respectively.

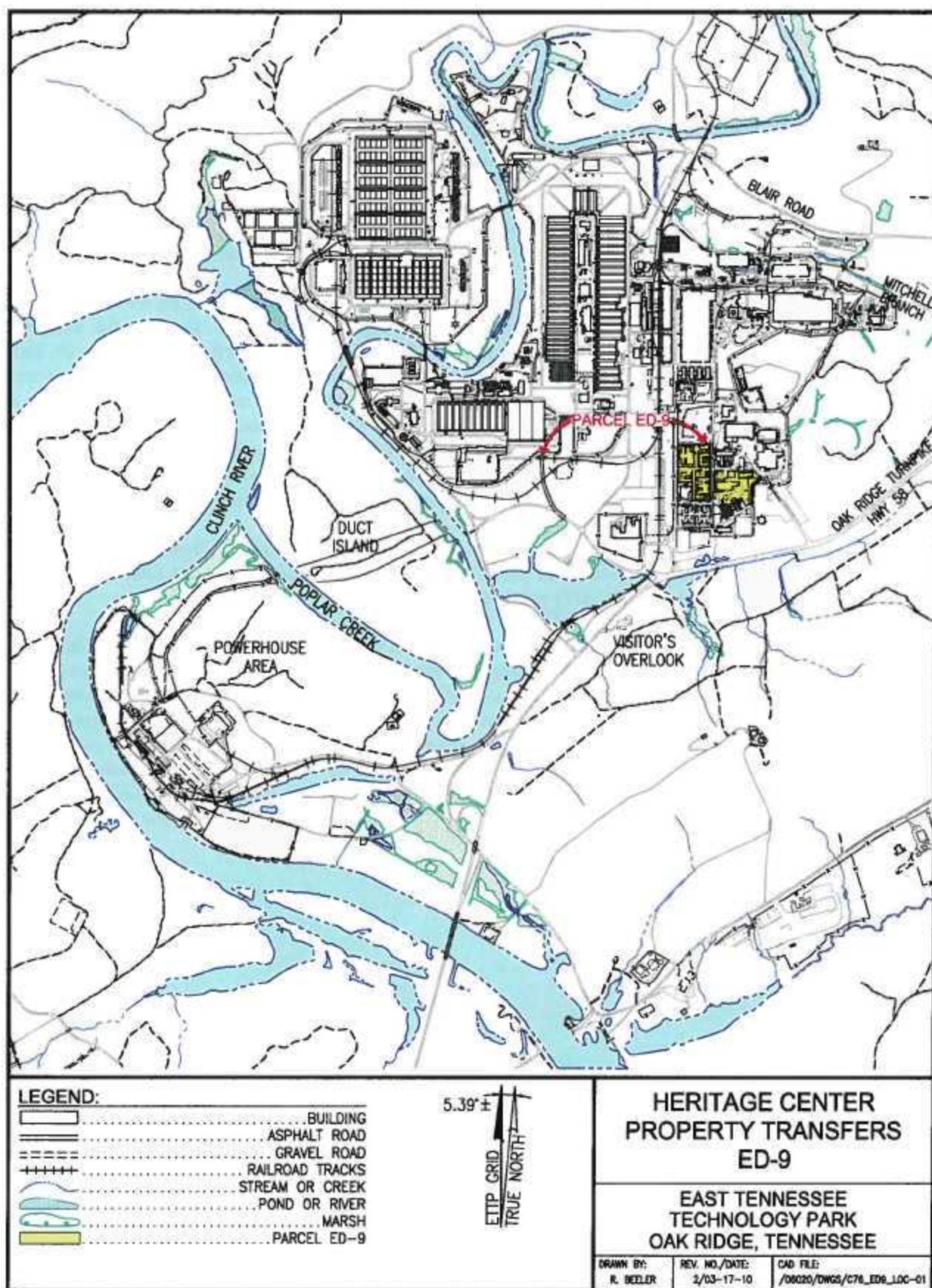


Fig. 1.1. Location map of the Parcel ED-9 study area.

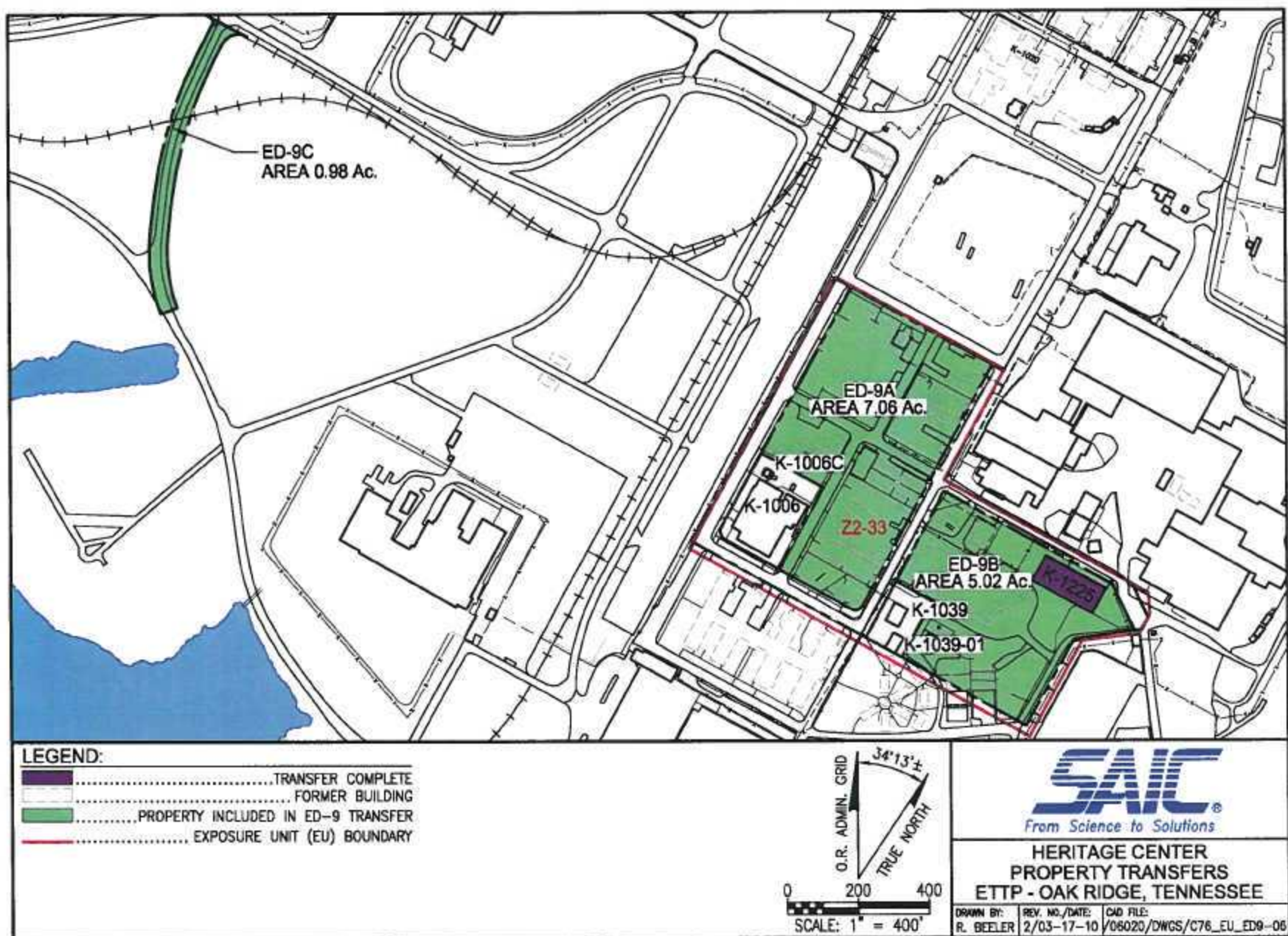


Figure 1.2. Map of the ED-9 Study Area Footprint

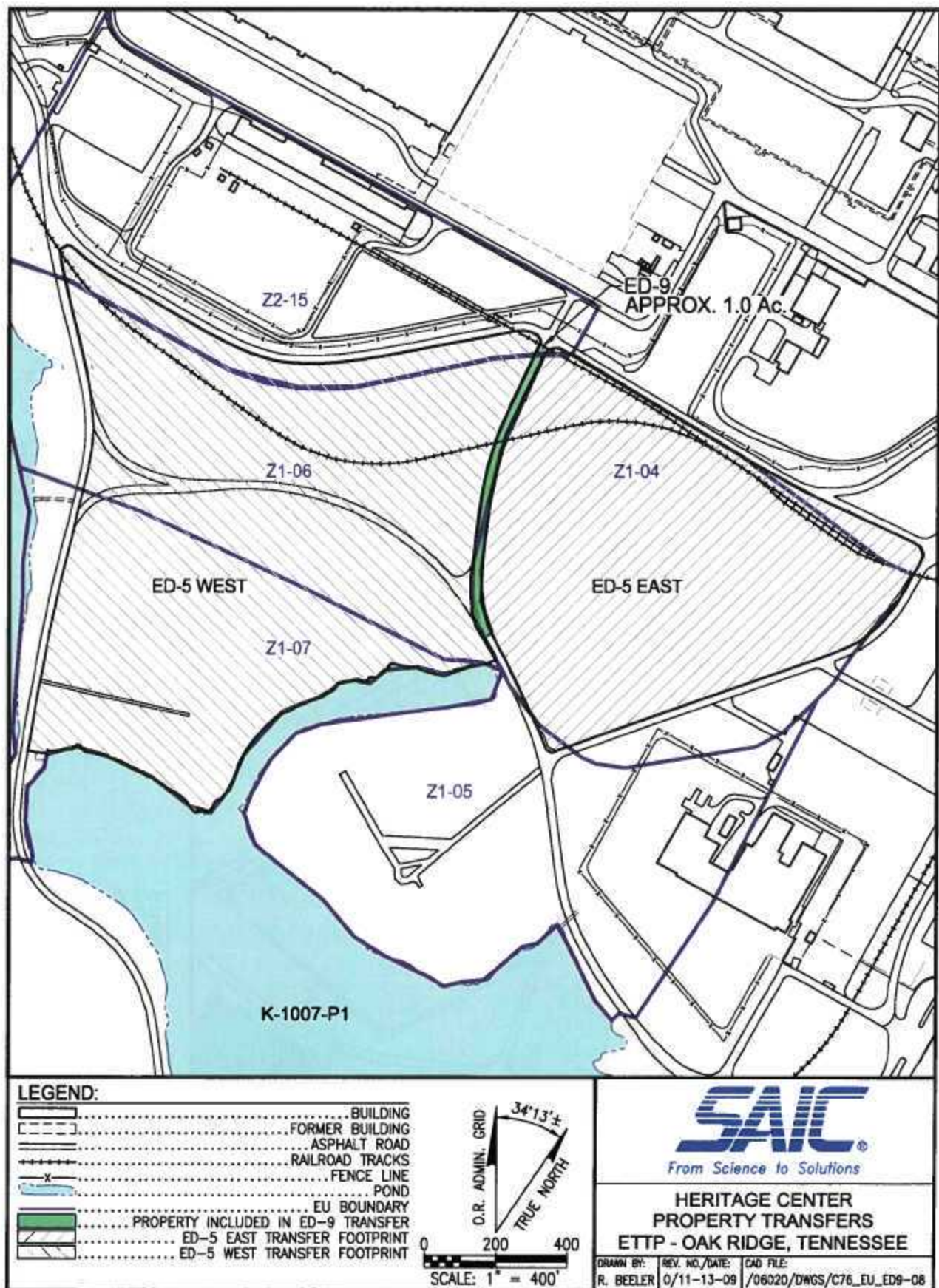
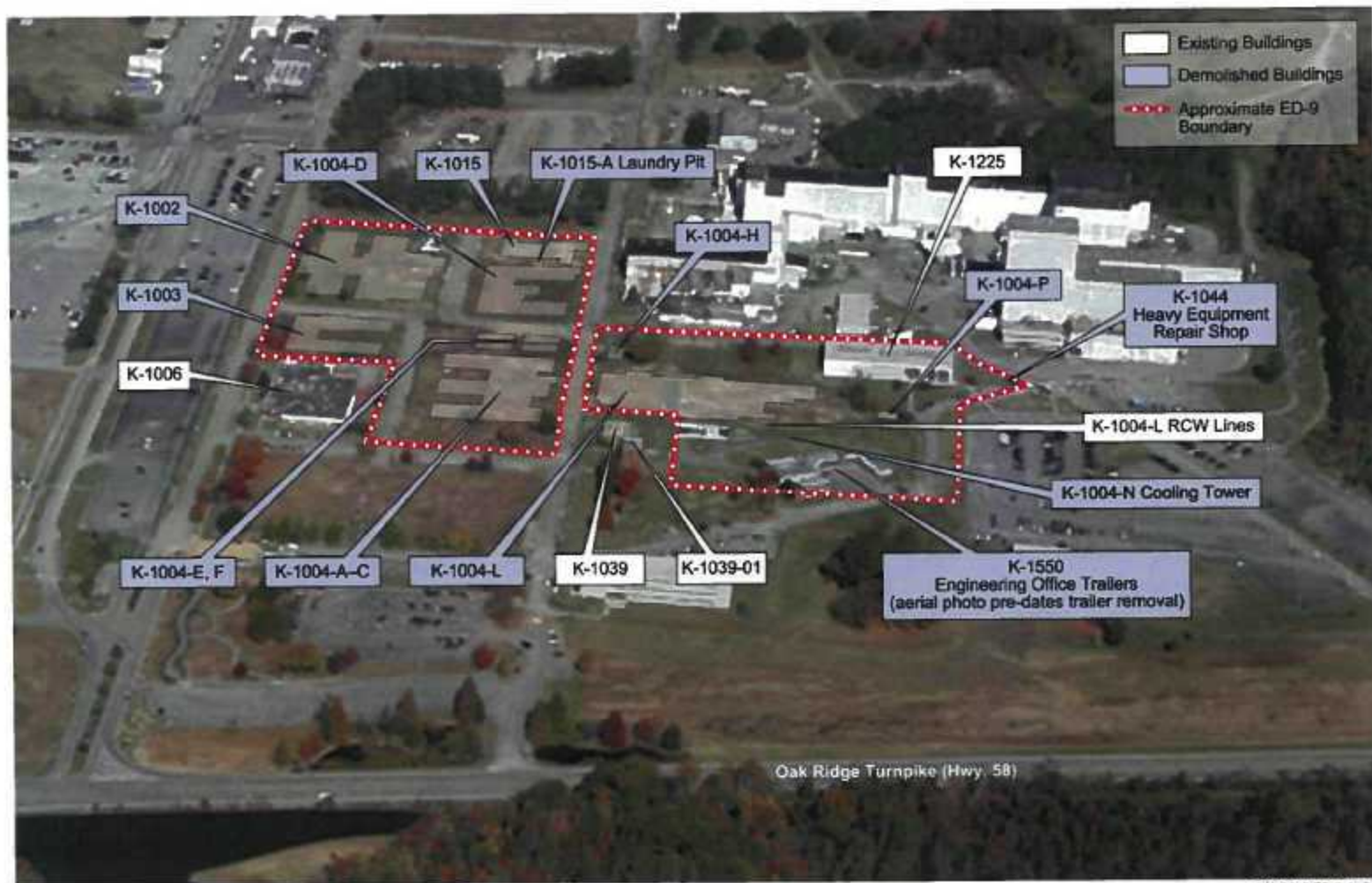


Figure 5. Map of Western Tract of Land Parcel ED-9 Components



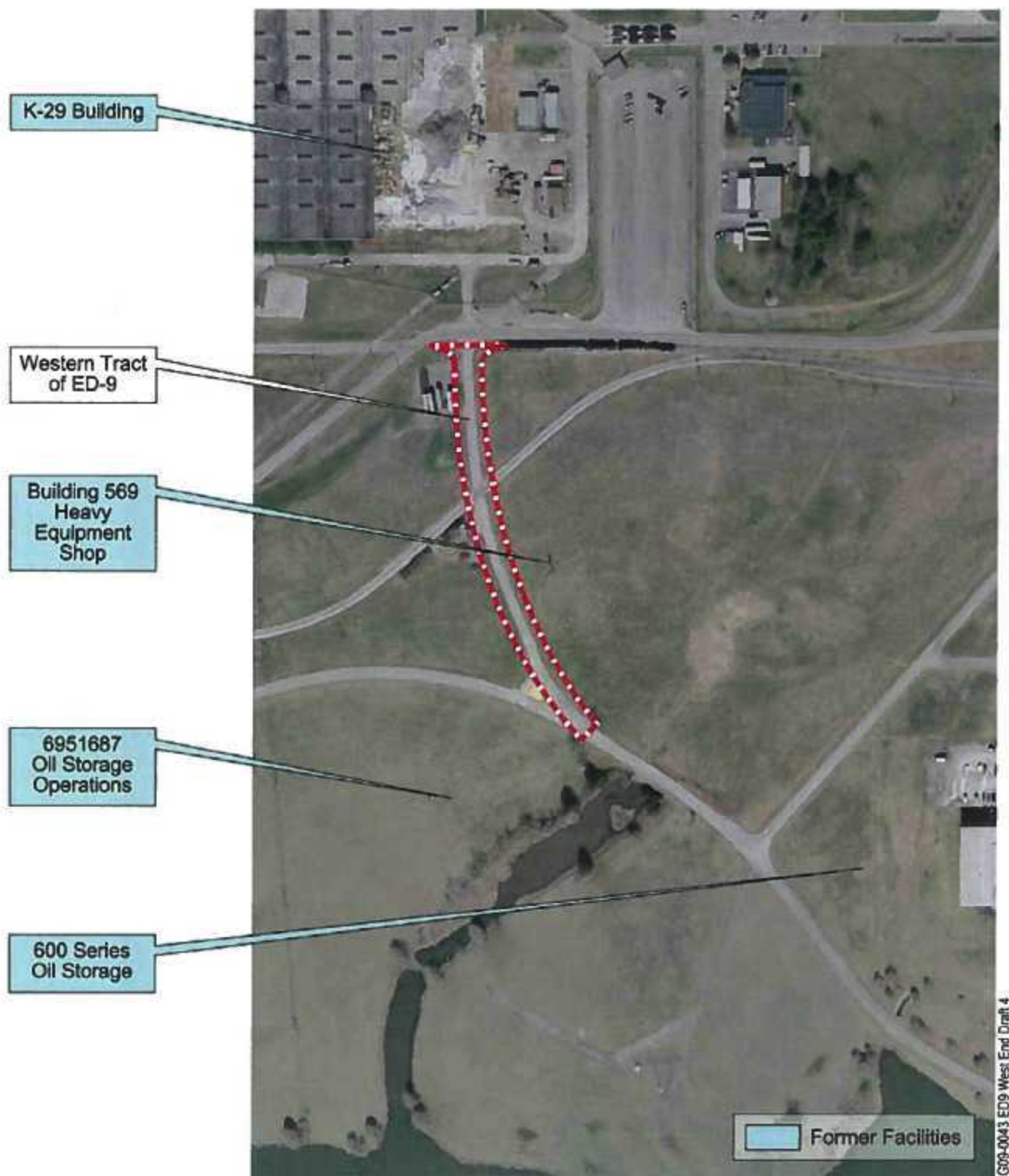


Fig. 1.5. Aerial photograph of tract ED-9C showing approximate locations of former facilities.

2. TITLE SEARCH

On June 4, 1996, and February 27, 1997, visits were made to the state of Tennessee Roane County Recorder's Office to conduct a review of the recorded deeds documenting previous ownership of the land tract on which the ED-9 study area is located. The deeds contained no information or references to other recorded evidence that, prior to DOE ownership and its U. S. Government predecessor agencies, the property was utilized for the storage of hazardous substances and/or petroleum products or their derivatives. Additionally, no information contained in the deeds would indicate that hazardous substances and/or petroleum products or their derivatives were released from or disposed of on the property. Prior to acquisition by the government, the area was farmland and was a combination of cultivated fields, pastures, and forested areas.

The deeds that conveyed the property from the previous owner to the U. S. Government, and any deeds that conveyed the property to that previous owner, were reviewed as a part of the title search. Generally, the deeds from the previous two owners of a particular ORR parcel provide information that goes back to the early 1900s or even earlier. The deeds were reviewed for any references to previous land uses (e.g., homestead, farm, school, business, etc.). Also reviewed were any easements or conveyances referenced in the deeds that might indicate that portions of the land were used for pipelines, power lines, etc. Partial disposal or acquisition conveyance deeds were also reviewed because, in some instances, the land comprising a large farm had been acquired via several separate acquisitions.

In addition, property assessment records from the County Property Assessor's Office were reviewed because these documents may also contain evidence of a particular land use. Survey or subdivision maps referenced in deeds and maintained in the Register of Deeds office were also reviewed for any indications of a previous land use.

3. FEDERAL RECORDS SEARCH AND REGULATORY SUMMARY

3.1 FEDERAL RECORDS SEARCH

The Tennessee Valley Authority (TVA) in Knoxville, Tennessee, and the U. S. Army Corps of Engineers (COE) District Office in Nashville, Tennessee, were contacted in 1997 and again in 1998, to determine if they maintained any records reflecting past or present land use relative to the land presently comprising ETTP (TVA 1998; COE 1998). Neither TVA nor COE had any information regarding past or present land use that would indicate whether hazardous substances or petroleum products or their derivatives were stored or released on the DOE-owned property currently comprising the ETTP.

In June 1997, DOE real estate records that document previous ownership of the land tracts where Parcel ED-9 is located were examined. Page A-3 of Appendix A is a statement (DOE 2002a) from the Realty Officer of the DOE Oak Ridge Office (ORO) that the real estate records contained no information or references to other recorded evidence that, prior to DOE and its U. S. Government predecessor agencies ownership, the property had been used for the storage of hazardous substances. Additionally, no information contained in these records indicated that hazardous substances had been released from or disposed of on the property.

The pre-construction aerial photographs and maps listed below that reflect prior use of this land were also reviewed. Copies of these photographs and maps are on file in the DOE-ORO Real Estate Office.

Aerial Photographs:

<u>Photograph Nos. and Date</u>	<u>Flight By</u>	<u>Source</u>
No. 130-3-9, dated 1939	Unknown	DOE-ORO, Real Estate Office
Nos. 820-2-20 through -23 and 820-3-20 through -24, dated September 25, 1942	Aero Service Corp. for Stone and Webster	DOE-ORO, Real Estate Office

These photographs, which were taken in 1939 and 1942, show that the land on which the study area is located was predominantly used for agricultural purposes. The remaining land was wooded. A map depicting pre-World War II structures, churches, and cemeteries that were present in the area of current ETTP is also included on page B-3 in Appendix B.

Topographic and real estate maps:

1. A November 2, 1942, topographic map identified as Section A-1 of ORR was prepared by Aero Services Corporation for Stone and Webster.
2. A February 19, 1945, real estate map (sheet 9 of 16) prepared by the U. S. Army shows the boundaries of all land tracts in Segment H of the ORR that were acquired during the early 1940s for the construction of the K-25 Site. The study area is on Land Tracts H-720 and H-731.

Neither the aforementioned photographs nor maps contained any information regarding the history of the past land use that would indicate that storage or releases of hazardous substances or petroleum

products or their derivatives have occurred on the land where Land Tract H is located. Copies of the 1942 topographic map and real estate map are maintained in the DOE-ORO Real Estate Office.⁴

3.2 REGULATORY SUMMARY

3.2.1 Background

As mentioned previously, this EBS relies upon regulatory agency-approved documentation in the PCCRs (indicated below) for the foundational information to support transfer. Approval letters from the U.S. Environmental Protection Agency (EPA) Region 4 and Tennessee Department of Environment and Conservation (TDEC) for the PCCRs are presented in Appendix C. The PCCRs were prepared as part of the Environmental Management's (EM) Dynamic Verification Process (DVS). This process is in use for remedial action (RA) decision-making across the ETTP, and decisions are based on hierarchical land unit divisions of Zones, then Geographic Areas, then Groups, then Exposure Units (EUs).

All of the approximately 13 acres in Parcel ED-9 are located within either Zone 1 or Zone 2 of the ETTP. Approximately 1 acre of paved roadway and adjacent ROW (tract ED-9C) occupies a portion of the Zone 1 EUs Z1-04 and Z1-06 and the Zone 2 EU Z2-15. The remaining ED-9 acreage (ED-9A and ED-9B) is located entirely within the Zone 2 EU Z2-33.

The PCCRs, and back-up documentation to the PCCRs, have already evaluated the environmental data in the parcel and the potential risk to receptors, documented the RAs completed within the boundaries of the parcel, and concluded that no further RAs are needed within the EUs comprising the parcel, which have approved PCCRs. These actions and decisions are presented in the following:

- *Phased Construction Completion Report for the K-1007 Ponds Area and Powerhouse Area in Zone 1 at East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2294&D2), August 2006 (DOE 2006);
- *Fiscal Year 2007 Phased Construction Completion Report for the Zone 2 Soils, Slabs, and Subsurface Structures at East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2723&D2), September 2007 (DOE 2007b); and
- *Fiscal Year 2008 Phased Construction Completion Report for EU Z2-33 in Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2368&D2/R1), August 2009 (DOE 2009).

A small segment of road (only about 30 of the 900 linear feet) in the western tract of ED-9 lies within EU Z2-15. This EU does not have an approved PCCR; however, the ED-5 East and ED-5 West EBSs evaluated the environmental data and the potential risk to receptors in these adjacent land parcels. The approved ED-5 East and ED-5 West CDRs determined that these parcels were suitable for transfer. Although not specifically addressed by the CDRs, based on the determination that the land adjacent to this segment of road is suitable for transfer, it can be inferred that this short segment of roadway is also suitable for transfer.

⁴ Energy Systems 1996. *Real Estate Section of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sect. 120(h) Review*, authored by W. W. Teer, Jr., Real Estate Manager, Lockheed Martin Energy Systems, Inc., Oak Ridge, TN, August 9, 1996.

3.2.2 The EM DVS Protocol and Parcel ED-9

Regulatory information for Zones 1 and 2 as it relates to Parcel ED-9 will be discussed below along with a summary of the EM DVS approach, and technical information for the component EUs will be presented in Chap. 6.

The EM DVS process was designed to facilitate real-time decision-making and includes five steps:

1. preparation of data quality objective scoping packages,
2. classification of soil units using a graded approach,
3. determination of additional sampling or surveying needs,
4. determination of the need for RA using decision rules, and
5. use of confirmation sampling to determine if RA is complete.

The decision rules mentioned in Step 4 were based on one or more of the following criteria:

- exceedance of a maximum remediation level (RL) at any location,
- exceedance of an average RL across the EU,
- unacceptable future threat to groundwater, or
- unacceptable cumulative Excess Lifetime Cancer Risk (ELCR) of $> 1 \times 10^{-4}$ and hazard index (HI) > 1 across the EU.

Decision rule 4, a threat to groundwater by Zone 1 or Zone 2 soils, is evaluated by reviewing historical groundwater data and, if necessary, screening soil data against established screening levels. Based on the screening, site-specific modeling may be conducted. Consideration of an action on groundwater is required if any of these steps indicates a site may be a potential source of contamination to groundwater. A Sitewide Record of Decision will evaluate all threats to groundwater.

3.2.3 Actions Taken Within the ED-9 Exposure Units

As mentioned in Sect. 3.2.1, the ETTP is divided into Zones 1 and 2 and further subdivided into geographic areas. The boundaries of geographic areas are based on natural boundaries of major water bodies, topographic divides, surface water drainages, and/or property boundaries. The geographic areas are subdivided into groups and then into EUs. EUs are the smallest land areas used for assessing risks to an exposed individual. For the purposes of risk evaluation, the entire EU is considered because there are no barriers or impediments preventing access to the entire EU.

Located within some of the EUs are sites designated as requiring special attention because they were listed in the Federal Facility Agreement (FFA) as having the potential for contamination. These FFA sites have been the focus of several RAs across the ETTP. The discussion below addresses the regulatory status of the EUs in which ED-9 is located and summarizes any actions taken at associated FFA sites. Table 3.1 summarizes the ED-9 FFA sites addressed and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) decision for those sites.

Table 3.1. Parcel ED-9 (Zone 1, EUs Z1-04 and Z1-06, and Zone 2, EU Z2-33) FFA sites and summary of CERCLA decisions

Zone	Geographic area	EU	Associated FFA sites	Decision
1	K-1007 Ponds	Z1-04	Building 569 Heavy Equipment Shop	Sampling and analysis of site resulted in NFA concurrence from EPA and TDEC.
			600 Series Oil Storage Area	Sampling and analysis of site resulted in NFA concurrence from EPA and TDEC.
1	K-1007 Ponds	Z1-06	695/687 Oil Storage Operations	Sampling and analysis of site resulted in NFA concurrence from EPA and TDEC.
2	South Park	Z2-33	K-1004-L Recirculating Cooling Water Lines Leak Sites	Sampling and analysis of site resulted in NFA concurrence from EPA and TDEC.
			K-1044 Heavy Equipment Repair Shop	Sampling and analysis of site resulted in NFA concurrence from EPA and TDEC.
			K-1015-A Laundry Pit	Completed RA at K-1015-A Laundry Pit resulted in NFA concurrence from EPA and TDEC.

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

EPA = U. S. Environmental Protection Agency.

EU = exposure unit.

FFA = Federal Facility Agreement.

NFA = No Further Action.

RA = remedial action.

TDEC = Tennessee Department of Environment and Conservation.

Parcel ED-9 is located within the K-1007 Ponds Geographic Area of Zone 1 and the South Park Geographic Area of Zone 2. Parcel ED-9 is located in portions of two Zone 1 EUs (EU Z1-04 and Z1-06) and two EUs in Zone 2 (EU Z2-15 and Z2-33). In these EUs, one FFA site (K-1015-A Laundry Pit) has a completed RA resulting in a No Further Action (NFA), while sampling and analysis at the other five sites resulted in NFA. RAs performed at the K-1015-A Laundry Pit included removal of the pit and a small amount of adjacent soil. Additional RAs completed within EU Z2-33 consisted of removal of six acid dilution pits and a small volume of soil at the pit, which was located southwest of the former K-1004-A building; removal of inlet piping to two of the six dilution pits; in-place closure of the acid dilution pit located immediately west of Bldg. K-1006; and removal of contaminated surface soils south of former Bldg. K-1004-J. Following completion of the RAs, NFA decisions were reached for EU Z2-33, including the FFA sites (DOE 2009). No RAs were necessary in EUs Z1-04 and Z1-06.

In addition to the actions described above, removal of the concrete slabs from previously demolished buildings (K-1004-A, K-1004-B, K-1004-C, K-1004-D, and K-1004-L) and a small area of contaminated soil were also performed in ED-9 under the DVS. Slab removal occurred between August 2006 and August 2007 and involved excavating the concrete and disposition of the material at an approved disposal facility. Clean soil was used to backfill the slab depressions. Analytical results showed no decision rule

exceedances for the remaining soils. These actions are described in the fiscal year (FY) 2007 PCCR for Zone 2 (DOE 2007b).

In March 2009, a final RA was performed for the Bldg. K-1006 north basement sump, which is located just outside the ED-9 footprint in EU Z2-33. The RA consisted of removing the water in the sump and then removing and sampling the solids. The solids were mixed with grout after removal and allowed to set. The solids were then disposed off-site at an approved disposal facility. The building sump will remain until the K-1006 building is demolished. The actions for the K-1006 sump are described in the revised PCCR for EU Z2-33, which received regulator approval in December 2009.

Although characterization of EU Z2-15 has not been completed under the DVS process and, thus, no CERCLA decisions made, only about 30 of the 900 linear feet of paved road extends into this EU, and the land bordering the east and west sides of this segment of road has already been transferred under the approved ED-5 East and ED-5 West CDRs (DOE 2005b and 2008). In addition to data supporting the regulator-approved CDRs for the adjacent property, DOE conducted a search of the site files and reviewed historic aerial photos of this area. The review indicates there is no evidence of prior use of the 30-ft segment of ED-9C located in EU Z2-15 that would have introduced contamination. Therefore, DOE has determined that this segment is also suitable for transfer.

4. PAST AND PRESENT ACTIVITIES

4.1 PAST AND PRESENT ACTIVITIES FOR THE REAL PROPERTY PROPOSED FOR TRANSFER

Prior to the acquisition of the land by the government in the 1940s, the entire area now known as ETTP was farmland or forested land. Over 800 acres of land were leveled and prepared in support of the Manhattan Project (to supply enriched uranium for nuclear weapons production). ED-9 occupies the heart of an area of the ETTP that was formerly referred to as the administration area because of the numerous office buildings and laboratory facilities that formerly occupied this portion of ETTP.

Parcel ED-9 is located in the south-central portion of ETTP. Impacts included construction of buildings, roads, parking lots, and sidewalks. The majority of the facilities that formerly occupied Parcel ED-9 have been demolished and the building slabs removed under the *Action Memorandum for the Remaining Facilities Demolition Project at East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE 2003). Facilities and related structures that formerly occupied tracts ED-9A and ED-9B, but are no longer in existence, include:

K-1002 Cafeteria	K-1004-N Cooling Tower
K-1003 Dispensary	K-1004-P Test Facility
K-1004-A Laboratory	K-1015 Laundry Facility
K-1004-B Laboratory	K-1015-A Laundry Pit
K-1004-C Laboratory	K-1019-2B Bus Shelter
K-1004-D Laboratory	K-1044 Heavy Equipment Shop
K-1004-E Laboratory Storage Building	K-1205-A Condensate Station
K-1004-F Laboratory Storage Building	K-1550 Engineering Office Trailers
K-1004-H Liquid Gas Storage Shed	
K-1004-L Laboratory Pilot Plant	

The existing building in the ED-9 transfer footprint is Bldg. K-1225; it is not included in the proposed Parcel ED-9 transfer. The K-1225 building was transferred to CROET previously. Tract ED-9C consists of approximately 900 linear feet of paved road, formerly known as Avenue "M," which connects Contractor's Road to South Perimeter Road in the area immediately north of the K-1007-P1 Pond. Avenue "M" was built as part of the original ETTP construction, at which time it extended well north of its current termination point. A portion of the underground electrical transmission line ducts that run from the K-25 Powerhouse to the K-25 Process Building also run beneath tract ED-9C, approximately one-third of the distance down from the northern terminus of this road segment. This road segment serves as the boundary between two land parcels, ED-5 East and ED-5 West, which have previously been transferred.

4.2 PAST AND PRESENT ACTIVITIES FOR THE ADJACENT PROPERTY

Directly to the south of ED-9A is Bldg. K-1006, which has an associated chiller and boiler designated as K-1006-C. A cooling tower, K-1006-A has been removed. K-1006 was a Demonstration Laboratory for radiological materials. In March 2009, a final RA was performed for the Bldg. K-1006 north basement sump. The RA consisted of removing the water in the sump and then removing and sampling the solids. The solids were mixed with grout after removal and allowed to set. The solids were

then disposed off-site at an approved disposal facility. The building sump will remain until the K-1006 building is demolished. The actions for the K-1006 sump are described in the revised PCCR for EU Z2-33, which received regulator approval in December 2009. Directly to the south of ED-9B are Bldgs. K-1039 and K-1039-01, used for communications. Disposition of these buildings will be determined by DOE.

The area adjacent to tracts ED-9A and ED-9B to the southwest was predominately used for administrative buildings (e.g., former K-1001, K-1000, K-1330, and K-1580), a computer support building (K-1007), parking lots, and sidewalks. There are several maintained lawns around current buildings and former building sites. The area adjacent to tract ED-9C consists of grass-covered land that was used between 1943 and 1948, during construction of the K-25 and K-27 Process Buildings, for construction support and maintenance operations. The underground electrical transmission lines, consisting of 13 concrete ducts, pass beneath the road near the railroad track crossing.

The former Administration Building, K-1001, was located to the southwest of tract ED-9A. The building was built in 1944 and was demolished in 2000 under a Memorandum of Agreement with the state of Tennessee. The area where Bldg. K-1001 was located is now a large, grassy field.

A portion of the K-1550 Engineering Office Trailer complex also occupied an area adjacent to the southeast corner of tract ED-9B, as did Bldg. K-1320 and its extension, K-1320-A, which both provided space for Engineering personnel. The Engineering Trailers were removed in 2004 and demolition of the K-1320 and K-1320-A buildings was completed in 2007.

To the west of tract ED-9A are the long north-south-trending K-1240-2 parking lots, and to the northwest is the K-1240-4A parking lot adjacent to Portal 4. All of the EUs comprising the adjacent areas on the west, south, and east of ED-9 have received NFA determinations.

To the north of tracts ED-9A and ED-9B are the former K-1066-G Storage Yard, K-1008-F, and the Centrifuge Area (K-1200 Complex). Building K-1008-F has been transferred and a Baseline Report has been prepared for the K-1200 Complex.

EBS reports have been prepared for both Land Parcel ED-5 East (DOE 2005b) and Land Parcel ED-5 West (DOE 2008), which border the east and west sides of the paved road segment comprising tract ED-9C. The former K-29 Process Building occupied the area north of this tract. Demolition of this building began in January 2006 and was completed in August 2006. The northern arm of the K-1007-P1 Pond lies to the south of tract ED-9C. RAs to address ecological and human health risks associated with pond sediment are ongoing at the pond.

4.3 HYDROGEOLOGIC ENVIRONMENT

ED-9 is located in the south-central portion of the ETTP. This portion of the ETTP is underlain by bedrock of the Chickamauga Supergroup. The Chickamauga Supergroup formations underlying this area include the Carters Limestone, the Hermitage Formation, the Cannon Limestone, and the Catheys Formation. Although less prone to karst development than the Knox Group rocks in the vicinity of the ETTP, the Chickamauga formations are nevertheless subject to the development of karst, and pre-construction topographic maps indicate the occurrence of sinkholes in an area from 500 to 2500 ft west of ED-9. These sinkholes were filled during construction of the plant in the 1940s. Figure 4.1 shows the hydrogeology of the ED-9 study area, including the identified groundwater plumes in the vicinity of the parcel.

Figure 4.1. Hydrogeology of Land Parcel ED-9

Solutionally enlarged fractures, joints, and bedding planes are common in exposures of Chickamauga rocks in the vicinity of ETTP. Structurally, these formations have been folded into an anticline (convex upward fold) with the axis of this structure trending northeast-southwest in a line located just south of Bldg. K-1006. Bedding in the Chickamauga generally dips northwestward on the north side of the axis and southeastward on the south side of the axis.

The water table at ETTP generally mimics topography with shallow groundwater flowing from higher topographic areas to the surrounding surface water bodies. Groundwater flow through bedrock is primarily controlled by fractures, bedding planes, and hydraulic gradient, and specific flow paths are difficult to discern. The interpretation of subsurface flow paths is further complicated by cut-and-fill activities that occurred to level the ground prior to construction of the facilities.

Twelve groundwater monitoring wells have been installed within tracts ED-9A and ED-9B, including nine bedrock wells and three unconsolidated zone wells. The three unconsolidated zone wells have consistently been dry, indicating that groundwater occurs primarily within bedrock beneath ED-9. Only the bedrock wells are shown on Fig. 4.1 due to this condition and the absence of chemical data for the unconsolidated zone monitoring wells. Depth to bedrock across the land parcel is expected to be from 2 to 27 ft below ground surface (bgs) based on the existing wells. Water levels in the existing bedrock

(DCE) has occurred in concentrations greater than its maximum contaminant level (MCL) at one well (BRW-053). However, since 2007, a maximum concentration of 58 micrograms per liter ($\mu\text{g/L}$) has been reported for DCE at BRW-053, which is below the MCL of 70 $\mu\text{g/L}$. Prior to 2007, concentrations as high as 130 $\mu\text{g/L}$ had been detected. TCE has exceeded its MCL (5 $\mu\text{g/L}$) at three wells (BRW-038, BRW-053, and BRW-073). TCE concentrations at these three wells have ranged from 11 $\mu\text{g/L}$ to 39 $\mu\text{g/L}$ in the most recent sampling event for these wells, which varies from 2005 to 2009. In general, VOC concentrations have been declining over the past 10 years at most of these wells; however, recent trend analysis indicates the possibility of an increasing trend in at least one well (BRW-053). The presence of contaminated groundwater beneath the parcel is considered to represent a release of hazardous substances to the property.

In addition to the groundwater plume present beneath tracts ED-9A and ED-9B, a plume potentially connected via bedrock to the plume beneath these tracts lies approximately 450 ft north (Fig. 4.1). This plume is located hydraulically upgradient of ED-9A and ED-9B and contains concentrations of TCE, tetrachloroethene (PCE), and *cis*-1,2-DCE above their respective MCLs. Concentrations of PCE greater than 1000 $\mu\text{g/L}$ are present in two unconsolidated zone monitoring wells and one bedrock monitoring well located near the southern extent of the mapped plume. Concentrations of PCE ranged from 1160 $\mu\text{g/L}$ to 8610 $\mu\text{g/L}$ at these three wells in 2009. These concentrations greatly exceed the MCL for PCE of 5 $\mu\text{g/L}$.

Groundwater contamination has not been identified beneath tract ED-9C. A groundwater plume consisting of primarily TCE is located approximately 600 ft west of this tract. Based on the anticipated groundwater flow direction in this area of the ETTP, this plume is flowing to the southwest toward Poplar Creek and will not impact tract ED-9C.

As established in the deed restrictions in the CDR, extraction, consumption, exposure, or use, in any way, of the groundwater underlying the property, or water from streams or ponds located on the property, is prohibited without the prior written approval of DOE, EPA Region 4, and TDEC.

5. RESULTS OF VISUAL AND PHYSICAL INSPECTIONS

5.1 VISUAL AND PHYSICAL INSPECTIONS OF THE PROPERTY FOR TRANSFER

A visual and physical inspection of the ED-9 study area was conducted on March 13, 2009. At that time, the eastern tracts of the ED-9 study area were generally grass-covered, subsequent to the removal of the former building pads and associated infrastructure, with several existing buildings and temporary trailers, several small parking areas, paved access roads, and a small fenced electrical substation were observed. The western tract is a hard-surface asphalt road bounded by grass-covered land.

At the time of the 2009 inspection, the only existing buildings located within the eastern tracts of the ED-9 study area were K-1006, which is located in the southwestern corner of tract ED-9A, K-1225, and K-1039 and K-1039-01. During development of the survey plat in 2010, the transfer footprint was revised to exclude Bldgs. K-1006, K-1039, and K-1039-01. These buildings are now adjacent to the property proposed for transfer. K-1225, located in the northeastern corner of tract ED-9B, was previously transferred to CROET. No buildings are included in the property currently proposed for transfer.

The temporary office trailers, located in the southeastern corner of tract ED-9B, included one used as the ETTP Visitor Center and Badging Office.⁵ The electrical substation, enclosed by fencing, is located in the northern portion of tract ED-9A.



Fig. 5.1. View of tract ED-9A following completion of remedial actions.

5.2 VISUAL AND PHYSICAL INSPECTIONS OF ADJACENT PROPERTY

During the walkdown of March 13, 2009, the properties immediately adjacent to Parcel ED-9 were also visually and physically inspected for signs of current or historical disposal of hazardous substances or petroleum products or their derivatives.

⁵ These trailers were subsequently removed in 2009.

Land adjacent to tracts ED-9A and ED-9B includes a small number of buildings and trailers, several large parking lots, numerous paved access roads, and railroad tracks. Parking lots occupy large areas on the west and east boundaries of these two tracts. A large, open, grass-covered area is located immediately to the southwest of tracts ED-9A and ED-9B. This grass-covered area is the site of the former K-1001 Administration Building, K-1320, and the K-1550 Engineering Office Trailer complex. The property adjacent to tract ED-9C consists of grass-covered vacant land.

The K-1200 Complex and the former K-1066-G Cylinder Yard lie north of tracts ED-9A and ED-9B. The K-1200 Complex buildings, which were in use from the 1960s to the 1980s, were part of the gas centrifuge program. The complex has been leased to CROET by DOE and subsequently to Materials and Energy Corporation for development of a commercial waste treatment facility. The K-1066-G Cylinder Yard is used for temporary storage of miscellaneous materials and equipment associated with the K-1414 Garage and various ETTP construction and demolition projects. Other facilities adjacent to tract ED-9B include Bldg. K-1008-F, which has been transferred and is located immediately north of Bldg. K-1225, and the small K-1045 building, located adjacent to K-1008-F. The former K-29 Process Building, which occupied the area north of tract ED-9C, has been demolished and the demolition debris removed. Remedial actions are still ongoing at the K-1007-P1 Pond.

In 2010, during development of the survey plat, the transfer footprint for Parcel ED-9 was revised. Buildings K-1006, K-1039, and K-1039-01, which had been in the initial ED-9 study area, were excluded from the current property proposed for transfer. Building K-1225, which is surrounded by the proposed transfer property, was previously transferred to CROET. Building K-1006, which was a laboratory for radiological materials, is directly south of ED-9A. In March 2009, a final RA was performed for the Bldg. K-1006 north basement sump. The RA consisted of removing water in the sump and then removing and sampling the solids. The solids were disposed off-site at an approved disposal facility. The RA received regulator approval in December 2009. Directly to the south of ED-9B are Bldgs. K-1039 and K-1039-01. These buildings house telecommunications equipment.

Based on the results of the walkdown and the subsequent remedial actions at K-1006, there are no physical or visual indications of potential impacts to ED-9 from adjacent properties.

6. SAMPLING RESULTS

Three of the four EUs (EU Z1-04, Z1-06, and Z2-33) in which the vast majority of Parcel ED-9 is located and/or the associated FFA sites listed in Table 3.1 were assessed under approved Work Plans that address sampling and analysis conducted in accordance with the DVS protocol. The Work Plans were approved by EPA and TDEC on December 7 and 13, 2007, respectively. All verified and validated data used to make regulatory decisions have been placed in the Oak Ridge Environmental Information System database (www-oreis.bechteljacobs.org/oreis/help/oreishome.html) and are available for review. The sampling results and data evaluation can be found in Appendix B (K-1007 Ponds Group Technical Memorandum) of the FY 2006 PCCR for Zone 1 K-1007 Ponds and Powerhouse and Appendix A (Exposure Unit Z2-33 South Park Area Technical Memorandum) of the FY 2008 PCCR for EU Z2-33 in Zone 2 (DOE 2009). These data were deemed sufficient to reach an NFA decision for all of the EUs, which have approved PCCRs, corresponding to the ED-9 land parcel.

Although characterization of EU Z2-15 has not been completed under the DVS process, the land bordering the east and west sides of this segment of paved road has already been transferred under the approved ED-5 East and ED-5 West CDRs (DOE 2005b and 2008). The EBS attachments to the CDRs evaluated the environmental data and potential risk to receptors for these two parcels. The results of the evaluations indicated that these parcels were suitable for transfer. In addition to data supporting the regulator-approved CDRs for the adjacent property, DOE conducted a search of the site files and reviewed historic aerial photos of this area. The review indicates there is no evidence of prior use of the 30-ft segment of ED-9C located in EU Z2-15 that would have introduced contamination. Therefore, DOE has determined that this segment is also suitable for transfer.

7. RISK EVALUATION

The Zone 1 and Zone 2 remedial action objectives (RAOs) were developed by the DVS to support the future use of ETPP as a mixed-use commercial and industrial park. Therefore, remediation criteria were designed for the protection of the future industrial worker under the assumption the worker normally would not have the potential for exposure to soils at depths below 10 ft bgs.

Within that constraint the decision rules established in the DVS were based on one or more of the following criteria:

- exceedance of a maximum RL at any location,
- exceedance of an average RL across the EU,
- unacceptable future threat to groundwater, or
- unacceptable cumulative ELCR of $> 1 \times 10^{-4}$ and HI > 1 across the EU.

The National Contingency Plan (NCP) preamble (55 *Federal Register* 8716, March 8, 1990) describes the process used to establish the remediation goal for environmental media as consisting of a two-step approach. First, an individual lifetime excess cancer risk of 10^{-6} is used as a starting point for establishing remediation goals for the risks from contaminants at specific sites. The second step involves consideration of a variety of site-specific or remedy-specific factors, which enter into the determination of where, within the risk range, the cleanup standard for a given contaminant will be established. The factors considered in the development of the Zone 1 and Zone 2 Records of Decision (RODs) and subsequent steps in the implementation of the RODs, such as the DVS, included an acceptable *cumulative* risk level of 10^{-4} , which is the upper bound of the EPA acceptable risk range. From the Zone 2 ROD (Section 1.4): "The remedial action objective (RAO) for Zone 2 is to 'Protect human health under an industrial land use to an excess cancer risk at or below 10^{-4} .'" A comparable statement is included in the Zone 1 ROD. Zone 1 and 2 RAOs were developed by the DVS to support the future use of 10^{-4} cumulative ELCR across the EU as one of the decision criteria. To achieve the RAO, constituent-specific cleanup goals were developed. Per the NCP preamble, these cleanup goals are to be based on a risk level of 10^{-6} for individual constituents unless site-specific or remedy-specific factors exist to suggest modifications are appropriate. For the Zone 1 and Zone 2 RODs, these factors include the following:

- Site-Specific Exposure Factors
 - exposure of the industrial worker is limited to soil-related pathways only (multiple media exposures are not applicable to this scenario), and
 - the limited contaminant of concern (COC) list indicates that the potential for a large number of remedial goal exceedances is unlikely, allowing for a higher risk level for each COC considered, while still achieving a cumulative risk $< 10^{-4}$.
- Remedy-Specific Technical Factors
 - remedial goals for particular COCs were generated at a risk level $> 10^{-5}$ due to cost prohibitiveness and impracticality of remediation to a lower concentration, and
 - remedial goals for particular COCs were revised to reflect consideration of elevated background levels.

Incorporation of the factors above provided RLs that reflect the RAO of achieving a cumulative human health risk that will not exceed 10^{-4} for a given EU or FFA site. Table 7.1 summarizes the decisions for the EU components of Parcel ED-9 and/or the decisions for the FFA sites located within the EUs. For purposes of risk evaluation, the entire EU is considered because there are no barriers or impediments preventing access to the balance of the EU.

Table 7.1. Parcel ED-9 risk evaluation results

Associated FFA sites	Decision rule evaluation ^a				Risk evaluation
	Max RL	Avg RL	Risk	GW	
Building 569 Heavy Equipment Shop	NFA	NFA	NFA	NFA	Passes
600 Series Oil Storage Area	NFA	NFA	NFA	NFA	Passes
695/687 Oil Storage Operations	NFA	NFA	NFA	NFA	Passes
K-1004-L Recirculating Cooling Water Lines Leak Sites	NFA	NFA	NFA	NFA	Passes
K-1044 Heavy Equipment Repair Shop	NFA	NFA	NFA	NFA	Passes
K-1015-A Laundry Pit	NFA	NFA	NFA	NFA	Passes

^a Decision rule and risk evaluation information are from DOE/OR/01-2368&D2/R1 and DOE/OR/01-2294&D2.

FFA = Federal Facility Agreement.

GW = groundwater.

NFA = No Further Action.

RL = remediation level.

RAs have been completed and confirmatory sampling has been obtained to support numerous NFA decisions in Zone 1 and Zone 2. Three of the four EU components to Parcel ED-9 (EU Z1-04, Z1-06, and Z2-33) have obtained NFA concurrence. Although characterization of EU Z2-15 has not been completed, the land bordering the east and west sides of this approximately 30-ft segment of paved road has already been transferred under the approved ED-5 East and ED-5 West CDRs (DOE 2005b and 2008). In addition to data supporting the regulator-approved CDRs for the adjacent property, DOE conducted a search of the site files and reviewed historic aerial photos of this area. The review indicates there is no evidence of prior use of the 30-ft segment of ED-9C located in EU Z2-15 that would have introduced contamination. Therefore, DOE has determined that this segment is also suitable for transfer.

DOE also considered risks from exposure to the larger ETTP site through evaluation of a "roving worker" who may access multiple areas at ETTP. The purpose of this effort was to evaluate the risk posed to workers when they are not inside the buildings. The roving worker scenario is considered to be applicable to all facilities at ETTP, including those transferred.

This evaluation was based on certain assumptions, including: (1) the worker will not be exposed to areas that are inaccessible due to radiological or other controls, such as fences or other barriers, or postings that prevent casual entry by a worker at a nearby building, and (2) there are no "hotspots" of contamination at ETTP that are accessible to these workers. The results of the roving worker risk screen, which used all available data, show that risks/hazards are within EPA's acceptable risk range.

8. REFERENCES

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APPENDIX A
REAL ESTATE ACQUISITION LETTER

PROPOSED REAL ESTATE ACTION (REVISED)
OAK RIDGE RESERVATION, TN
FILES RESEARCH FOR HAZARDOUS SUBSTANCE ACTIVITY

The following statement is provided in support of guidance promulgated under Section 120(h) of the Comprehensive Environmental Response, Compensation and Liability Act, as amended (CERCLA) 42 U.S.C 9620(h) and in support of regulations issued by the Environmental Protection Agency at 40 CFR part 373.

The undersigned has made a complete search of existing and available Department of Energy (DOE) records, documentation, and data within the real estate files relating to the property that is subject to the proposed fee transfer action of Parcel ED-9 (including Europa Avenue) at the East Tennessee Technology Park (ETTP) within the Oak Ridge Reservation, Tennessee. The proposed action would result in transfer to the Heritage Center, LLC, under a 10 CFR 770 Proposal. The search conducted was considered reasonable with a good faith effort expended to identify whether any hazardous substances were known to have been released or disposed of on the property. The available real estate records of this office do not reflect any determinable reference that hazardous substance activity as defined by Section 101(14) of CERCLA took place on or in the property during the time the property was owned by the United States of America.


Lands affected by this action are identified as portions of the following original acquisition tracts in which the United States of America acquired title, (having been acquired for the Atomic Energy Commission as a forerunner of the Department of Energy) by Civil Action No. 429 filed in the United States District Court for the Eastern District of Tennessee, Northern Division:

Parcel ED-9 is located on a portion of Tract H-720. Title to this land was vested in the United States of America by Declaration of Taking No. 19. Judgment on Declaration of Taking was filed for public record on February 23, 1943, in Vol. Y-5, page 138, in the Roane County Register's Office, Tennessee.

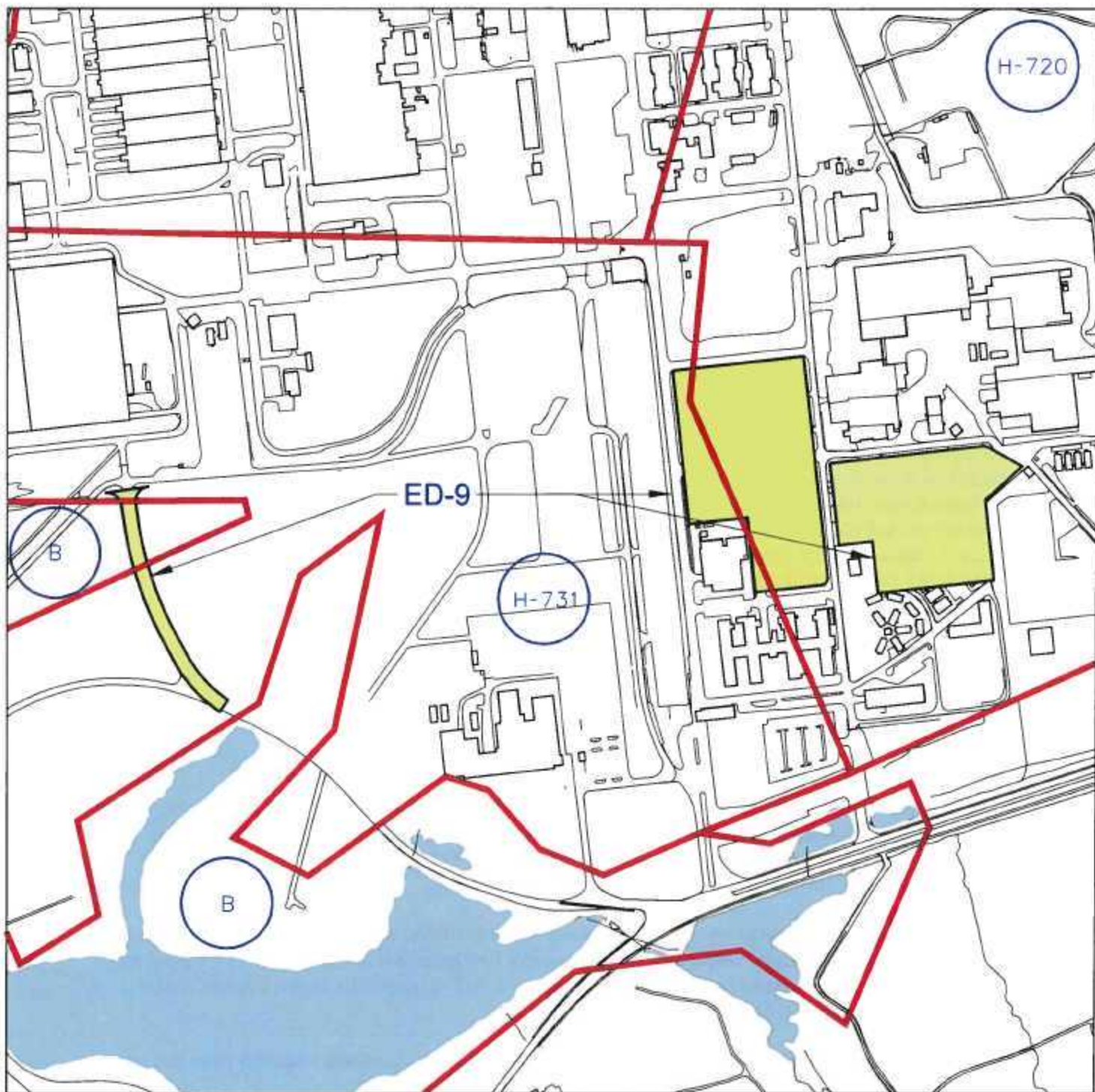
Parcel ED-9 is located on a portion of Tract H-731. Title to this land was vested in the United States of America by Declaration of Taking No. 19. Judgment on Declaration of Taking was filed for public record on February 23, 1943, in Vol. Y-5, page 120, in the Roane County Register's Office, Tennessee.



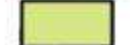
Parcel ED-9 is located on a portion of Tract B. Title to this land was acquired from Department of Army, Executive Order No. 9816, Dated December 31, 1946.

This record shall be made a part of the CERCLA report currently being prepared.


Tracye Baker, Certified Realty Specialist
U. S. Department of Energy
Oak Ridge Office

Attachment
Plat Exhibit



-  Acquisition Tract Number
 Acquisition Tract
 Transfer Footprint ED-9

Tract B: Acquired from Department of the Army, executive order no. 9816 dated 12-31-46
 Tract H-720: Acquired from W. F. Elzey et ux, DB/Page Y-5/138 Declaration of Taking No. 19
 Tract H-731: Acquired from Rhea Gallaher et ux, DB/Page Y-5/120 Declaration of Taking No. 19

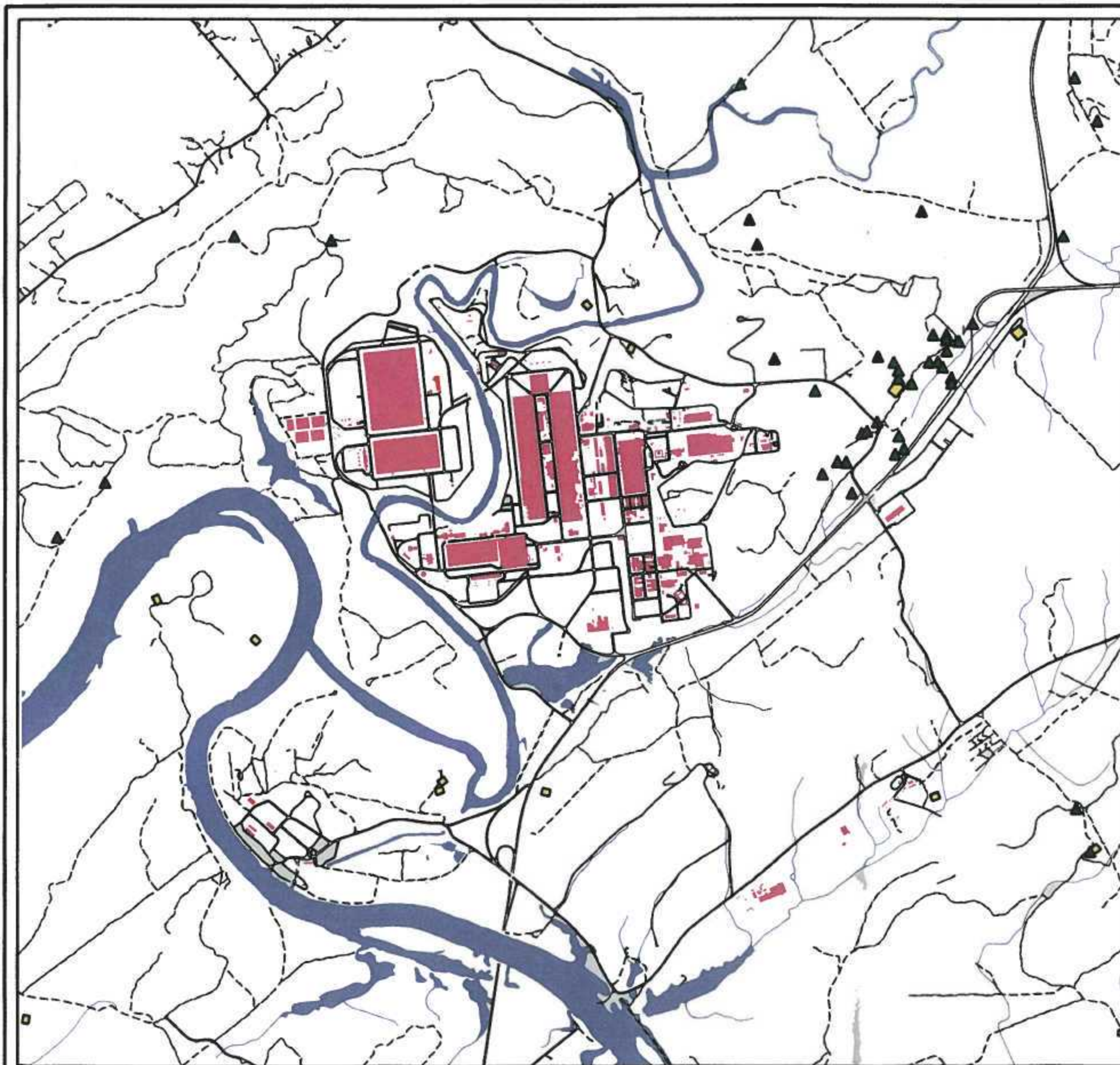
500' 0 500' 1000' 1500'



SCALE: 1" = 500'

APPENDIX B

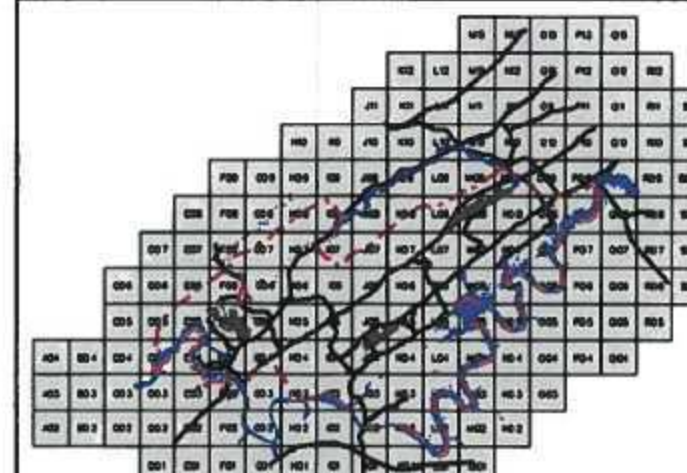
STUDY AREA MAP FROM RECORDS SEARCH



Location of Pre-World War II Structures and Cemeteries in or near the East Tennessee Technology Park

LEGEND

-  Pre-World War II Structures
-  Cemeteries
-  Buildings
-  Roads
-  Water Bodies
-  Streams



DATA COMPILED BY GRID IS HAD 83 FEET
ER REMOTE SENSING PROGRAM
ENVIRONMENTAL INFORMATION MANAGEMENT PROGRAM
GEOGRAPHIC INFORMATION SCIENCES AND TECHNOLOGY GROUP
ORIGINAL BY: BARGE, WAGGONER, SUMNER AND CANNON, INC.
REVISED BY: TETRA TECH, INC. 2/1001

KMAPS QRO HISTORIC MAP GSL

APPENDIX C
PCCR APPROVAL LETTERS



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

September 28, 2009

Certified Mail
Return Receipt Requested

4SD-FFB

Mr. David G. Adler, Project Manager
Federal Facility Agreement
Department of Energy
Oak Ridge Operations Office
P.O. Box 2001

SUBJ: EPA Approval of the Fiscal Year 2008 Phased Construction Completion Report
for EU Z2-33 in Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee
(DOE/OR/01-2368&D2/R1)

Dear Mr. Adler:

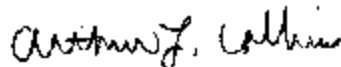
The Environmental Protection Agency (EPA) has reviewed the above-referenced document which was submitted on September 11, 2009. On November 11, 2008, EPA approved the PCCR for Z2 EU-33 based on the Department of Energy's (DOE) recommendation that the K-1006 north sump needed to be remediated. At the time the PCCR was submitted, the sump was in-use at an active facility and leased with an uncertain demolition date. Allowing the contaminated sump to remain in operation impacted the land use control to protect industrial workers to 10 ft below ground surface. The subject PCCR completes all of Z2 EU-33 actions related to the K-1006 sump and includes:

- The requirement to remove the sump, based on Radium/Thorium decay series Maximum Remedial Level exceedance of 41.64 pCi/g and Average Remedial Level exceedances for PCB 1254 of 23, 000 ug/kg and Uranium-238 of 116 pCi/g;
- Removing water and solids contained in the sump;
- Adding grout to the remaining solids, hydrating the solids with water and allowed to set;
- Equipment and personal protective equipment was containerized and disposed at Energy Solutions; and
- Retaining the decontaminated sump in the basement until the building is demolished.

The remedial action objectives have been achieved for the 18 acres located in Z2 EU-33 with the decontamination of the K-1006 north sump. Therefore, based on the actions identified above, EPA is approving the PCCR as submitted.

If you have any questions regarding this matter, please contact Ms. Constance Allison Jones of my staff at (404) 562-8551 or electronically at: Jones.Constance@epa.gov.

Sincerely,



Arthur L. Collins, Chief
Federal Facilities Branch
Superfund Division

cc: Roger Petrie, TDEC
Michael Traglini, DOE
Patricia Halsey, DOE
Russell Vranicar, DOE
Thomas Gebhart, TDEC
SSAB
LOC



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

June 9, 2008

Certified Mail
Return Receipt Requested

4SF-FFB

Mr. David G. Adler, Project Manager
Federal Facilities Agreement
Oak Ridge Reservation Management Group
Department of Energy
P.O. Box 2001
Oak Ridge, TN 37831

SUBJ: EPA Approval of the Fiscal Year 2007 Phased Construction Completion Report
for the Zone 2 Soils, Slabs, and Subsurface Structures at East Tennessee
Technology Park, Oak Ridge, Tennessee (DOE/OR/01-2723&D2)

Dear Mr. Adler:

The Environmental Protection Agency (EPA) reviewed the D2 of the Fiscal Year 2007 Phased Construction Completion Report (PCCR) for the Zone 2 Soils, Slabs, and Substructures at East Tennessee Technology Park, which was submitted March 2008. The Department of Energy has addressed all comments submitted by the EPA.

Based on the information provided, the PCCR serves to:

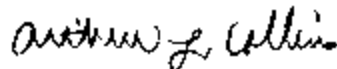
- provide information on the execution of the Dynamic Verification Strategy (DVS) for 11 Exposure Units (EU) in Zone 2 completed in FY 2007;
- describe and document the risk evaluation for each EU evaluated under the DVS and the determination of whether the EU met the Zone 2 Record of Decision (ROD) requirements for unrestricted industrial use to 10 feet below ground surface;
- describe remedial actions performed in EUs Z2-33, Z2-35, and Z2-36;
- identify two additional areas not defined in the Zone 2 ROD that require remediation based on the DVS evaluation results;
- describe the Remedial Actions performed in Zone 2;
- evaluate approximately 195.5 acres and recommends 143 acres for unrestricted industrial use to 10 feet below ground surface;

- evaluate 16 Federal Facility Agreement sites and recommend No Further Action for 14;
- describe remaining remedial action in EU Z2-28 and EU Z2-41; and
- provide a qualitative assessment that 5 of the 11 EUs that have a probability of being released for unrestricted industrial land use throughout the soil zone.

The EPA has no further comments on this document and is approving the PCCR as submitted, which includes the erratum on that corrects Figures C.2 through C.5 in Appendix C and updates to Figures F.2 and F.4 through F.6 in Appendix F. Although this interim remedial action document is approved, the Department of Energy should ensure that the Zone 2 Remedial Action Report (RAR) clearly specifies all land use controls implemented for all acreage within Zone 2, including all changes to the dig restrictions below 10 feet. Revising the industrial land use restrictions may require further specification of the remaining land use controls (e.g., restrictions on digging into contaminated aquifers). The current discussions to remove these controls need to conclude with an agreement between the FFA Parties regarding the specific conditions to apply prior to submitting the D1 RAR.

If you have any questions regarding this matter, please feel free to contact Constance Jones of my staff at (404) 562-8551.

Sincerely,



Arthur L. Collins, Chief
Federal Facilities Branch
Superfund Division

cc: Roger Petrie, TDEC
Patricia Halsey, DOE
James Kopotic, DOE
Michael Travaglini, DOE
Greg Eidam, Bechtel-Jacobs
Thomas Gebhart, TDEC
SSAB
LOC



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

OCT - 2 2006

Certified Mail
Return Receipt Requested

4WD-FFB

Mr. David G. Adler, Project Manager
Federal Facilities Agreement
Oak Ridge Reservation Management Group
Department of Energy
P.O. Box 2001
Oak Ridge, TN 37831

SUBJ: EPA Approval of the Phased Construction Completion Report for the K-1007 Ponds Area and the Powerhouse North Area in Zone 1 at East Tennessee Technology Park, Oak Ridge, Tennessee (DOE/OR/01-2994&D2)

Dear Mr. Adler:

The Environmental Protection Agency (EPA) has reviewed the document which was submitted on August 29, 2006. The Phased Construction Completion Report (PCCR) for the K-1007 Ponds Area and the Powerhouse North Area in Zone 1 documents:

- the characterization results of the Dynamic Verification Strategy (DVS) for 21 of the accessible 36 Exposure Units (EU) in the K-1007 Ponds and Powerhouse Area addressing 404.1 acres;
- the risk evaluation for each EU evaluated under the DVS and the determination of whether the EU met the Zone 1 Record of Decision (ROD) requirements for unrestricted industrial use to 10 feet below ground surface;
- evaluated 25 Federal Facility Agreement (FFA) sites and recommends no further action for 16 of these sites;
- final status assessments of nine FFA sites which are contingent on completion of remedial action at the site or in the associated EU;
- recommends 326 acres for unrestricted industrial use to 10 feet below ground surface;
- 9.2 acres of water bodies that will be addressed by the Site-wide Remedial Investigation and ROD;


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- four of the remaining 15 EUs await removal of the K-770 Scrap prior to completion of the characterization and associated remedial action; and
- eleven of the remaining 15 EUs await completion of decontamination and decommissioning actions prior to final sampling activity.

The EPA has no further comments on this document and is approving the PCCR as submitted. Although, this interim remedial action is approved, the Department of Energy should ensure that the Zone 1 Remedial Action Report (RAR) clearly specifies all land use controls implemented for all acreage within Zone 1 including all changes to the dig restrictions below 10 feet. Revising the industrial land use restrictions may require further specification of the remaining land use controls (e.g., restrictions on digging into contaminated aquifers). The current discussions to remove these controls need to conclude with an agreement between the FFA Parties regarding the specific conditions to apply prior to submitting the D1 RAR.

The EPA commends the efforts of the Remedial Action Core Team to achieve this major milestone. If you have any questions regarding this matter, please feel free to contact Constance Jones of my staff at (404) 562-8551.

Sincerely,


 Earl L. Bozeman, Jr., Acting Chief
 Federal Facilities Branch
 Waste Management Division

cc: R. Doug McCoy, TDEC
 Patricia Halsey, DOE
 James Kopotic, DOE
 Thomas Gebhart, TDEC
 SSAB
 LOC



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

December 15, 2009

David Adler
DOE FFA Project Manager
PO Box 2001
Oak Ridge, TN 37830

Dear Mr. Adler

**TDEC Approval Letter
Fiscal Year 2008 Phased Construction Completion Report for EU Z2-33 in Zone 2
East Tennessee Technology Park
Oak Ridge, Tennessee
DOE/OR/01-2368&D2/R1
August 2009**

The Tennessee Department of Environment and Conservation, DOE Oversight Division has received the Department of Energy letter dated December 8, 2009 which contains an erratum for the above mentioned document.

Although the document was technically adequate, the state was unable to approve the PCCR upon its initial submittal because of some editorial issues that caused confusion in interpretation of the report.

The replacement pages contained in this erratum resolve those editorial issues and with the inclusion of these replacement pages in the report the state is able to provide approval for this PCCR.

Questions or comments concerning the contents of this letter should be directed to Thomas Gebhart or Randy Hoffmeister at the above address or by phone at (865) 481-0995.

Respectfully


Roger Petrie
FFA Project Manager

cc Jeff Crane - EPA
Pat Halsey - DOE
Russ Vranicar - DOE

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Tonya + B. Howard



I-10033-0385

**STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
781 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072**

February 6, 2008

David Adler
DOE FFA Project Manager
PO Box 2001
Oak Ridge, TN 37830

Dear Mr. Adler

**TDEC Approval Letter
Fiscal Year 2007 Phased Construction Completion Report for the Zone 2 Soils,
Slabs, and Subsurface Structures at East Tennessee Technology Park
Oak Ridge, Tennessee
DOE/OR/01-2723&D1
September, 2007**

The Tennessee Department of Environment and Conservation, DOE Oversight Division has reviewed the above referenced document pursuant to the Federal Facility Agreement for the Oak Ridge Reservation and approves the document contingent on satisfaction of comments submitted by the EPA in their transmittal dated December 17, 2007.

Questions or comments concerning the contents of this letter should be directed to Thomas Gebhart at the above address or by phone at (865) 481-0995.

Respectfully

A handwritten signature in black ink, appearing to read "Roger Petrie".

Roger Petrie
FFA Project Manager

cc Jeff Crane - EPA
Pat Halsey - DOE
Jack Howard - DOE

er865

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STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

September 28, 2006

Mr. David Adler
DOE FFA Project Manager
PO Box 2001
Oak Ridge, TN 37830

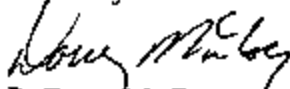
Dear Mr. Adler

**TDEC Approval Letter
Phased Construction Completion Report for the
K-1007 Ponds Area and Powerhouse North Area in Zone 1
East Tennessee Technology Park
Oak Ridge, Tennessee
DOE/OR/01-2294&D2
August, 2006**

The Tennessee Department of Environment and Conservation, DOE Oversight Division has reviewed the above referenced document pursuant to the Federal Facility Agreement for the Oak Ridge Reservation and approves the document as presented.

Questions or comments concerning the contents of this letter should be directed to Erin Dixon or Thomas Gebhart at the above address or by phone at (865) 481-0995.

Sincerely


R. Doug McCoy
FFA Project Manager

cc: Jeff Crane – EPA
Pat Halsey – DOE
Donna Perez – DOE

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DOE/OR/01-2375
FINAL-CONCURRED

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