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FINAL

DOE/EA-1299

Environmental Assessment for the U.S. Department of Energy, Oak Ridge Operations Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project Site

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT FOR THE RECEIPT AND STORAGE OF URANIUM MATERIALS FROM THE FERNALD ENVIRONMENTAL MANAGEMENT SITE

AGENCY: U. S. DEPARTMENT OF ENERGY

ACTION: FINDING OF NO SIGNIFICANT IMPACT

SUMMARY: The U. S. Department of Energy (DOE) has completed an environmental assessment (DOE/EA-1299) for the receipt and storage of uranium materials from the Fernald Environmental Management (FEMP) Site. Based on the results of the impacts analysis reported in EA-1299, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the context of the National Environmental Policy Act of 1969 (NEPA). Therefore, the preparation of an environmental impact statement (EIS) is not necessary, and DOE is issuing this Finding of No Significant Impact (FONSI).

PUBLIC AVAILABILITY OF EA-1299 AND FONSI: The EA-1299 and FONSI may be reviewed at and copies of documents obtained from

U. S. Department of Energy
Public Reading Room
230 Warehouse Road, Suite 300
Oak Ridge, Tennessee 37830
Phone: (423) 241-4780

Fernald Public Environmental Information Center
10995 Hamilton Cleves Highway
Harrison, Ohio 45030
Phone: (513) 648-7480

Portsmouth Reading Room
U.S. DOE Environmental Information Center
U. S. 23 and Perimeter Road
P.O. Box 693
Piketon, Ohio 45661
Phone: (740) 289-3317

Paducah Reading Room
U.S. DOE Environmental Information Center
175 Freedom Boulevard
Kevil, Kentucky 42053
Phone: (502) 462-2550

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BACKGROUND: The proposed action is to receive approximately 3800 metric tons of potentially marketable uranium material at an identified Oak Ridge Operations (ORO) site, or a combination of identified ORO sites. Identified ORO sites analyzed include storage area(s) at the Portsmouth Gaseous Diffusion Plant, Paducah Gaseous Diffusion Plant, Y-12 Plant, and East Tennessee Technology Park. This action is proposed so that the uranium material may be stored, rather than disposed of as waste, until a later time when its market potential can be realized.

The material receipt is needed to facilitate a decision of the U.S. Department of Energy to change the mission of the FEMP site to no longer include nuclear material storage. Removing this nuclear material inventory from the site by the end of fiscal year (FY) 1999 would greatly facilitate FEMP's ability to support commitments made to the state of Ohio regarding site cleanup.

ALTERNATIVES: In addition to the proposed action, impacts were also evaluated for the no-action alternative. Under this alternative, the uranium currently stored at the FEMP site would remain at the site. The uranium is currently stored in various container types including 55-gallon steel drums, T-hoppers, half-high boxes, and sea-land containers.

ENVIRONMENTAL IMPACTS:

No Action--Under normal operations, land use, geology and soils, water resources, cultural resources and the infrastructure would remain unchanged. Air effluents would be minimal and would remain the same as the present. Since there is no new construction and there are no effluents from the stored uranium, impacts to all resources are minimal. Radiological dose rates to facility workers, co-located workers and the public under normal operations are negligible. Under accident conditions, the highest radiological risk to the public is 0.63 rem from a storage fire and 0.84 rem to a co-located worker from an earthquake with aerial dispersion of uranium materials. Since the uranium materials would remain at the FEMP site, there is no change in these exposures or risks.

Proposed Action--Under the proposed action the FEMP uranium materials would be located at the Portsmouth Gaseous Diffusion Plant, the Paducah Gaseous Diffusion Plant, the East Tennessee Technology Park, the Y-12 Plant or a combination of these sites.

The proposed action has been analyzed for its potential impacts to the following resources at all of the above-mentioned identified sites:

- public and worker risk
- climate and air quality
- water resources

- geology and soils
- ecological resources
- socioeconomics and environmental justice
- land use
- infrastructure
- cultural resources

No significant construction or operational impacts are expected to occur due to the implementation of the proposed action at any of the ORO sites. Selection of plant sites that would or could require construction of storage facilities (Paducah Gaseous Diffusion Plant and/or the East Tennessee Technology Park) would convert approximately 1 acre of property from open grass habitat to buildings. Construction impacts for this development would be minimal because this area size is small in comparison to other similar available property located at each of these plants. At other sites, existing buildings would be used to store the uranium materials. Operational impacts, as well as routine handling risks, at the identified sites would be negligible.

Radiological risks to humans from all accident scenarios for all areas at all ORO locations are deemed to be low. For all accident scenarios at all sites the uranium metal toxicity to aquatic biota for both acute and chronic exposures would be negligible.

DETERMINATION: Based on the analysis of potential impacts, DOE has been determined that implementation of the proposed action does not constitute a major Federal action affecting the quality of the human environment at the Paducah Gaseous Diffusion Plant, the Portsmouth Gaseous Diffusion Plant, the Y-12 Plant, or the East Tennessee Technology Park. Public comments on the Draft EA were fully addressed in the Final EA. An Environmental Impact Statement is not required.

Issued at Oak Ridge, Tennessee, this 13 day of April 1999.

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DOE/EA-1299

Final
Environmental Assessment
for the
U. S. Department of Energy, Oak Ridge Operations
Receipt and Storage of Uranium Materials
from the
Fernald Environmental Management Project Site

April 1999

Prepared by
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U. S. Department of Energy
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5.1

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

contributed to the preparation of this document and should not be considered an eligible contractor for its review.

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ARF	airborne release fraction
BMP	best management practice
DCF	dose conversion factor
DCG	derived concentration guide
DOE	U.S. Department of Energy
DR	damage ratio
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ETTP	East Tennessee Technology Park
FEMP	Fernald Environmental Management Project
FTE	full-time equivalent
GCEP	Gas Centrifuge Enrichment Plant
HQ	hazard quotient
HVAC	heating, ventilation, and air conditioning
LLW	low-level radioactive waste
MAR	material at risk
MSA	Metropolitan Statistical Area
MTU	metric tons of uranium
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
O/H	overhead
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations
ORR	Oak Ridge Reservation
PGDP	Paducah Gaseous Diffusion Plant
PORTS	Portsmouth Gaseous Diffusion Plant
PSD	prevention of significant deterioration
RF	respirable fraction
ROI	region of influence
SHPO	State Historic Preservation Officer
TSCA	Toxic Substances Control Act
TSS	tension-support structure
TVA	Tennessee Valley Authority

1. INTRODUCTION

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1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION

Through a series of material transfers and sales agreements over the past 6 to 8 years, the Fernald Environmental Management Project (FEMP) has reduced its nuclear material inventory from 14,500 to approximately 6800 metric tons of uranium (MTU). This effort is part of the U.S. Department of Energy's (DOE's) decision to change the mission of the FEMP site; it is currently shut down and the site is being remediated. Removing this remaining nuclear material inventory from the site by the end of fiscal year (FY) 1999 would greatly facilitate FEMP's ability to support commitments made to the state of Ohio regarding site cleanup. Interest in the material has been expressed by the U.S. Department of Defense and other commercial ventures. However, the timing for transfer will not support the regulatory commitments. Of the remaining inventory there are approximately 3800 metric tons of potentially marketable uranium material. It would be in the best interest of DOE to maintain and eventually market or use these materials. Oak Ridge Operations (ORO) has committed to receiving and storing the material at an undetermined site. The purpose of, and need for, this action is to receive this material at an acceptable site, or sites, so that its market value can be realized rather than disposing of the material as waste. Approximately 800 metric tons of low-enriched uranium (LEU) are currently in the process of being sold by the Ohio Field Office. Should this sale not go through, then these materials would need to be stored until reused or sold; the LEU is part of the 3800 metric tons evaluated in this Environmental Assessment (EA).

1.2 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

This EA focuses on the receipt and storage of uranium materials at various DOE-ORO sites. The packaging and transportation of FEMP uranium material has been evaluated in previous NEPA and other environmental evaluations. A summary of these evaluation efforts is included as Appendix A. The material would be packaged in U.S. Department of Transportation-approved shipping containers and removed from the FEMP site and transported to another site for storage. The Ohio Field Office will assume responsibility for environmental analyses and documentation for packaging and transport of the material as part of the remediation of the site, and ORO is preparing this EA for receipt and storage at one or more sites.

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 BACKGROUND

DOE proposes to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site at another suitable DOE site. This includes the approximately 800 metric tons of LEU currently out for bid. If the 800 metric tons out for bid are not sold expeditiously, then it is proposed that the LEU would also be moved to another DOE site. Uranium to be moved from the FEMP site to another site includes normal uranium [same assay as natural uranium (0.711% ^{235}U) but created by a man-made process], depleted uranium (assay less than natural uranium), and LEU (assay >0.711% and <20%). Table 2.1 provides a summary of the uranium inventory at the FEMP site, relative amounts of each type, and the approximate storage space required for each type. Appendix B provides more detail on each type of uranium with a breakdown of each type according to its composition (metal, UF_4, etc.).

Table 2.1. FEMP Uranium Proposed for Receipt and Storage at Other DOE Site(s)

Uranium	Pounds (millions)	Metric Tons Uranium (MTU)	Storage Space Requirements (approximate in ft^2)
Normal	0.434	193	600
Depleted	7.085	2,761	17,200
Low-Enriched	2.205	799	12,500
TOTALS	9.724	3,753	30,300

Five DOE site alternatives, Portsmouth Gaseous Diffusion Plant (PORTS), Paducah Gaseous Diffusion Plant (PGDP), Oak Ridge National Laboratory (ORNL), the Y-12 Plant, and the East Tennessee Technology Park (ETTP), were considered for receipt and storage of these materials. At some of these DOE sites, various locations/building variations were considered. Storage at a licensed, commercial facility was also considered initially but was ruled out because of schedule constraints. The no action alternative is to leave the uranium at FEMP.

Receipt and storage of the uranium products would require that suitable existing buildings with sufficient floor space at the various DOE sites be made available. Approximately 50,000 ft^2 of space is required, and buildings would have to be available in time to receive all product before the end of the fourth quarter of FY 1999. Alternatively, if existing buildings are not available, an area where at least two tension-support structures (TSSs) could be built would have to be identified (or a combination thereof). These TSSs would have concrete floors, a rigid frame, and tarpaulin roof and sides, and they would provide approximately 27,000 ft^2 each in storage space. DOE inventoried buildings and space availability at five sites—Portsmouth, Ohio; Paducah, Kentucky; and three sites (the Y-12 Plant, ORNL, and ETTP) in Oak Ridge, Tennessee. As noted in Sect. 2.8, the ORNL site was dropped from consideration due to mission-related land use conflicts.

2.2 NO ACTION ALTERNATIVE

Under this alternative, the uranium currently stored at the FEMP site would remain at the site. The uranium is currently stored in various container types including 55-gallon steel drums, T-hoppers, half-high boxes, and sea-land containers. A description of these containers is provided at the end of Appendix B.

Currently, the nuclear material is predominantly located in Buildings 4B, 77, and 54B but would be moved to TS-4 and TS-5 at Plant Pad 1. The nuclear material would be located in two TSSs in the northwest quadrant of the site (see Fig. 2.1). Since a No Action alternative would leave uranium materials in place at FEMP, it does not support a regulatory commitment made to the state of Ohio.

2.3 PORTSMOUTH GASEOUS DIFFUSION PLANT

Under this alternative, the DOE PORTS site in Piketon, Ohio, would receive and store up to 3800 MTU product from the FEMP site. The uranium would be stored in some existing buildings or in a storage yard. Eight location alternatives within the PORTS site are considered (Fig. 2.2).

2.3.1 Building X-3001

Building X-3001 is a very large building formerly used as a process building. This single-story building has an 87-ft ceiling and is comprised of four 630- by 104-ft bays. Each bay is equipped with a serviceable 7.5-ton crane. All bays have existing fire suppression and are heated and well lighted. Part of this building is still being used to store some Gas Centrifuge Enrichment Plant (GCEP) equipment as well as waste materials. Over 50,000 ft^2 of space is available, and all the Fernald nuclear material could be stored here. Building X-3001 is located in the southwest portion of the PORTS site, just north of Lewis Street (Fig. 2.2).

2.3.2 Building X-3002

Building X-3002 is identical to Building X-3001 except this building is empty and has no contamination. The building could easily store all the Fernald nuclear materials. Building X-3002 is located immediately east of Building X-3001 and near the corner of Grebe Avenue and Lewis Street (Fig. 2.2).

2.3.3 Building X-7725A

Building X-7725A is referred to as the GCEP Waste Accountability Facility; it is a one-story light steel and metal-clad structure. Building X-7725A is located east of the Perimeter Road and Contractor Access Road (Fig. 2.2). This building is being used as a Toxic Substances Control Act (TSCA) building (used to store polychlorinated biphenyls) and has a sealed, curbed floor for this purpose. It has approximately 29,400 ft^2 of floor space and is currently about half full. The building has an overhead (O/H) fire suppression sprinkler system and is well lighted. The building also is equipped with a radiation detection system.

2.3.4 X-7745R Storage Yard

This storage yard is located north of Rush Street and north of Building X-3002 (Fig. 2.2). There is sufficient space here to construct two TSSs and to store all the Fernald nuclear material proposed for receipt and storage. A concrete pad is already in place; however, the pad is currently used for the storage of low-level radioactive waste (LLW) containers and appears to be completely full. The existing LLW would obviously have to be moved to another area before this storage yard could be used for uranium storage.

2.3.5 Lithium Storage Buildings

Buildings X-744S, X-744T, and X-744U were used for lithium storage. Buildings X-744U and X-744S are physically connected and, combined, provide sufficient floor space (48,000 ft^2 in X-744S and 98,000 ft^2

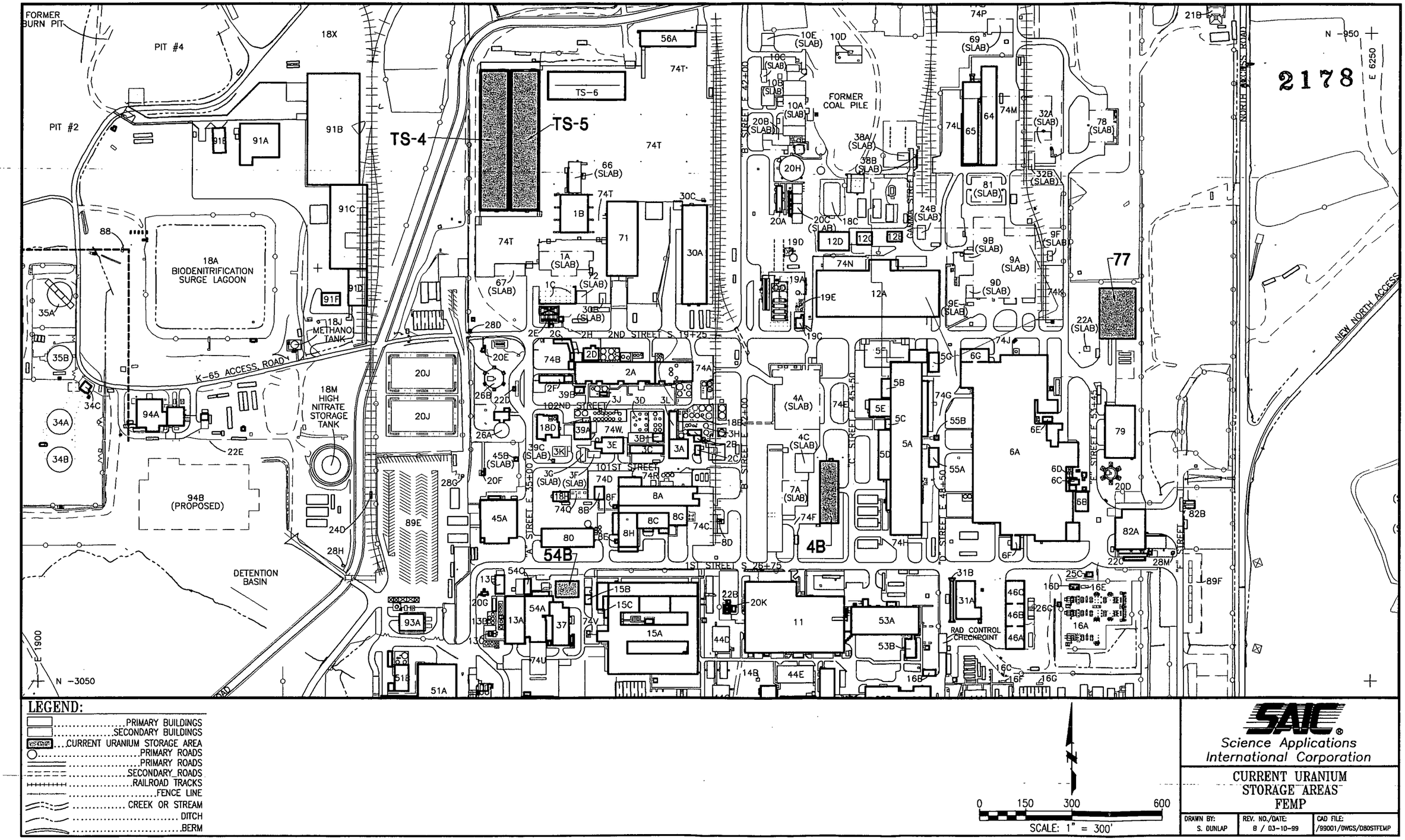


Figure 2.1. Current Uranium Storage Locations at FEMP

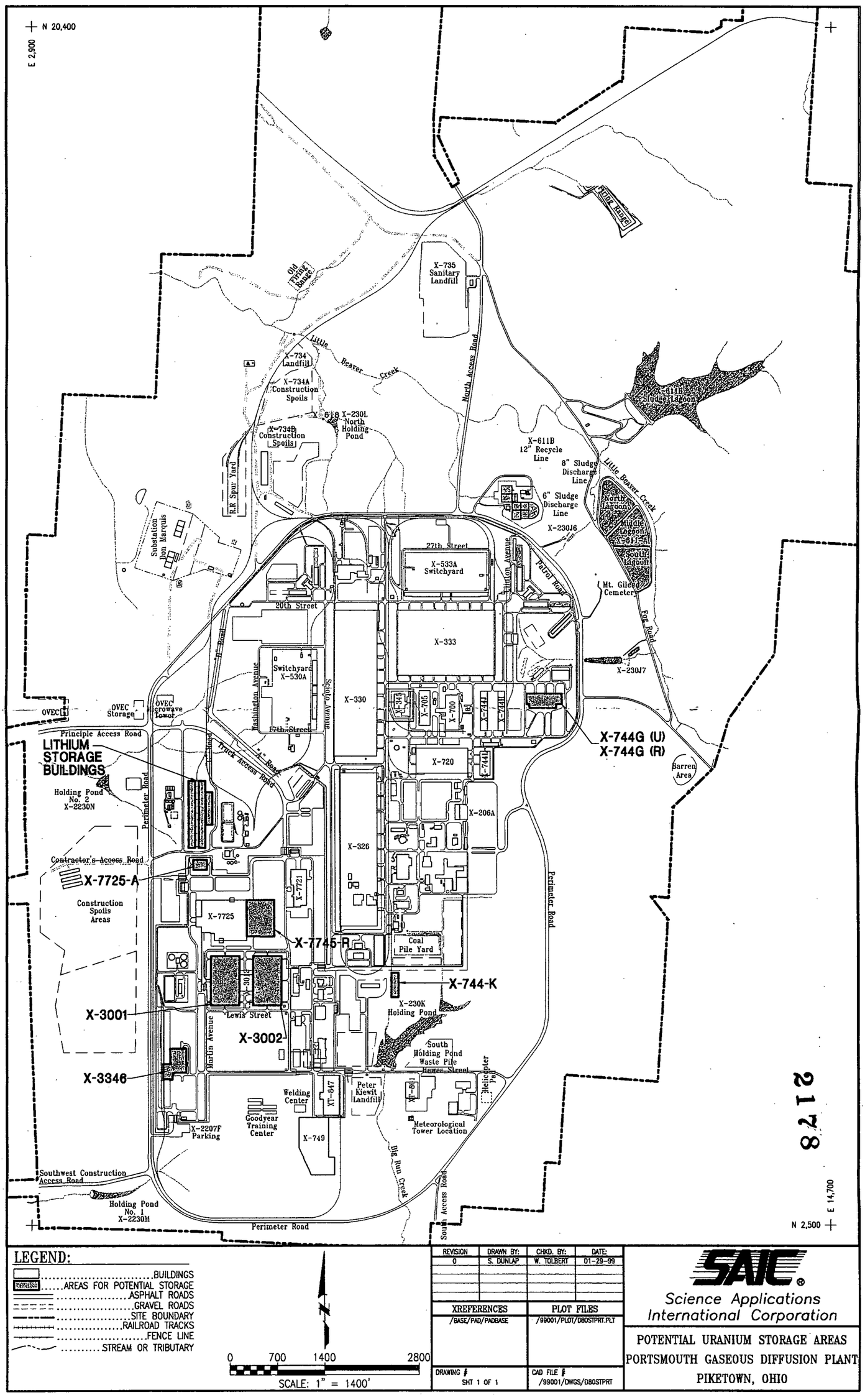


Figure 2.2. Portsmouth Gaseous Diffusion Plant with Proposed Uranium Storage Locations

in X-744U). Some clean-out and painting will have to be done, and lighting will have to be installed. A 30- by 40-ft concrete receiving dock would be constructed immediately adjacent to Building X-744U beside "C" Road which runs west of, and parallels the length of, the buildings (Fig. 2.2). Building X-744T is the westernmost of the three former lithium storage buildings and would likely require the most upgrading. It has approximately 98,000 ft^2 of available floor space. Access to this building would be from an unnamed road paralleling the building to the west, and a receiving dock would be needed for this building as well. The building heights vary from approximately 14 ft at the eaves to approximately 22 ft at the center of the buildings. The buildings are equipped with an O/H fire suppression sprinkler system, but the sprinklers are currently disconnected from the fire water mains and are no longer functional. There is no lighting or heating because the electric power has been disconnected. These buildings are currently used for lithium hydroxide drum storage. This material is gradually being sold commercially and removed offsite.

2.3.6 Building X-744K

Building X-744K is a relatively small structure (36,000 ft^2) located approximately 800 ft north of the X-230K South Holding Pond and just south of 2nd Street. This building was formerly used as a lithium warehouse. The building has been empted of lithium and is currently leased to the Ohio Army National Guard for storage of military vehicles. Big Run Creek shows as a "blue line" (permanent) stream within 200 ft of Building X-744K.

2.3.7 Building X-744G

Building X-744G is located south of 18th Street between Brown Avenue and Athens Avenue at the northeast corner of the PORTS site. It has 107,000 ft^2 available for storage. The interior height of the building is approximately 22 ft. The building is equipped with an O/H fire suppression dry-pipe sprinkler system and is well lighted. The building is equipped with a criticality alarm system but is not heated. This warehouse is currently used to store some uranium oxide and contaminated alumina trap material.

2.3.8 Building X-3346

This building is referred to as the GCEP Feed and Withdrawal Facility and is a two-story heavy structural steel and metal-clad building with concrete floors on both the first and second levels. This building encompasses approximately 110,000 ft^2, and the first floor is basically divided into three large rooms. One of the rooms is a high bay area which was to be the Autoclave area. The concrete floor throughout this area is at various elevations, and container storage in this area would be difficult. A considerable amount of floor space in the other areas is taken up by abandoned process piping and equipment which has not been removed.

The building is equipped with an O/H fire suppression sprinkler system and is heated and well lighted. Based on the current use of the building, the combustible loading is moderate and primarily consists of hydraulic fluids, gas cylinders, lubricants, and other associated materials required for vehicle maintenance activities.

This building is currently being leased to the Ohio Army National Guard and is used for miliary vehicle maintenance and storage, as well as parts and maintenance material storage.

2.4 PADUCAH GASEOUS DIFFUSION PLANT

A greenfield/brownfield site inside the DOE Paducah site boundary would be used. Two TSSs and an off-loading dock would be built and the uranium stored in the TSSs. Figure 2.3 shows the proposed location for the TSSs. They will be oriented east-west in an open field which is just west of 10th street and north of Virginia Avenue and Building C-752.

2.5 Y-12 PLANT

Two buildings, 9204-4 and 9720-33, are proposed for receipt and storage of the FEMP site nuclear materials. Building 9204-4 has approximately 5,000 ft^2 of space available, and Building 9720-33 has 40,000 ft^2. Combined, the buildings have approximately 45,000 ft^2 of potentially available space—5,000 ft^2 less than the maximum space estimated to be needed. Building 9720-33 has material in it that would require removal before use as a uranium storage facility. Building 9204-4 is located toward the west end of the Y-12 Plant near the Bear Creek Portal. The building is located south of First Street and west of "J" Road (Fig. 2.4). Building 9720-33 is located southwest of Building 9204-4, between Second Street and West Third Street.

2.6 EAST TENNESSEE TECHNOLOGY PARK

Three sites were evaluated at the ETTP (Fig. 2.5). This site was formerly named the Oak Ridge Gaseous Diffusion Plant (ORGDP) and often referred to as the K-25 Site.

2.6.1 K-1066F Area

One site, K-1066F, is a paved lot immediately south of the UF_6 cylinder yard (K-1066-J). This site is approximately 150 ft south of Poplar Creek at its closest point and immediately north of 19th Street. It is an open lot with sufficient space to construct two TSSs and store all the uranium materials from the FEMP site (Fig. 2.5).

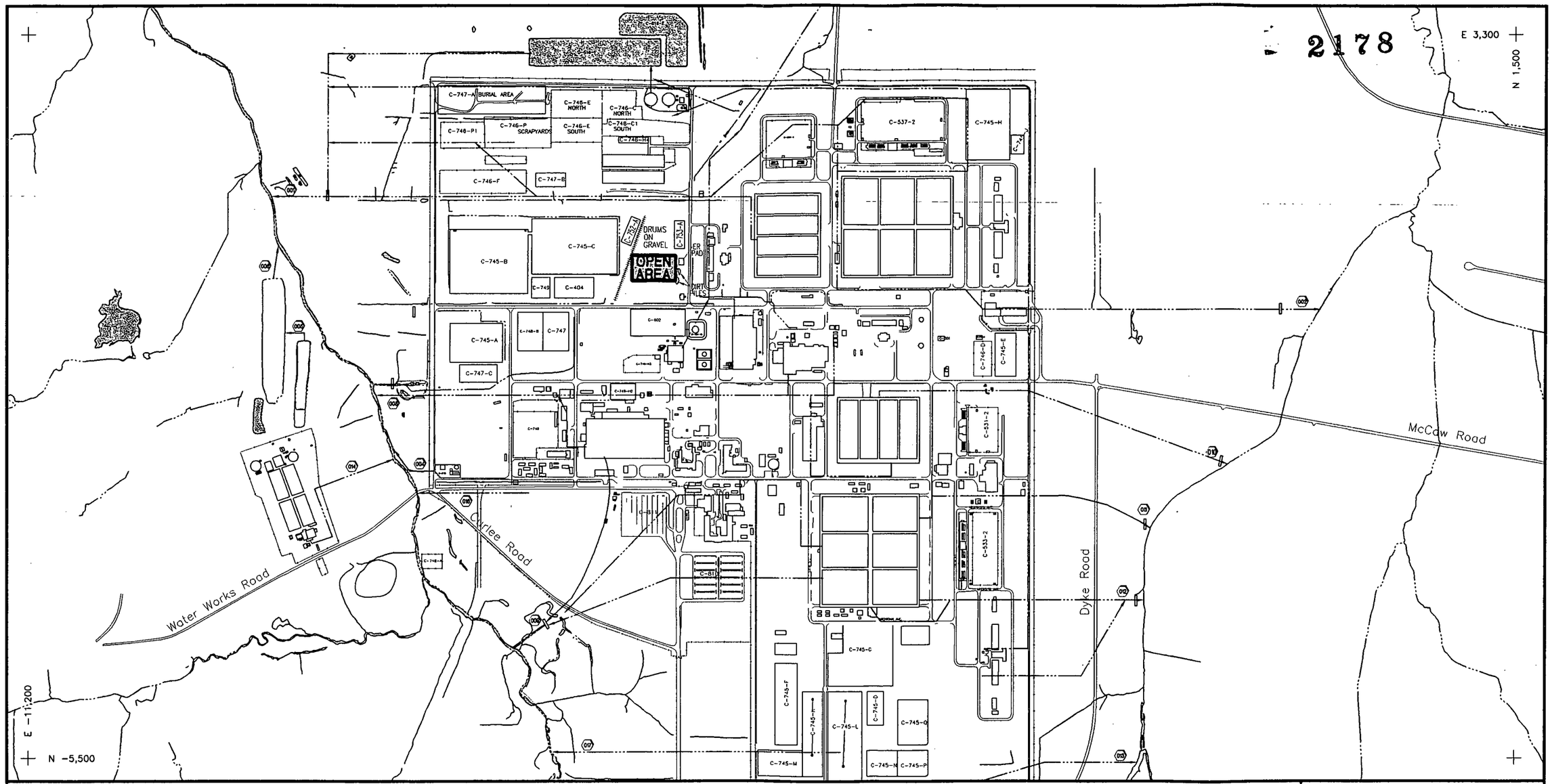
2.6.2 K-131 and K-631 Buildings

The basement floor of each building is available for use. The basement floor is the ground-level floor on the north side of each building and would be accessed from this side. Building K-131 has a nominal basement floor space of 19,902 ft^2 with usable space of approximately 17,900 ft^2. Building K-631 has approximately 14,000 ft^2 of usable space in two wings of the basement. The nominal basement size is 22,765 ft^2. Thus, both buildings would have approximately 31,900 ft^2, which is less than the minimum space requirement to store all the FEMP site materials.

These buildings are approximately 200 ft south of Poplar Creek at its closest point.

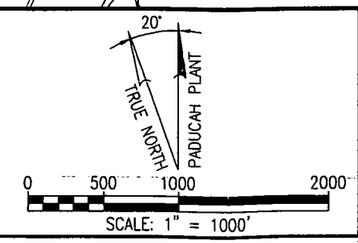
2.6.3 K-861 Open Area

This large, open area is immediately east of Building 861 and immediately west of Avenue North. This area is approximately 300 ft west of Poplar Creek (Fig. 2.5). The area is large enough to construct the two TSSs needed to store all the Fernald nuclear materials. This site has been identified as having some existing



LEGEND:

- PRIMARY BUILDINGS
- SECONDARY BUILDINGS
- AREAS FOR POTENTIAL STORAGE
- PRIMARY ROADS
- SECONDARY ROADS
- RAILROAD TRACKS
- FENCE LINE
- STREAM OR TRIBUTARY



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POTENTIAL URANIUM STORAGE AREAS
PADUCAH GASEOUS DIFFUSION PLANT
PADUCAH, KENTUCKY

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S. DUNLAP	B / 03-10-99	/990D1/DWGS/DBOSTPAD

Figure 2.3. Paducah Gaseous Diffusion Plant with Proposed Uranium Storage Locations

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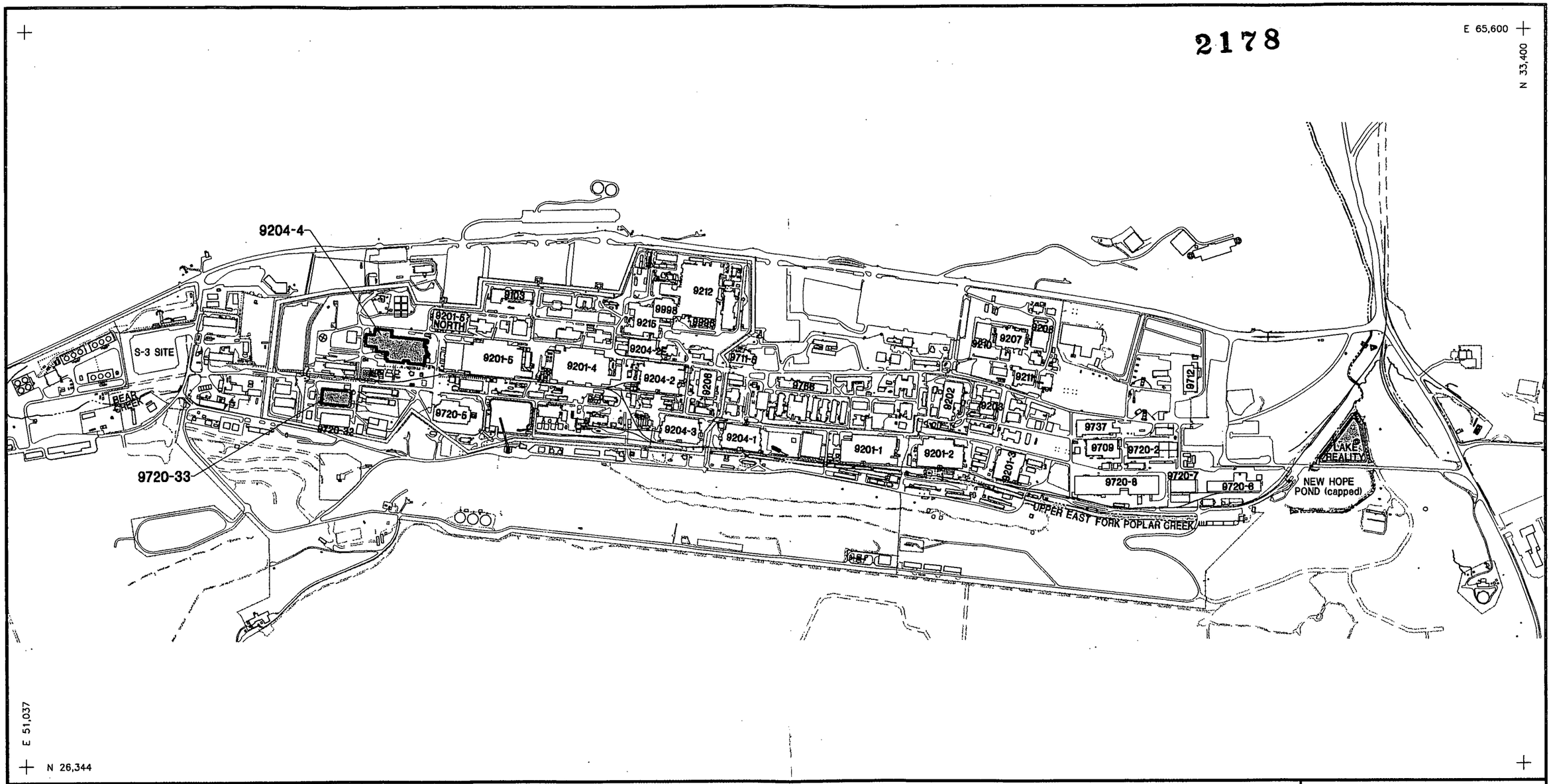

Figure 2.4. Y-12 Plant with Proposed Uranium Storage Locations

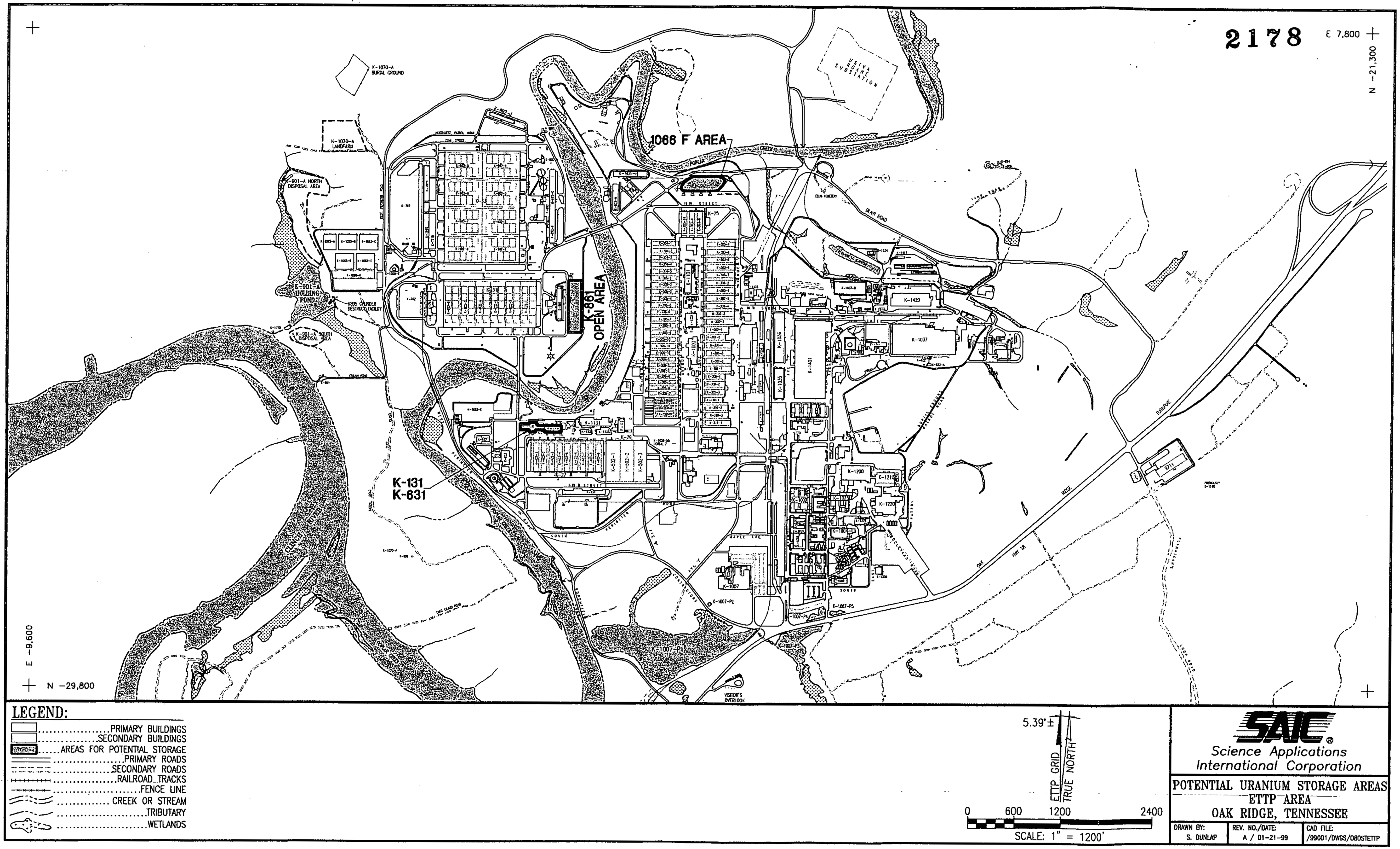

Figure 2.5. East Tennessee Technology Park with Proposed Uranium Storage Locations

radiological contaminants in the soil; however, the risk from these contaminants was less than 1×10^{-4} excess cancer risk to workers.

2.7 COMBINATION OF SITES

DOE would consider storing the nuclear materials at a combination of sites if multiple sites are environmentally acceptable. If multiple sites prove to be environmentally acceptable and, individually, each site can receive and store all of the nuclear material, then placement of some of the material at one site and other materials at another site should also be environmentally acceptable. Other mission-related factors may be considered in placing the materials in this event.

2.8 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

2.8.1 Commercial Facilities

Some commercial facilities exist that have appropriate uranium and radiological licenses. However, the requirement to have all the uranium moved from the FEMP site by September 30, 1999, precludes consideration of any commercial facilities. There is not enough time to prepare and issue a competitive request for proposal, to evaluate proposals including license validations, and to award a contract to commercial vendor(s). Therefore, this alternative was not considered further.

2.8.2 Oak Ridge National Laboratory

There were no buildings or spaces identified for storage of uranium materials at this site that would not conflict with the research mission of the Laboratory. Therefore, ORNL was not considered further as a potential site.

2.8.3 Other DOE Sites

Management of uranium is an integral part of DOE-ORO work. This, combined with the stringent schedule for removing these uranium materials from FEMP to support compliance with regulatory requirements, necessitated that only sites under the administrative control of ORO be considered.

3. AFFECTED ENVIRONMENT

3.1 FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

The Fernald site is currently termed the FEMP site and was formerly known as the Feed Materials Production Center. The site is located just north of Fernald, Ohio, in southwest Ohio about 17 miles northwest of downtown Cincinnati. The 1050-acre site began operation in 1952 with its primary mission to purify uranium metal and uranium compounds for use at other DOE defense facilities. A small amount of thorium processing has also been conducted at the FEMP site (DOE 1997b). By the late 1980s production was suspended, and the site's mission changed from uranium production to site environmental restoration.

3.1.1 Public and Worker Risk

The uranium currently stored in Buildings 54B, 77, and 4B will be consolidated at one location (Plant Pad 1) where two TSSs are available for long-term storage. During storage of uranium, materials workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked and overpacked if deemed necessary. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, a radiation dose from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses) (personal communication with Scott Tolar, Fernald Site, with Carol Mason, SAIC, January 13, 1999). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding.

The radiological risk associated with various accident scenarios is presented in detail in Appendix C. In summary, the risks for various accident scenarios were calculated for the public, the facility worker, and the co-located worker at the FEMP site. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table 4.1 in Sect. 4. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials.

3.1.2 Climate and Air Quality

Prevailing winds are from the south-southwest 12% of the time; calm winds occur 4% of the time. The annual average wind speed recorded at the Greater Cincinnati Airport was 9 mph with 1-min sustained winds of up to 46 mph. Average monthly temperatures of 32°F to 88°F were recorded in 1992. Precipitation for the year was 38 in., and the monthly maximum was 7 in. in July (DOE 1997b).

Hamilton and Butler counties are classified as "moderate nonattainment" areas for ozone; these counties are in attainment for the remaining five criteria pollutants. The major source of air pollution at the FEMP site is the boiler plant.

3.1.3 Water Resources

Surface Water

Major surface water features include Paddy's Run, which drains into the Great Miami River and ultimately into the Ohio River. There are no federally designated Wild and Scenic Rivers near to and downstream of the site. The site is located within the 100-year and 500-year floodplains of Paddy's Run. Wastewater is discharged to on-site streams and the Great Miami River.

Groundwater

The site is underlain by the Great Miami Buried Valley Aquifer, which is a sole-source aquifer.

3.1.4 Geology and Soils

The FEMP site lies on a terrace above the Greater Miami River Valley, with glacial features dominating the landscape. Bedrock consists of sedimentary shales and limestone approximately 60 to 200 ft below the ground surface. The bedrock forms the floor and valley walls of the New Haven Trough. No major geologic faults have been mapped in the area (DOE 1997b).

The dominant soils at the site are silty loams of glacial origin. These soils are poorly drained, occur on relatively flat surfaces, have low permeability, and experience seasonal saturation. There is little likelihood of risk from subsidence, earthquakes, or volcanic activity.

3.1.5 Ecological Resources

Vegetation consists of non-native grasses, pine plantations, deciduous woodlands, and riparian woodlands. Ecologically important habitat includes mature woodlands; pine plantations for wildlife species, such as white-tailed deer and the eastern cottontail rabbit; and riparian woodlands. Cattle grazing and brush clearing have resulted in habitat fragmentation and reduction in wildlife corridors. A total of 35.9 acres of freshwater wetlands (palustrine forested, drainage ditches/swales, and isolated persistent emergent and scrub/shrub wetlands) have been delineated at the FEMP site. There are no federally protected threatened or endangered species known at the FEMP site; however, excellent habitat exists for the Federally-endangered Indiana Bat in site riparian woodlands and the state-threatened Sloan's Crayfish inhabits portions of Paddy's Run Creek.

3.1.6 Socioeconomics and Environmental Justice

Socioeconomics

The region of influence (ROI) for the Fernald site could be defined as either Hamilton County, Ohio, or the Cincinnati Metropolitan Statistical Area (MSA), since Hamilton County includes most of Cincinnati. This analysis focuses on the smaller economic unit of Hamilton County, a conservative definition designed to identify the maximum potential impact. Table 3.1 summarizes population, per capita income, and wage and salary employment for both Hamilton County and the Cincinnati MSA between 1991 and 1996, the last year for which figures were available. The Cincinnati MSA includes counties in Ohio, Kentucky, and Indiana. Cincinnati is a relatively large urban area, with a population of nearly 1.9 million and wage and salary employment over 984,000. Hamilton County represented about half of the population in the MSA and

Table 3.1. Population, Income, and Employment in the Fernald Region of Influence for Hamilton County and Cincinnati Metropolitan Statistical Area

Region/Variable	1991	1992	1993	1994	1995	1996	Growth 1991-96
Ohio							
Hamilton County							
Population	868,586	869,659	869,397	865,213	860,391	855,800	-0.30%
Per Capita Pers. Inc. ($)	22,444	23,768	24,774	25,728	27,321	28,690	5.03%
Total Personal Income (Mil.$)	19,495	20,670	21,538	22,260	23,507	24,553	4.72%
Wage & Salary Employment	567,054	568,608	570,200	579,674	586,195	596,485	1.02%
Cincinnati-Hamilton Oh-Ky-In							
Population	1,842,551	1,861,177	1,881,694	1,894,377	1,906,832	1,919,010	0.82%
Per Capita Pers. Inc. ($)	19,772	20,869	21,636	22,511	23,787	24,901	4.72%
Total Personal Income (Mil.$)	36,431	38,841	40,712	42,644	45,358	47,785	5.58%
Wage & Salary Employment	885,496	895,824	909,756	934,009	959,697	984,055	2.13%

60% of wage and salary employment, at 596,000. Total personal income was over $24 billion, approximately half the total for the Cincinnati MSA (U.S. Bureau of Economic Analysis 1998).

Environmental Justice

There are no federally recognized Native American tribes present near the site. There are no minority or low-income populations within 5 miles of the FEMP site (DOE 1997b).

3.1.7 Land Use

The site covers an area of 1050 acres, of which 275 acres are developed. Of the area that is undeveloped, 195 acres are considered environmentally sensitive. Land use around the site is predominantly agricultural.

3.1.8 Infrastructure

A public water system provides an average of 0.4 million gallons of water per day. An on-site wastewater treatment plant treats an average of 2.18 million gallons of sewage per day and discharges treated effluent to the Great Miami River. The Cincinnati Gas and Electric Company supplies power to the site; average loads are 33 MW. Transportation in the region consists of roads (State Road 126 and U.S. Route 27) and interstates (275 and 74). Rail access is by the Baltimore and Ohio Railroad, which is 3 miles west of the site.

3.1.9 Cultural Resources

Native American occupation of the FEMP area began about 14,000 years ago. European settlement began during the late Eighteenth Century. The site has 42 recorded archaeological sites, standing structures, or traditional cultural properties. Sixty-one percent of this site has been subject to a comprehensive cultural resources survey. Three areas are eligible for inclusion on the National Register of Historic Places.

3.2 PORTSMOUTH GASEOUS DIFFUSION PLANT

PORTS is located approximately 22 miles northeast of Portsmouth in Pike County, Ohio, occupying an area of 3,714 acres. Construction of the site began in late 1952 and ended in 1956, one year after the start of uranium enrichment processing at the site. On July 1, 1993, DOE leased portions of PORTS to the United States Enrichment Corporation for the purpose of managing and operating the uranium enrichment enterprise. DOE retains responsibility for the non-leased portions of the site, which consist primarily of environmental restoration and waste management activities.

3.2.1 Public and Worker Risk

The radiation dose from airborne radionuclides to a maximally exposed individual was 0.260 mrem, and the collective radiological dose from airborne emissions to the site ROI health risk population was 3.0 person-rem (DOE 1997b).

3.2.2 Climate and Air Quality

Prevailing winds at Portsmouth are from the south to southwest, with the south averaging the highest at just over 11% of the time. Wind speeds average 5 mph, with winds up to 75 mph on record. The average annual temperature measured at the site in 1992 was 55°F with seasonal average temperatures of 32°F in the winter and 90°F in the summer (DOE 1997b).

Pike County is classified by the U.S. Environmental Protection Agency (EPA) as an attainment area for all six National Ambient Air Quality Standards (NAAQS) criteria air pollutants. The major sources of criteria pollutant emissions are three coal-fired boilers at the X-600 steam plant. Sources of radionuclide and fluoride emissions include purge cascade vents, cold recovery and wet evacuation vents, the X-344 evacuation vent, and six seal exhaust vents.

3.2.3 Water Resources

Surface Water

Major surface water features include the Scioto River and its on-site tributaries–Little Beaver Creek and Big Run Creek. There are no federally designated Wild and Scenic Rivers in the ROI. Both the Scioto River and an alluvial aquifer supply water to the site, and the on-site streams and Scioto River receive treated wastewater. The site is located outside the 500-year floodplain.

Groundwater

Major groundwater units include the Mississippian shale and sandstone bedrock aquifer and the unconsolidated sediment aquifer.

3.2.4 Geology and Soils

The site is on gently rolling land about 130 ft above the Scioto River and 670 ft above sea level. The predominant landform in the area is a relatively level, filled valley of the preglacial Portsmouth River, which runs north to south. Major rock units include, from oldest to youngest, the Ohio Shale, the Bedford Shale, the Berea Sandstone, the Sunbury Shale, and the Cuyahoga Shale. The site is in an abandoned river valley filled with fluvial materials. The soils in the fenced area are mostly urban land covered by roads, parking lots,

buildings, and railroads. Other soils are well-drained upland soils. No significant geologic faults exist in the ROI, and the potential for volcanic activity is small.

3.2.5 Ecological Resources

Vegetation consists of pastureland, old fields, oak-hickory, upland mixed hardwood, bottomland mixed hardwood, pine, second-growth hardwood, and scrub thicket. All forests and old fields are second growth. There is one acre of wetlands at the site. The federally protected, endangered Indiana Bat has been identified in the vicinity of the site, but no threatened or endangered species have been located onsite. Several state-listed species are known for the vicinity but none onsite.

3.2.6 Socioeconomics and Environmental Justice

Socioeconomics

The Portsmouth ROI includes both Pike County, where the facility is located, and Scioto County, which includes Portsmouth, the nearest city. Table 3.2 summarizes population, per capita income, and wage and salary employment for both counties from 1991 to 1996, the last year for which figures were available. Combined wage and salary employment for the region was nearly 38,000 in 1996; total personal income was $1.7 billion (U.S. Bureau of Economic Analysis 1998). Total site employment in 1990 was 2386.

Table 3.2. Population, Income, and Employment in the Portsmouth Region of Influence for Pike County and Scioto County

Region/Variable	1991	1992	1993	1994	1995	1996	Growth 1991-96
Pike County							
Population	24,656	25,233	25,654	26,052	26,757	27,088	1.90%
Per Capita Pers. Inc. ($)	12,469	13,323	13,937	14,543	14,751	15,462	4.40%
Total Personal Income (Mil.$)	307	336	358	379	395	419	6.42%
Wage & Salary Employment	8,286	8,625	9,215	9,887	10,834	11,386	6.56%
Scioto County							
Population	80,156	80,874	80,617	80,918	81,123	80,947	0.20%
Per Capita Pers. Inc. ($)	12,841	13,451	14,082	14,716	15,516	16,313	4.90%
Total Personal Income (Mil.$)	1,029	1,088	1,135	1,191	1,259	1,320	5.11%
Wage & Salary Employment	22,790	23,282	24,356	25,027	26,007	26,421	3.00%
Region Total							
Population	104,812	106,107	106,271	106,970	107,880	108,035	0.61%
Per Capita Pers. Inc. ($)	12,747	13,420	14,049	14,677	15,332	16,097	4.78%
Total Personal Income (Mil.$)	1,336	1,424	1,493	1,570	1,654	1,739	5.41%
Wage & Salary Employment	31,076	31,907	33,571	34,914	36,841	37,807	4.00%

Environmental Justice

There are no federally recognized Native American tribes in the ROI. There are no minority populations within a 20-mile radius of the PORTS site. However, the vast majority of a 20-mile radius of the plant has low-income populations (based on population proportions greater than the national average of 13.1%).

3.2.7 Land Use

The site covers approximately 6.3 square miles (4003 acres), of which 800 acres are developed and 3203 acres are undeveloped. Of the land that is undeveloped, nearly all is available for future site development. Land use surrounding the site is predominantly rural.

3.2.8 Infrastructure

An on-site facility and 31 off-site wells provide an average of 14 million gallons of water per day. An on-site facility receives an average of 0.35 million gallons of sewage per day. The Ohio Electric Corporation supplies power via an electrical and coal-fired system; the current load is 1537 megawatts of electricity and 4500 tons of coal per month. Transportation in the region consists of local access roads (such as Piketon Hill Road and State Route 32) and major roads (such as Interstate 70 and U.S. Highways 23, 52, and 50). The Chesapeake and Ohio Railroad and the Norfolk and Western Railroad are the primary providers of rail service to the Portsmouth region.

3.2.9 Cultural Resources

The site has no recorded archaeological sites, standing structures, or traditional cultural properties, except for two cemeteries in the northwest corner of the site. A cultural resources study was conducted for the site in 1997. The study addressed the site facilities and surrounding lands and included archaeological and historical aspects of the site.

3.3 PADUCAH GASEOUS DIFFUSION PLANT

The PGDP Reservation covers 3425 acres in western Kentucky, 10 miles west of Paducah, and employs 1868 people. Paducah has been an active uranium enrichment facility since 1952. Enriched uranium is produced by the United States Enrichment Corporation for the commercial sector as fuel for nuclear power reactors in the United States and overseas. PGDP is a feed facility for Portsmouth.

3.3.1 Public and Worker Risk

The radiation dose from airborne radionuclides to the maximally exposed individual was 0.0045 mrem, and the collective dose from radionuclide emissions to the site ROI health risk population was 0.017 person-rem. The ROI population was estimated at 500,502 based on 1990 census data.

3.3.2 Climate and Air Quality

Prevailing winds at the Paducah Airport in 1992 were from the south 16% of the time on a yearly basis. The highest occurrence of wind speed was from 8 to 11 mph with an annual occurrence of 31%. January is the coldest month, with a daily average temperature of 35°F, while July is the warmest month with an average temperature of 79°F.

McCracken County is classified by the EPA as a marginal attainment area for ozone. The county is in attainment for the other criteria pollutants. The major sources of criteria air pollutant emissions are coal-, oil-, and gas-fired boilers. Sources of radionuclide emissions in 1997 were the cascade purge vent/stack at the C-310 purge and products building, decontamination activities at the C-400 cleaning building, and emissions from laboratory hoods in the C-710 building.

3.3.3 Water Resources

Surface Water

Major surface water features include the Ohio River, which is less than 2 miles from Paducah; Metropolis Lake (1.5 miles northeast); and two small tributaries to the Ohio River (Big Bayou Creek and Little Bayou Creek) that provide surface drainage to the site. There are no federally designated Wild and Scenic Rivers in the ROI. The site is above the probable 500-year flood level. The site receives fresh water from the Ohio River, and both the two onsite streams and the Ohio River receive treated wastewater from the site.

Groundwater

Major groundwater units include, from bottom to top, the McNairy Flow System (interbedded sand, silt and clay); the terrace gravels; the Regional Gravel Aquifer (the primary aquifer in the area, composed of sand and gravel units); and the Upper Continental Recharge System (clayey silt with interbedded sand and gravel). No aquifers are considered sole-source aquifers. Two major plumes of groundwater contamination extend offsite.

3.3.4 Geology and Soils

The topography slopes slightly from more than 450 ft in the southern part of the site to near 300 ft near the Ohio River. Surface sediments consist of valley fill deposits, which underlie most of the site, extending northward to the Ohio River. Major rock units include, from oldest to youngest, basement rocks; Tuscaloosa Formation basal gravels; the McNairy Formation; the Porters Creek Clay; continental deposits of gravel and clay-sand units; and a 10- to 30-ft layer of loess (windblown sediment). Soils beneath the site are nearly level and somewhat poorly drained. Geologic hazards include the potential for earthquakes. The site is near two active seismic zones, the New Madrid Fault Zone and the Wabash Valley Fault Zone. The potential for volcanic activity is small.

3.3.5 Ecological Resources

Nonforested areas consisting of mowed grass and developed area cover most of the Paducah site; forested areas are small and dominated by mature hardwood upland and riparian forests. On-site wetlands consist of forested wetlands (mature riparian hardwood forest). A wetland in the West Kentucky Wildlife Management Area (the buffer area surrounding the production facilities) has been designated an area of ecological concern.

Federally listed endangered species that have been identified, or could be identified, in the vicinity of the Paducah site include the Indiana Bat, the Interior Least Tern, and four species of pearly mussels. Another species of pearly mussel is federally listed as threatened, as are the bald eagle and Evening Bat. No federally listed plant species are known to occur in the vicinity of Paducah.

3.3.6 Socioeconomics and Environmental Justice

Socioeconomics

The Paducah ROI includes McCracken County, Kentucky, where the facility is located. Table 3.3 summarizes population, per capita income, and wage and salary employment from 1991 to 1996. Wage and

salary employment for the region was over 39,000 in 1996; total personal income was $1.5 billion. Total site employment in 1990 was 1,740.

Table 3.3. Population, Income, and Employment in the PGDP Region of Influence for McCracken County

Region/Variable	1991	1992	1993	1994	1995	1996	Growth 1991-96
Kentucky							
McCracken County							
Population	63,237	63,729	64,171	64,646	64,600	64,701	0.46%
Per Capita Pers. Inc. ($)	18,352	19,311	20,089	20,689	22,437	23,567	5.13%
Total Personal Income (Mil $)	1,161	1,231	1,289	1,337	1,449	1,525	5.61%
Wage & Salary Employment	33,959	34,746	36,713	37,391	38,639	39,392	3.01%

Environmental Justice

There are both low-income and minority populations near the plant site with minority populations in the City of Paducah. There are no federally recognized Native American tribes in the area.

3.3.7 Land Use

The site occupies approximately 3425 acres, of which 750 acres are developed and 2675 acres are undeveloped. Land use surrounding the site is predominantly undeveloped natural area.

3.3.8 Infrastructure

The Ohio River supplies an average of 15 million gallons of water per day; the water is treated onsite by chemical and physical processes. An on-site treatment plant receives an average of 0.2 to 0.4 million gallons of sewage per day. Sewage is treated on site. Electric Energy, Inc., supplies power; the current site load is 1564 MW. The site also uses approximately 82 tons of coal per day. Transportation in the region consists of local access roads (State Routes 1154 and 358) and major roads (Interstate 24 and U.S. Highways 45, 60, and 63). The Burlington Northern Railroad, Paducah Railroad, Louisville, and the on-site U.S. Government Railroad are primary providers of rail service to the Paducah region.

3.3.9 Cultural Resources

The site has three recorded archaeological or historic sites, and others have been identified in areas near the Paducah plant site. The site has not been subject to any systematic cultural resources surveys.

3.4 Y-12 PLANT

Until 1992 the primary mission of the Y-12 Plant was the production and fabrication of nuclear weapons components. Current assignments in the Y-12 Defense Programs include dismantling nuclear weapons components returned from the national arsenal, serving as the nation's storehouse of special nuclear materials, and providing special production support to DOE programs (ORNL 1998).

3.4.1 Public and Worker Risk

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The calculated radiation doses to maximally exposed off-site individuals from airborne releases in 1997 was 0.33 mrem (ORNL 1998). The collective radiological dose from airborne radionuclide emissions to the site ROI health risk population was 43 person-rem (DOE 1997b).

3.4.2 Climate and Air Quality

The climate of eastern Tennessee may be broadly classified as humid continental, although it is very near the region of temperate continental climate to the north. The Cumberland Mountains/Plateau to the northwest and the Great Smoky Mountains to the southeast influence the patterns of temperature and precipitation over the region, with cooler temperatures and greater precipitation generally occurring at the higher elevations. The average annual temperature in Oak Ridge, based on a 30-year period from 1961 to 1990, is 56.6°F and precipitation is 53.8 in. per year. Precipitation is fairly evenly distributed most of the year. The average wind speed is approximately 4 mph (at 10 m above the ground), and the highest wind speed, 79 mph, was associated with a tornado in Bear Creek Valley during the afternoon of February 21, 1993. Prevailing wind directions are from the northeast and southwest, reflecting the channeling of winds parallel to the ridges and valleys in the area.

Roane County and all surrounding counties are in attainment for NAAQS criteria pollutants. The nearest nonattainment area is Polk County, which is about 40 miles south of the Y-12 Plant. Air quality in the region is generally good. The ozone standard is occasionally exceeded in Knoxville; however, Knox County is in attainment of the ozone standard.

The release of radiological contaminants, primarily uranium, into the atmosphere at the Y-12 Plant occurs almost exclusively as a result of plant production, maintenance, and waste management activities. In 1997, only 0.013 curies of uranium were released from Y-12. However, ORNL releases are much larger with over 10,000 curies from the High Flux Isotope Reactor in 1997 (ORNL 1998). Measurements at the perimeter of the Oak Ridge Reservation (ORR) indicate ambient air concentrations are less than 1% of their respective derived concentration guides (DCGs) given in DOE Order 5400.5 (DOE 1997a). A DCG is a concentration of a given radionuclide for one exposure pathway (e.g., inhalation) that would result in an effective close equivalent of 100 mrem per year to reference man, as defined by the International Commission on Radiological Protection.

The nearest prevention of significant deterioration (PSD) Class I area to the Y-12 Plant is the Great Smoky Mountains National Park approximately 30 miles south of the Y-12 Plant. The Joyce Kilmer Wilderness Area, which is also a Class I area, is just south of the western end of the Great Smoky Mountains National Park. The median visibility range at the park is 24 miles with a summer median of 12 miles.

3.4.3 Water Resources

The Y-12 Plant is approximately 2 miles from the Melton Hill Reservoir and Clinch River. Onsite, two streams originate approximately in the middle of the plant. Bear Creek flows directly west from its headwaters at the Y-12 Plant; East Fork Poplar Creek flows east before turning north and west and flowing through the city of Oak Ridge. These two creeks merge near the ETTP, which is approximately 10 miles west of the Y-12 Plant. The major groundwater unit for the ORR is the Knox Aquifer, composed of the Knox Group and the Maynardville Limestone. No aquifers are considered sole-source aquifers (DOE 1997b).

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3.4.4 Geology and Soils

On a regional scale, the ORR, which includes the Y-12 Plant, is located on the western part of the Valley and Ridge Province (DOE 1998).The stratigraphic section of the ORR is stacked along three major thrust faults. The eastern portion of the Y-12 Plant is located on the White Mountain thrust sheet. This fault has not been historically active (DOE 1998).

Bear Creek Valley, to the west, is underlain by rocks of three regionally important stratigraphic units: the Rome Formation, the Conasauga Formation, and the Knox Group that typically dip 45° to the southeast (DOE 1997). The geology of Bear Creek Valley displays an inclined layer cake-style stratigraphy that is observed on a variety of scales: on a regional scale where limestone- and dolomite-dominated rock groups are interbedded with predominantly clastic shale groups, and on the scale of outcrops where clastic beds are interlayered with carbonate beds. This layered structure exerts a strong influence on groundwater flow (DOE 1997).

3.4.5 Ecological Resources

The ORR consists of diverse habitats and supports a rich variety of flora and fauna. Vegetation is characteristic of that found in the intermountain regions of central and southern Appalachia. The Y-12 Plant site is covered in mowed grass, concrete, gravel, asphalt, and industrial structures. Thus, the site does not have unique habitats or a wide diversity of flora or fauna. Upper East Fork Poplar Creek lacks riparian vegetation because much of the stream is channelized and maintained. Lake Reality is a 2.5-acre, plastic-lined, flat-bottomed settling and spill control structure located near the east end of the plant on East Fork Poplar Creek.

There are no federally protected threatened or endangered species known on the Y-12 Plant site. Although surveys for protected species are not comprehensive enough to rule out all possible federal- or state-listed vertebrates, the likelihood of finding such species seems very low (DOE 1998).

There is a small wetland (0.45 acres) in a small wooded area between New Hope Cemetery and Bear Creek Road.

3.4.6 Socioeconomics and Environmental Justice

The Y-12 Plant is one of three sites located on the DOE ORR, which includes portions of both Anderson and Roane counties in Tennessee. This region also includes the city of Oak Ridge, which provides a substantial portion of the work force for the three facilities. To generate the most conservative estimates of potential impact, the ROI includes only these two counties. Actual impacts are likely to be distributed over a wider area, since Anderson County is also part of the MSA for the much larger city of Knoxville and draws commuters from at least 12 counties in eastern Tennessee.[1]

Table 3.4 summarizes population, per capita income, and wage and salary employment from 1991 to 1996. Wage and salary employment for the region was over 64,000 in 1996; total personal income was over $2.5 billion. The Scarboro Community, which borders the fence line of the plant's northern boundary, is predominantly an African-American Community.

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[1]Commuting data taken from Oak Ridge Chamber of Commerce website, www.orcc.org/labor.html.

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3.4.7 Land Use

Land use within 50 miles of the Y-12 Plant is primarily agricultural except for the city of Knoxville and the city of Oak Ridge (DOE 1994). The Y-12 Plant is an industrial site that has been in operation since World War II. The city of Oak Ridge forms much of the northern boundary to the site, and the Tennessee Valley Authority's (TVA's) Melton Hill Reservoir and the Clinch River form the eastern and southern boundaries. Recreational uses of the surrounding area include fishing, boating, hunting, and camping. Several recreational areas are within 5 miles of the site.

Table 3.4. Population, Income, and Employment in the Y-12 Plant Region of Influence for Anderson County and Roane County

Region/Variable	1991	1992	1993	1994	1995	1996	Growth 1991-96
Tennessee							
Anderson County							
Population	69,208	70,361	70,648	70,878	71,292	71,479	0.65%
Per Capita Pers. Inc. ($)	18,040	19,101	20,092	20,690	21,715	22,292	4.32%
Total Personal Income (Mil $)	1,249	1,344	1,419	1,466	1,548	1,593	4.99%
Wage & Salary Employment	37,395	39,102	41,296	40,698	42,922	41,010	1.86%
Roane County							
Population	47,639	47,880	47,985	48,763	48,986	49,673	0.84%
Per Capita Pers. Inc. ($)	15,551	16,705	17,740	18,158	19,070	19,601	4.74%
Total Personal Income (Mil $)	741	800	851	885	934	974	5.62%
Wage & Salary Employment	21,305	22,186	23,055	24,235	23,550	23,633	2.10%

3.4.8 Infrastructure

Sanitary wastewater from the Y-12 Plant is discharged to the City of Oak Ridge publicly owned treatment works under an industrial and commercial wastewater discharge permit. Sanitary sewer radiological sample results at the Y-12 Plant are routinely reviewed to determine compliance with DOE Order 500.5 "Radiological Protection of the Public and the Environment." No radiological parameter that is monitored (including uranium) has exceeded a DCG (ORNL 1998). Typically, sample results indicate the Y-12 Plant radiological discharges are three orders of magnitude below their respective DCG (ORNL 1998).

3.4.9 Cultural Resources

Native American occupation of the Oak Ridge area began about 12,000 years ago. European settlement began in the Eighteenth Century. Much of the current Y-12 Plant site was farmed before World War II when the site was secured by the federal government as part of the Manhattan Project. A recent draft Cultural Resources Survey identified an historic district with 93 contributing buildings that is eligible for inclusion in the National Register of Historic Places.

3.5 EAST TENNESSEE TECHNOLOGY PARK

ETTP, formerly known as the ORGDP or K-25 Site, is located in Roane County, Tennessee, and is one of three large facilities comprising the ORR. The site is located on a level 1500-acre tract of land near the

confluence of Poplar Creek and the Clinch River. ETTP is approximately 35 miles west of Knoxville and approximately 8 miles southwest of the city of Oak Ridge.

3.5.1 Public and Worker Risk

The calculated radiation doses to maximally exposed off-site individuals from airborne releases in 1997 was 0.59 mrem (ORNL 1998). The collective radiological dose from airborne radionuclide emissions to the site ROI health risk population was 43 person-rem (DOE 1997b).

3.5.2 Climate and Air Quality

The climate of eastern Tennessee may be broadly classified as humid continental, although it is very near the region of temperate continental climate to the north. The Cumberland Mountains/Plateau to the northwest and the Great Smoky Mountains to the southeast influence the patterns of temperature and precipitation over the region, with cooler temperatures and greater precipitation generally occurring at the higher elevations. The average annual temperature in Oak Ridge, based on a 30-year period from 1961 to 1990, is 56.6°F and precipitation is 53.8 in. per year. Precipitation is fairly evenly distributed most of the year. The average wind speed is approximately 4 mph (at 10 m above the ground) and the highest wind speed, 79 mph, was associated with a tornado in Bear Creek Valley during the afternoon of February 21, 1993. Prevailing wind directions are from the northeast and southwest, reflecting the channeling of winds parallel to the ridges and valleys in the area.

Roane County and all surrounding counties are in attainment for NAAQS criteria pollutants. The nearest nonattainment area is in Polk County, which about 45 miles south of ETTP. Air quality in the region is generally good. The ozone standard is occasionally exceeded in Knoxville; however, Knox County is in attainment of the ozone standard.

For radiological pollutants, emissions are variable and emanate mostly from the TSCA incinerator. Measurements at the perimeter of the ORR indicate ambient air concentrations are less than 1% of their respective DCGs given in DOE Order 5400.5 (DOE 1997a).

The nearest PSD Class I area to ETTP is the Great Smoky Mountains National Park, 35 miles south of ETTP. The Joyce Kilmer Wilderness Area, which is also a Class I area, is just south of the western end of the Great Smoky Mountains National Park. The median visibility range at the park is 24 miles with a summer median of 12 miles.

3.5.3 Water Resources

Surface Water

ETTP is directly adjacent to the Clinch River along the northwest boundary of the ORR. Poplar Creek is a moderately wide (30- to 70-ft) stream that enters the north side of ETTP about 0.3 miles downstream of the confluence of the east and west forks of Poplar Creek. The lower reach of Poplar Creek meanders sharply along the southwest side of the ETTP and enters the Clinch River.

TVA performed an analysis of floods on the Clinch River and Poplar Creek. TVA concluded that most of ETTP is above the probable maximum flood level. The only facilities identified at risk during major floods were the K-25 power plant and the pumping station for ETTP's water filtration plant. The source of flooding at ETTP would be backwater from the Clinch River near the confluence of Poplar Creek. All proposed storage locations are above the 100-year flood level.

Groundwater

Groundwater occurs at ETTP in both the unconsolidated overburden and underlying bedrock as a single, unconfined water table aquifer. With few exceptions the water table occurs in the overburden overlying bedrock with the saturated overburden ranging up to 70 ft. In general, the water table is encountered within several feet of the surface adjacent to major water features and in incised ravines.

Groundwater flows in bedrock are controlled by hydraulic gradients, fracture networks, and karst solution features. Typically, bedrock flowpaths tend to follow geologic strike. Karst features are present in bedrock at ETTP, but conduit-dominated flow has been confirmed only in portions underlain by Knox carbonate along Black Oak Ridge.

The nearest domestic water supply wells are located approximately 2 miles southwest of ETTP on the opposite side of the Clinch River. It is unlikely that these wells could be affected by groundwater flowpaths from ETTP, should such a pathway exist. Additionally, there are nearly a dozen domestic wells along Black Oak Ridge, west of the DOE boundary. Four of these wells were sampled recently and found to be uncontaminated.

3.5.4 Geology and Soils

In general, ETTP is underlain by bedrock that can be broadly characterized as carbonate (Chickamauga and Knox Group) or clastic (Rome Formation). The carbonates underlie the majority of the main plant area. The eastern part of the site is underlain by clastic bedrock of the Cambrian Rome Formation. The structural geology of the ETTP is complex; the principal faults in the area include the White Oak Fault, a major regional thrust fault located along the south side of the ETTP. Seismic activity in the southern Appalachian Mountains that has affected the site area has been recorded 45 times since 1800. The probability of future seismic damage is moderate.

3.5.5 Ecological Resources

The ORR consists of diverse habitats and supports a rich variety of flora and fauna. Vegetation is characteristic of that found in the intermountain regions of central and southern Appalachia. Vegetation around the buildings within the fenced area on the ETTP proper is a mixture of mowed grasses with a few shrubs and trees. Many of the shrubs and trees have been planted as landscaping, although some native species are found in unmowed areas around ponds and waterways.

Since ETTP proper is primarily planted in non-native grasses, it has very little habitat available for native animals except along Poplar Creek. The majority of animal species found within ETTP's boundaries are species that adapt well to disturbance and the presence of humans. There are no known federally protected plant or animal species on the ETTP site, although suitable habitat exists for the endangered bald eagle on Melton Hill Reservoir and the Clinch River. Sixteen plant species and 18 animal species that are considered rare, threatened, or endangered by the State of Tennessee are found on or near ETTP.

The Lower Poplar Creek Rookery is the only environmentally sensitive area within ETTP. It is approximately 6.5 acres in size and is located on the north bank of Poplar Creek in the middle of the plant site.

3.5.6 Socioeconomics and Environmental Justice

Like the Y-12 Plant, ETTP is located on the DOE ORR, and the region of impact is identical to the ROI for the Y-12 Plant alternative. See Sect. 3.4.6 for summaries of population, income, and employment within the region. ETTP is in proximity to low-income populations on Blair Road (which runs behind the Park).

3.5.7 Land Use

The approximately 1500 acres of land in the ETTP site are industrial. The site formerly produced enriched uranium using a gaseous diffusion process. Portions of the site have been used for waste storage since the facility ceased enrichment operations. Efforts are under way to convert existing buildings into productive use through reindustrialization.

3.5.8 Infrastructure

Treatment of domestic wastewater is performed at the ETTP Sewage Treatment Plant which is operating within its National Pollutant Discharge Elimination System permit. The operating capacity of the treatment plant is about 600,000 gallons per day (gpd) with a current load of half that capacity (DOE 1997a). The ETTP water treatment plant is currently producing 800,000 gpd to 1.4 Mgd of potable water. Capacity of the system is roughly three times the current use. Highways in the area of the site include State Routes 95 and 58.

3.5.9 Cultural Resources

The K-25 Site was established as part of the Manhattan Project to develop and produce highly enriched uranium nuclear fuel for the atomic bomb used in World War II. The Manhattan Project was the first industrial process for separating the uranium isotopes by the gaseous diffusion method. A summer 1994 cultural resources survey of the former K-25 Site identified a "Main Plant Historic District," with 120 "contributing" buildings, that is eligible for inclusion on the National Register of Historic Places.

4. ENVIRONMENTAL CONSEQUENCES

At all sites the environmental impacts associated with minimal construction and operations, including risks associated with receipt and offloading of uranium materials and normal operations, are minimal and negligible. Postulated accident scenarios at all the DOE sites and buildings/areas within DOE sites result in low to negligible potential risk. Buildings or areas located relatively close to the facility boundaries (e.g., K-1066F Area at ETTP) have the highest potential for adverse consequences (but still low risk) under certain hypothetical accident scenarios.

The first part of this chapter (Sect. 4.1) establishes the methodology used to calculate public and worker risk under both routine operations and under various accident scenarios. The uranium source term, the assumed accident frequencies, and other parameters needed to model the accident scenarios will be defined in Appendix C. The detailed results of the modeling will be presented in tables showing all storage alternatives under all the hypothetical accident scenarios. The second part of this chapter (Sects. 4.2 through 4.6) summarizes the environmental consequences at each of the five alternative storage sites [No Action (FEMP), PORTS, PGDP, Y-12 Plant, and ETTP].

4.1 PUBLIC AND WORKER RISK

This section describes risk to the public, co-located worker, and facility worker due to continued storage of uranium materials at the FEMP site, or receipt and storage of these materials at other DOE-ORO sites described in Sect. 2. Risks are evaluated for routine operations and non-routine (accident) conditions. Offsite releases were determined to be minor at all sites.

The number of parameters that could affect the off-site human health and environmental consequences of a catastrophic release are vast. For example, the assumptions regarding wind speed, wind direction, height of plume, the amount of uranium affected, the amount of dilution, and the area of deposition could vary in some cases by orders of magnitude. Because of the complexity involved with multiple varying assumptions, worst-case assumptions for off-site transport and human health dose at each potential storage location are employed according to the following rationale.

For assessment of environmental consequences, the worst-case accident is assumed to be a seismic event and resulting fire which breaches much of the primary and secondary containment and results in a plume that entrains a large portion of the uranium source material. It is further assumed that the plume moves directly via the shortest distance from the storage locations to a potential receptor at the facility boundary, and that all of the uranium in the plume is respirable. However unlikely this scenario is, given fire alarm and suppression capabilities, it is still assumed that a resulting plume from a seismic event and fire would be the most likely worst-case accident to get the highest concentration of source material to the nearest off-site receptor (i.e., compared to a tornado or aircraft impact). This is especially true given the form of the majority of the uranium (e.g., ingots, recyclable pieces of metal.) While a tornado might lift a large majority of the source term and drop it in off-site areas, the material would not exist in a respirable fraction. The hypothetical seismic/fire scenario also results in the worst-case exposure pathway (inhalation), since uranium is predominately an alpha-particle emitter. This will be addressed in greater detail in Appendix C.

Uranium that is released from primary and secondary containment under the accident scenario described above and modeled later in this section can be deposited on surface soils and be subject to movement with soil water through the vadose zone into groundwater. The material could also be deposited directly into water

bodies or move from the surface soil overland into water bodies. As described below, any exposure pathway to human receptors via soil, groundwater, or surface water would be relatively unimportant compared to the inhalation pathway to the nearest off-site receptor.

Upon deposition of the uranium entrained in the plume, the fate and transport of uranium is a function of the environmental site characteristics and the physical/chemical properties of uranium. Such properties include uranium's solubility in water, the tendency of uranium to transform or degrade (e.g., ^{238}U has a half-life of 4.5 billion years), and chemical affinity for solids or organic matter (described as a partitioning coefficient K_d). An average K_d value for uranium is 15 L/kg, although the possible range of K_ds can vary widely (Sheppard and Thibault 1990). Contaminants with small K_ds will be leached more effectively into the groundwater (i.e., be more mobile) than those with larger K_ds. For example, uranium is much less mobile than ^{99}Tc, which has a K_d of 0.1 L/kg.

In addition, uranium can be transformed to other oxidation states in soil, further reducing its mobility. If organic matter, clay, and hydrous oxides are present in the receiving soils, adsorption of the uranium metal may occur onto these materials, also reducing the uranium's mobility and toxicity. The soils described in Sect. 3 are generally clay- and organic-matter rich and would be effective in retarding the mobility of uranium. Further, even if resuspended and available to an off-site receptor via inhalation, uranium concentrations would be diluted compared to the concentrations available in the original plume.

Each of the potential storage locations described in Sect. 3 is located within water-rich environments (i.e., each site is near major rivers). Therefore, even though the previous section supports minimal mobility of uranium in the soil, upon any accidental release, a fraction of the uranium could enter the water system, especially by direct deposition from the plume. The mobility of uranium deposited onto water depends upon the type of complex (cationic or anionic) formed as a result of the physical processes acting on the uranium. Cationic species tend to adsorb to soil, and anionic species tend to move with water. Uranium released in a fire would be oxidized (be cationic) and would tend to adsorb to the soil particles entrained in the water. As with uranium deposited upon the soil, the doses to a receptor in contact with uranium in water or associated sediment would be less significant than those of the receptor exposed to the initial plume.

Once in the off-site environment, the source material is assumed to intercept a human receptor. In general, uranium compounds are not easily absorbed across the gastrointestinal tract. Soluble uranium compounds demonstrate the best absorption, but this absorption is still low. Uranium is known to be a chemical toxicant, exposure to which leads to nephritis in the kidney. Uranium can also induce cancer when organs and tissues are exposed to alpha particles emitted from decaying uranium atoms. While other energetic emissions from radioactive decay of atoms, such as beta particles and gamma rays, also cause molecular ionization, these radiations do not produce the density of ionizations that alpha particles do when inside the human body. The ionization events cause biological damage, which is believed to be responsible for inducing cells to become cancerous. The types of uranium (e.g., natural, enriched, and depleted) under consideration are important because different types of uranium have different specific activities (the amount of radioactivity per unit mass). The difference between natural, enriched, and depleted uranium is defined by the percent ^{235}U mass enrichment. The higher the ^{235}U enrichment, the higher the specific activity of the mixture. The different quantities of source material and their associated activities are considered in the quantitative assessment that follows.

In summary, the potential adverse effects of the uranium source material in environmental media such as groundwater, surface water, soil, or sediment are relatively unimportant when compared to a release of the source material into the air from various accident scenarios. Therefore, the quantitative assessment

provided in this section will address the inhalation exposure pathway and the resulting calculated dose from both routine operations and various accident scenarios.

4.2 NO ACTION ALTERNATIVE

Under this alternative, the uranium currently stored at the FEMP site would remain at the site. The uranium is currently in various container types including 55-gallon steel drums, T-hoppers, half-high boxes, and sea-land containers. Currently, the nuclear material is located in Buildings 4B, 77, and 54B but would be moved to TS-4 and TS-5 at Plant Pad 1 and would be located under two existing TSSs (see Fig. 2.1).

4.2.1 Normal Operations

Under normal operations, land use, geology and soils, water resources, cultural resources, and the infrastructure would remain unchanged. Air effluents associated with uranium inventory maintenance would be minimal and would remain the same as present. Since there is no new construction and there are no effluents from the stored uranium, plant and animal species would not be adversely affected and cultural resources would not be impacted. Some continued maintenance of these buildings would be required, and monitoring and surveillance by FEMP site personnel would continue. The socioeconomic impact analysis assumes little or no construction activity and that the employees currently monitoring the uranium will continue to do so. Under these assumptions, there is no change in expenditures or employment and, consequently, no impact. Even if three additional workers were hired for monitoring, they would represent a minimal increase to the more than 590,000 existing wage and salary workers in Hamilton County. In the absence of important impacts, environmental justice concerns do not arise.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked and overpacked if deemed necessary. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, a radiation dose from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

4.2.2 Accidents

The accident risk calculated for the baseline condition would not change. Various accident scenarios are calculated for both the public and the co-located worker at the DOE sites, including the FEMP site. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials. Average annual exposure to natural sources is approximately 0.29 rem. Since the uranium materials would continue to remain at the FEMP site, there is no change in these exposures or risks. These risks would continue to exist for the public and the workers. These exposures constitute a low risk and are environmentally negligible.

4.3 PORTSMOUTH GASEOUS DIFFUSION PLANT

The proposed action is to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site to another DOE-ORO site. PORTS qualifies as such a site and has a long history of handling uranium and other nuclear products.

4.3.1 Normal Operations

Under normal operations, land use, cultural resources, and infrastructure would remain unchanged. Construction would be involved only at the X-7745R Storage Yard for two TSSs and receiving docks at the lithium buildings, and possibly Building X-744K. Construction would occur within the existing plant boundary in an industrial area. The receiving docks would be immediately adjacent to existing buildings, and each would be 30 by 40 ft in size. The amount of land disturbance would result in minor impacts to soils or biota. In those areas where some existing grass and open area exists, this permanent conversion is less than 0.3 acre and would be inconsequential. The area required for the TSSs at X-7745R Storage Yard would be slightly over 1 acre; however, the area is already covered by a concrete pad and no additional impacts to soils, air quality, or biota are expected. Building X-744K is approximately 200 ft from Big Run Creek and 800 ft from a holding pond associated with Big Run Creek.

Under normal operations no impacts to the water quality or aquatic biota in this holding pond or Big Run Creek are expected. Should a receiving dock be required for this building, it would be constructed on the opposite side of the building from Big Run Creek, and standard best management practices (BMPs) will be followed to ensure that construction-related runoff is controlled. No increase in turbidity in Big Run Creek or the holding pond is expected.

The socioeconomic impact analysis assumes a maximum of $5 million in construction expenditures to be spent in the current fiscal year for a combination of building upgrades and TSS construction. Up to three full-time equivalent (FTE) jobs would be required to operate the facility. If one assumes that all of the construction funds are spent on labor, and that the three new facility employees earn the average per capita income for the ROI, the impact on income in the first year would be $5.05 million, or 0.3% of the ROI 1996 baseline. This represents a conservative upper bound, since some of the construction investment will represent materials purchases rather than labor, and actual construction expenditures may be smaller. After the first year, the impact on income would be limited to the salaries of the three employees, an even smaller fraction of the local economic base.

Based on this analysis, the proposed action would be inconsequential. In the absence of any important impacts, including effluent releases, environmental justice issues do not arise.

The impact on employment and population is similarly small. If one assumes that the construction workers each earn the average per capita income, the initial $5 million expenditure implies roughly 310 construction jobs in the first year, and three full-time workers to operate the facility. The first-year impact then represents 0.8% of the wage and salary workers shown in Table 3.2. For subsequent years, the impact of three full-time jobs in this region is negligible. If the new employees moved into the region with their families, the impact on the population base would be even smaller than the employment impact.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation doses from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

4.3.2 Accidents

Human Health

Various accident scenarios are calculated for both the public, facility worker, and the co-located worker at PORTS. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials. These exposures constitute a low risk and are environmentally negligible.

Biota

For all accident scenarios (see Table D.3), uranium metal toxicity to aquatic biota for both acute and chronic exposure is negligible with all Hazard Quotients (HQs) less than one. An HQ is a ratio, calculated by dividing the environmental concentration of a chemical constituent by that chemical's acute or chronic toxicity benchmark for a given ecological receptor. If the HQ is less than 1, adverse affects to the receptor are assumed to be negligible, where as an HQ greater than 1 implies potential adverse impacts.

4.4 PADUCAH GASEOUS DIFFUSION PLANT

The proposed action is to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site to another DOE-ORO site. PGDP qualifies as such a site and has a long history of handling uranium and other nuclear products.

4.4.1 Normal Operations

At PGDP, site construction of two TSSs, including a concrete pad, would be required to store the uranium product. Land use would not be altered since the TSS location would be in the middle of the industrial part of the plant, and the proposed location would not impact any known cultural resources. BMPs will be followed during construction, and no impacts to water resources or aquatic biota or habitat are expected. The infrastructure is expected to be unchanged. Some compaction of the soil under the concrete pad would occur, but in the long term this effect is negligible.

Some minor and temporary fugitive dust would be generated during the grading of the site before the concrete pad is installed. Also, construction equipment would temporarily increase airborne exhaust emissions. These emissions would be typical of other common construction practices, and impacts would be temporary and negligible.

The TSS location would involve the permanent removal of approximately 1 acre of open field habitat. Plants and non-mobile animals occupying the site would be killed, and animals that currently use the field for foraging or nesting habitat would have to relocate. However, the amount of habitat affected is very small

in relation to the size of similar habitat in and around the PGDP site, and impacts to the ecosystem are minor. No threatened or endangered species, or their habitat, would be affected.

The socioeconomic impact analysis assumes a maximum of $5 million in construction expenditures to be spent in the current fiscal year, and a maximum of three FTE jobs required to operate the facility. Assuming all of the construction funds are spent on labor and that the three new facility employees earn the average per capita income for the ROI, the impact on income in the first year would be $5.07 million, or 0.3% of the ROI 1996 baseline. This represents a conservative upper bound, since some of the construction investment will represent materials purchases rather than labor, and actual construction expenditures may be smaller. After the first year, the impact on income would be limited to the salaries of the three employees, an even smaller fraction of the local economic base.

The impact on employment is similarly small. Assuming that the construction workers each earn the average per capita income, the initial $5 million expenditure implies roughly 212 construction jobs in the first year and three full-time workers to operate the facility. The first-year impact then represents 0.5% of the wage and salary workers shown in Table 3.3. For subsequent years, the impact of three full-time jobs in this county is negligible. If the new employees moved into the region with their families, the impact on the population base would be even smaller than the employment impact.

Based on this analysis, the proposed action would be inconsequential. In the absence of any important impacts including effluent releases, environmental justice concerns do not arise.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation doses from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

4.4.2 Accidents

Various accident scenarios are calculated for both the public, facility worker, and the co-located worker at PGDP. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials. These exposures constitute a low risk and are environmentally negligible.

4.5 Y-12 PLANT

The proposed action is to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site to another DOE-ORO site. The Y-12 Plant qualifies as such a site and currently is storing some LEU onsite.

4.5.1 Normal Operations

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Storage of uranium products at the Y-12 Plant would involve preparation of existing buildings (9720-33 and 9204-4) including removing some existing materials from 9720-33 and building upgrades. The west end of the Y-12 Plant where these two buildings are located is highly developed and industrialized. Land use would not be altered. There would be no impact to cultural resources, biota, water resources, the infrastructure (except minor improvements to the buildings themselves), or geology and soils. Some very minor air emissions would be associated with preparing the buildings for receipt of uranium.

The socioeconomic impact analysis assumes a maximum of $5 million in construction expenditures to be spent in the current fiscal year, and a maximum of three FTE jobs required to operate the facility. If one assumes that all of the construction funds are spent on labor and that the three new facility employees earn the average per capita income for the ROI, the impact on income in the first year would be $5.06 million, or 0.2% of the ROI 1996 baseline. This represents a conservative upper bound, since some of the construction investment will represent materials purchases rather than labor and actual construction expenditures may be smaller. After the first year, the impact on income would be limited to the salaries of the three employees, an even smaller fraction of the local economic base.

The impact on employment is similarly small. If one assumes that the construction workers each earn the average per capita income, the initial $5 million expenditure implies approximately 236 construction jobs in the first year, and three full-time workers to operate the facility. The first-year impact then represents 0.4% of the wage and salary workers shown in Table 3.4. For subsequent years, the impact of three full-time jobs in this region is negligible. If the new employees moved into the region with their families, the impact on the population base would be even smaller than the employment impact.

Based on this analysis, the proposed action would be inconsequential. In the absence of any important impacts including effluent releases, environmental justice concerns do not arise.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation doses from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

4.5.2 Accidents

Various accident scenarios are calculated for both the public, facility worker, and the co-located worker at the Y-12 Plant. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. The highest radiological risk to the public (0.63 rem dose) is from a storage area fire and to the co-located worker (0.84 rem) is from an earthquake with aerial dispersion of uranium materials. These exposures constitute a low risk and are environmentally negligible.

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4.6 EAST TENNESSEE TECHNOLOGY PARK

The proposed action is to place up to 3800 MTU of nuclear materials product currently stored at the FEMP site to another DOE-ORO site. The ETTP, formerly known as the ORGDP or K-25 Site, qualifies as such a site and has a long history of handling uranium and other nuclear products.

4.6.1 Normal Operations

Both the use of existing buildings (K-131 and K-631) and the site construction of two TSSs at two possible locations (K-861 Open Area and K-1066F Area) were evaluated. At each TSS location a concrete pad would be constructed. Land use would not be altered since the buildings and the TSS locations would be within the boundaries of the industrial part of the plant. None of the three proposed locations for uranium storage would impact any known cultural resources. BMPs will be followed during construction of the TSSs at the K-861 Open Area and the K-1066F Area, and no impacts to water resources or aquatic biota or habitats are expected. The infrastructure is expected to remain unchanged. Some compaction of the soil under the concrete pads would occur, but in the long term this effect is insignificant.

Some minor and temporary fugitive dust would be generated during the grading of the sites before the concrete pads are installed. Also, construction equipment would temporarily increase airborne exhaust emissions. These emissions would be typical of other common construction practices, and impacts would be temporary and insignificant.

The TSS locations would involve the permanent removal of approximately 1 acre of open field habitat at each of the two locations (K-861 Open Area and K-1066F Area). Plants and non-mobile animals occupying the sites would be killed, and animals that currently use the fields for foraging or nesting habitat would have to relocate. However, the amount of habitat affected is very small in relation to the size of similar habitat in and around the ETTP site, and impacts are insignificant. No threatened or endangered species, or their habitat, would be affected.

Since the ROI for this alternative is the same as for the Y-12 Plant alternative in Sect. 4.4.1, the calculations are identical. Based on this analysis, the proposed action will have no significant socioeconomic impact. In the absence of significant impacts, environmental justice concerns do not arise.

During storage of uranium materials, workers could be exposed to direct radiation from surface contamination on the storage containers. However, the containers have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation doses from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the dose rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

Human Health

Various accident scenarios are calculated for both the public, facility worker, and the co-located worker at ETTP. Doses to the facility worker, co-located worker, and the public associated with general handling accidents, storage area fires, and seismic events are summarized in Table C.8 in Appendix C. Risks to the public are dependent on how close the proposed storage locations are to the public. The K-1066F Area has the highest radiological risk to the public (1.26 rem, which is still low) with the other areas and buildings at ETTP having a negligible risk. This risk is associated with aerial dispersion of uranium materials after an earthquake. These exposures constitute a low risk and are environmentally negligible.

Biota

For all accident scenarios (see Table D.2), uranium metal toxicity to aquatic biota for both acute and chronic exposure is negligible with all HQs less than one.

4.7 CONCLUSIONS

Construction-related impacts at all sites are minor to negligible. The sites that propose the use of TSSs (PGDP and the K-861 Open Area and K-1066F Area at ETTP) would have approximately 1 acre of land, which is now open grass habitat, converted permanently to buildings. However, this acreage is unimportant in comparison to the similar acreage in and around these plant sites. TSSs are proposed at the X-7745R Storage Area at PORTS, but a concrete pad already exists and only very minor land disturbance would occur.

Operations impacts are also negligible. Routine operations would result in negligible risks. Accident-related risks range from negligible for general handling (off-loading operations, storage, and maintenance) at all sites to negligible and low risk at various sites, depending on the type of accident involved. Generally, dispersion of uranium material associated with a storage area fire and/or earthquake results in the highest radiological risk. Even the highest radiological risk to both the public and the co-located worker (1.26 rem) at the K-1066F Area at ETTP is still considered a low risk and is environmentally insignificant. Uranium metal toxicity to aquatic biota from all accident scenarios at all sites is negligible.

4.8 CUMULATIVE IMPACTS

All four DOE-ORO sites have been and are still undergoing changes from their historical missions. Environmental cleanup has become a majority priority over the past decade, the need for uranium production has declined sharply, and the facilities at all the sites are aging. Cumulative impacts are impacts associated with the proposed action when combined with other past, present, or reasonably foreseeable future impacts. There are no significant impacts associated with the proposed action, except for potential short-term effects to aquatic biota at two sites under worst-case accident conditions. When the insignificant impacts associated with construction and normal operation of the proposed storage facilities are added to the baseline environment at each of the sites, and taking into account historical uses and projected future changes, no significant cumulative impacts would occur. The receipt and storage of the uranium materials at one or more of the DOE-ORO sites has the effect either of using existing buildings or developing small (approximately 1-acre) areas within heavily industrialized sites which are undergoing the changes mentioned above. Cumulative impacts from these actions are minimal and insignificant.

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Issac Diggs, P.E.	M.S. Engineering Mechanics	25 years experience, including 5 years at the Fernald site	Technical review
Alauddin Khan	Ph.D. Chemical Engineering	9 years experience	Contaminant fate and transport (pathways development)
James Elmore	Ph.D. Ecology	18 years NEPA experience	Purpose and need; DOE technical reviewer

DOE = U.S. Department of Energy
EA = Environmental Assessment
NEPA = National Environmental Policy Act
PORTS = Portsmouth Gaseous Diffusion Plant

7. LIST OF AGENCIES/INDIVIDUALS CONSULTED

This chapter contains copies of correspondence with the State Historic Preservation Officers (SHPOs) in Tennessee, Kentucky, and Ohio and with the U.S. Fish and Wildlife Service and state conservation departments.

Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

2178

March 9, 1999

Mr. Joseph Garrison
Tennessee Historical Commission
Department of Environment and Conservation
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. Garrison:

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, RECEIPT AND STORAGE OF URANIUM MATERIALS FROM FERNALD ENVIRONMENTAL PROJECT - OAK RIDGE OPERATIONS

Enclosed is a Project Summary for the proposed Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project. A description and discussion of the proposed project is included in the enclosed Project Summary and Archeological Historical Review (AHR).

The Department of Energy Oak Ridge Operations (DOE ORO) has determined that the proposed project would have no effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places (National Register). This determination is included with the Project Summary. This type of proposed activity is addressed in the *Programmatic Agreement Among The Department Of Energy Oak Ridge Operations Office, The Tennessee State Historic Preservation Officer, And The Advisory Council On Historic Preservation Concerning The Management Of Historical And Cultural Properties At The Oak Ridge Reservation* (PA) in Section III. Section A.2.B.

DOE ORO requests documentation of your concurrence with the determination for the proposed Tennessee sites. With your concurrence DOE ORO's responsibilities for compliance with Section 106 of the National Historic Preservation Act as related to the proposed activities in Tennessee will be completed for this project.

If you have questions or need additional information related to this proposed project please call me at (423) 576-9574.

Sincerely,

Ray T. Moore
DOE ORO Cultural Resources
Management Coordinator

Enclosure

cc w/enclosure:
Richard Frounfelker, EM-96, ETTP Site Office
Susan Morris, DP-81, Y-12 Site Office
Dave Snyder, Ohio Historic Preservation Office, OH
David Morgan, Kentucky Heritage Council
and State Historic Preservation Office
EC Document Center Bldg. 9734, MS-8130 (w/maps)

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PROJECT SUMMARY

2178

SECTION 106 ARCHEOLOGICAL AND HISTORICAL REVIEW

RECEIPT AND STORAGE OF URANIUM MATERIALS

FROM FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PROPOSED ACTION: The U.S. Department of Energy Oak Ridge Operations (DOE ORO), is in the process of preparing an Environmental Assessment (EA), DOE/ORO-2078, for the Receipt and Storage and Uranium Materials from the Fernald Environmental Management Project (FEMP). Storage at a licensed, commercial facility was also initially considered but was ruled out because of schedule constraints. The no action alternative is to leave the uranium at FEMP.

LOCATION OF THIS ACTION: Five DOE site alternatives were considered for receipt and storage of these materials, Oak Ridge National Laboratory (ORNL) in Anderson County, the Y-12 Plant in Anderson County, and the East Tennessee Technology Park (ETTP) in Roane County, and also Portsmouth Gaseous Diffusion Plant (PORTS), Paducah Gaseous Diffusion Plant (PGDP). The ORNL site was dropped from consideration due to mission-related land use conflicts. At some of these DOE sites, various locations/building variations were considered.

DISCUSSION: DOE proposes to place up to 3800 Metric Tons Uranium (MTU) of nuclear materials product currently stored at the FEMP site at another suitable DOE site. The type and amount of uranium product is listed in Table 2.1.

Table 2.1. FEMP Uranium Proposed for Receipt and Storage at Other DOE Site(s)

Uranium	Pounds (millions)	Metric Tons Uranium (MTU)	Storage Space Requirements (approximate in ft^2)
Normal	0.434	193	600
Depleted	7.085	2,761	17,200
Low-Enriched	2.205	799	12,500
TOTALS	9.724	3,753	30,300

Receipt and storage of the uranium products would require that suitable existing buildings with sufficient floor space at the various DOE sites be made available. Approximately 50,000 ft^2 of space is required, and buildings would have to be available in time to receive all product before the end of the fourth quarter of FY 1999. Alternatively, if existing buildings are not available, an area where at least two Tension-Support Structures (TSSs) would be built (or a combination thereof). These TSSs would have concrete floors, a rigid frame, and tarpaulin roof and sides, and

they would provide approximately 27,000 ft^2 each in storage space. DOE inventoried buildings and space availability at five sites — three sites (the Y-12 Plant, ORNL, and ETTP) in Oak Ridge, Tennessee; Portsmouth, Ohio; and Paducah, Kentucky. The ORNL site was dropped from consideration due to mission-related land use conflicts.

Tennessee Sites

Enclosed are figures 2.4 and 2.5, from the draft EA, showing the various building locations proposed at the Oak Ridge Reservation. Two existing buildings, 9204-4 and 9720-33, are proposed to be used at the Y-12 Plant. Building 9204-4 was identified as a contributing property to the proposed Y-12 Historic District. Building 9720-33 was constructed in 1967 and is not a contributing property. Two existing buildings, K-131 and K-631, and two open areas (K-861 and 1066F) are proposed at the ETTP. Buildings K-131 and K-631 are located in the K-25 Historic District and are contributing properties. K-861 is located in the K-25 Historic District and 1066F is not located in the K-25 Historic District. Neither of these open areas are considered eligible or contributing properties for inclusion in the National Register of Historic Places. The proposed project would not require modification to any of the buildings and only a TSS would be added to the open areas.

DETERMINATION: DOE ORO personnel have reviewed this proposed project in accordance with the *Programmatic Agreement (PA) Among the Department of Energy, Oak Ridge Operations, the Tennessee State Historic Officer, and the Advisory Council on Historic Preservation Concerning Management of Historical and Cultural Properties at the Oak Ridge Reservation*. The proposed project is addressed in the PA in Section III. Section A.2. B. DOE ORO has determined that the proposed project would have no adverse effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places for the proposed Y-12 and ETTP sites located in Tennessee.

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Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

2178

March 9, 1999

Mr. David Morgan
Kentucky Heritage Council
and State Historic Preservation Office
300 Washington Street
Frankfort, Kentucky 40601

Dear Mr. Morgan:

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, RECEIPT AND STORAGE OF URANIUM MATERIALS FROM FERNALD ENVIRONMENTAL MANAGEMENT PROJECT - OAK RIDGE OPERATIONS

Enclosed is a Project Summary for the proposed Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project. A description and discussion of the proposed project is included in the enclosed Project Summary and Archeological Historical Review (AHR).

The Department of Energy Operations (DOE ORO) has determined that the proposed project would have no effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places (National Register). This determination is included with the Project Summary.

DOE ORO requests documentation of your concurrence with the determination for the proposed Paducah Gaseous Diffusion Plant, Kentucky site. With your concurrence DOE ORO's responsibilities for compliance with Section 106 of the National Historic Preservation Act as related to the proposed activities in Kentucky will be completed for this project.

If you have questions or need additional information related to this proposed project please call me at (423) 576-9574.

Sincerely,

Ray T. Moore

Ray T. Moore
DOE ORO Cultural Resources
Management Coordinator

Enclosure

cc w/enclosure:
David Tidwell, EF-22, PORTS
Wayne Tolbert, SAIC, OR
Joseph Garrison, Tennessee Historical Commission
Dave Snyder, Ohio Historic Preservation Office
EC Document Center Bldg. 9734, MS-8130 (w/maps)

PROJECT SUMMARY

SECTION 106 ARCHEOLOGICAL AND HISTORICAL REVIEW

RECEIPT AND STORAGE OF URANIUM MATERIALS

FROM FERNALD ENVIRONMENTAL PROJECT

PROPOSED ACTION: The U. S. Department of Energy Oak Ridge Operations (DOE ORO), is in the process of preparing an Environmental Assessment (EA), DOE/ORO-2078, for the Receipt and Storage and Uranium Materials from the Fernald Environmental Management Project (FEMP). Storage at a licensed, commercial facility was also initially considered but was ruled out because of schedule constraints. The no action alternative is to leave the uranium at FEMP.

LOCATION OF THIS ACTION: Five DOE site alternatives were considered for receipt and storage of these materials, Oak Ridge National Laboratory (ORNL), the Y-12 Plant, and the East Tennessee Technology Park (ETTP) in Oak Ridge Tennessee, the Portsmouth Gaseous Diffusion Plant (PORTS), and the Paducah Gaseous Diffusion Plant (PGDP). The ORNL site was dropped from consideration due to mission-related land use conflicts. At some of these DOE sites, various locations/building variations were considered.

DISCUSSION: DOE proposes to place up to 3800 Metric Tons Uranium (MTU) of nuclear materials product currently stored at the FEMP site at another suitable DOE site. The type and amount of uranium product is listed in Table 2.1.

Table 2.1. FEMP Uranium Proposed for Receipt and Storage at Other DOE Site(s)

Uranium	Pounds (millions)	Metric Tons Uranium (MTU)	Storage Space Requirements (approximate in ft^2)
Normal	0.434	193	600
Depleted	7.085	2,761	17,200
Low-Enriched	2.205	799	12,500
TOTALS	9.724	3,753	30,300

Receipt and storage of the uranium products would require that suitable existing buildings with sufficient floor space at the various DOE sites be made available. Approximately 50,000 ft^2 of space is required, and buildings would have to be available in time to receive all product before the end of the fourth quarter of FY 1999. Alternatively, if existing buildings are not available, an area where at least two tension-support structures (TSSs) would be built (or a combination

thereof). These TSSs would have concrete floors, a rigid frame, and tarpaulin roof and sides, and they would provide approximately 27,000 ft^2 each in storage space. DOE inventoried buildings and space availability at five sites — three sites (the Y-12 Plant, ORNL, and ETTP) in Oak Ridge, Tennessee; PORTS, Portsmouth, Ohio; and PGDP, Paducah, Kentucky. The ORNL site was dropped from consideration due to mission-related land use conflicts.

PGDP Site - Kentucky

Enclosed is figure 2.3, from the draft EA, showing the proposed location at the PGDP in Paducah Kentucky. The proposed location is an open areas in the previously disturbed plant area and two TSSs would need to be built at this area.

DETERMINATION: DOE ORO personnel have reviewed this proposed project and has determined that the proposed project would have no adverse effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places for the proposed site at PGDP.

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Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

E 2178

March 9, 1999

Mr. Dave Snyder
Ohio Historic Preservation Office
567 Hudson Street
Columbus, Ohio 43211-1030

Dear Mr. Snyder:

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, RECEIPT AND STORAGE OF URANIUM MATERIALS FROM FERNALD ENVIRONMENTAL MANAGEMENT PROJECT - OAK RIDGE OPERATIONS

Enclosed is a Project Summary for the proposed Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project. A description and discussion of the proposed project is included in the enclosed Project Summary and Archeological Historical Review (AHR).

The Department of Energy Oak Ridge Operations (DOE ORO) has determined that the proposed project would have no effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places (National Register). This determination is included with the Project Summary.

DOE ORO requests documentation of your concurrence with the determination for the proposed PORTS, Ohio site. With your concurrence DOE ORO's responsibilities for compliance with Section 106 of the National Historic Preservation Act as related to the proposed activities in Ohio will be completed for this project.

If you have questions or need additional information related to this proposed project please call me at (423) 576-9574.

Sincerely,

Ray T. Moore

Ray T. Moore
DOE ORO Cultural Resources
Management Coordinator

Enclosure

cc w/enclosure:
Dee Perkins, EF-21, PORTS
Wayne Tolbert, SAIC, OR
Joseph Garrison, Tennessee Historical Commission
David Morgan, Kentucky Heritage Council
and State Historic Preservation Office
EC Document Center Bldg. 9734, MS-8130 (w/maps)

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PROJECT SUMMARY E 2178

SECTION 106 ARCHEOLOGICAL AND HISTORICAL REVIEW

RECEIPT AND STORAGE OF URANIUM MATERIALS

FROM FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PROPOSED ACTION: The U. S. Department of Energy Oak Ridge Operations (DOE ORO), is in the process of preparing an Environmental Assessment (EA), DOE/ORO-2078, for the Receipt and Storage and Uranium Materials from the Fernald Environmental Management Project (FEMP). Storage at a licensed, commercial facility was also initially considered but was ruled out because of schedule constraints. The no action alternative is to leave the uranium at FEMP.

LOCATION OF THIS ACTION: Five DOE site alternatives were considered for receipt and storage of these materials, Oak Ridge National Laboratory (ORNL), the Y-12 Plant, and the East Tennessee Technology Park (ETTP) in Oak Ridge Tennessee, the Portsmouth Gaseous Diffusion Plant (PORTS), and the Paducah Gaseous Diffusion Plant (PGDP). The ORNL site was dropped from consideration due to mission-related land use conflicts. At some of these DOE sites, various locations/building variations were considered.

DISCUSSION: DOE proposes to place up to 3800 Metric Tons Uranium (MTU) of nuclear materials product currently stored at the FEMP site at another suitable DOE site. The type and amount of uranium product is listed in Table 2.1.

Table 2.1. FEMP Uranium Proposed for Receipt and Storage at Other DOE Site(s)

Uranium	Pounds (millions)	Metric Tons Uranium (MTU)	Storage Space Requirements (approximate in ft^2)
Normal	0.434	193	600
Depleted	7.085	2,761	17,200
Low-Enriched	2.205	799	12,500
TOTALS	9.724	3,753	30,300

Receipt and storage of the uranium products would require that suitable existing buildings with sufficient floor space at the various DOE sites be made available. Approximately 50,000 ft^2 of space is required, and buildings would have to be available in time to receive all product before the end of the fourth quarter of FY 1999. Alternatively, if existing buildings are not available, an area where at least two Tension-Support Structures (TSSs) would be built (or a combination thereof). These TSSs would have concrete floors, a rigid frame, and tarpaulin roof and sides, and

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they would provide approximately 27,000 ft^2 each in storage space. DOE inventoried buildings and space availability at five sites — three sites (the Y-12 Plant, ORNL, and ETTP) in Oak Ridge, Tennessee; PORTS, Portsmouth, Ohio; and PGDP, Paducah, Kentucky. The ORNL site was dropped from consideration due to mission-related land use conflicts.

PORTS Site - Ohio

Enclosed is figure 2.2, from the draft EA, showing the various building locations proposed at the PORTS Site in Portsmouth Ohio. Eight existing buildings were identified that could be used for storage of the FEMP material. The proposed project would not require modification to any of the buildings. One outside storage area was identified. This storage area is within the previously disturbed plant area and a concrete pad is presently at this location. One TSS would need to be built at this area.

DETERMINATION: DOE ORO personnel have reviewed this proposed project and has determined that the proposed project would have no adverse effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places for the proposed sites at PORTS.

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DOE F 1325.8
(4/93)

United States Government | Department of Energy

Oak Ridge Operations Office

Memorandum

2178

DATE: April 5, 1999

REPLY TO
ATTN OF: SE-32:Moore

SUBJECT: **NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, RECEIPT AND STORAGE OF URANIUM MATERIALS FROM FEMP - OAK RIDGE OPERATIONS**

TO: J. Dale Jackson, Executive Director, Office of Assistant Manager for Enrichment Facilities, EF-20

Attached is a letter from the Tennessee State Historic Preservation Officer (SHPO) that concurs with the Department of Energy Oak Ridge Operations (DOE ORO) determination that the proposed project would have no effect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places (National Register) in the State of Tennessee. With the SHPO's determination, DOE ORO has complied with Section 106 of the National Historic Preservation Act for proposed activities in Tennessee.

If you have questions or need additional information please call me at (423) 576-9574.

Ray T. Moore
DOE ORO Cultural Resources
Management Coordinator

Attachment

cc w/attachment:
Richard Frounkfelker, EM-96, ETTP Site Office
Susan Morris, DP-81, Y-12 Site Office
David Tindell, EF-22, PAD
Dee Perkins, EF-21, PORTS
Sheila Thornton, BJC LLC, Bldg. K-1550-E, MS 7235
Jennifer Webb, LMES, Bldg. 9115, MS 8219, Y-12
James Hall, LMER, Bldg. 1061, MS-6429
Mick Wiest, LMES, Bldg. 9116, MS 8098, Y-12
Jack Newman, BJC LLC, 55 Jefferson, Room 117, MS 7604
Wayne Tolbert, SAIC, Oak Ridge
Dave Snyder, Ohio Historic Preservation Office
David Morgan, Kentucky Heritage Council and State Historic Preservation Office
EC Document Center Bldg. 9734, MS-8130

2178

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

March 17, 1999

Mr. Ray T. Moore
USDOE/Oak Ridge Operations
Post Office Box 2001
Oak Ridge, Tennessee 37831-8739

RE: DOE, ORNL/URANIUM STORAGE/FERNAND, OAK RIDGE, ANDERSON COUNTY

Dear Mr. Moore:

Pursuant to your request received on Wednesday, March 10, 1999, this office has reviewed documentation concerning the above-referenced undertaking. This is a quirement of the Agreement Document ratified to ensure compliance with Section 106 of e National Historic Preservation Act as codified at 36 CFR 800 (51 FR 31115, September 2, 1986) and an Agreement Document

Considering available information, we find that the project as currently proposed will not adversely affect any property that is eligible for listing in the National Register of Historic Places. Therefore, this office has no objection to the implementation of this project.. Please direct questions and comments to Joe Garrison (615)532-1559. We appreciate your cooperation.

Sincerely,

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jyg

OFFICIAL FILE COPY
AMESQ
Log No C 0378
Date Received MAR 23 1999
File Code 2182.15

65
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OHIO Department of Natural Resources

2178

George V. Voinovich • *Governor*
Donald C. Anderson • *Director*

March 11, 1999

James L. Elmore
Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, TN 37831

Dear Dr. Elmore:

Your letter to Jennifer Windus regarding the receipt and storage of uranium materials from the Fernald site was referred to me for response. I have enclosed listings of rare animals and plants recorded in our Natural Heritage Database for Butler and Hamilton counties (FEMP site) and for Pike County (Portsmouth Gaseous Diffusion Plant site). Scientific name, common name state and federal status are shown for each species. Status code definitions are provided on an accompanying sheet.

I have also included our data request form and brochure should you require a more detailed database search for your sites. Please note that we charge for this service. You can contact me at (614) 265-6472 if you have any questions about these materials.

Sincerely,

Patricia D. Jones

Patricia D. Jones
Data Services Administrator
Division of Natural Areas & Preserves

Enclosures

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Division of Natural Areas and Preserves
Ohio Department of Natural Resources

Endangerment Codes

Federal Status Codes

LE= Endangered
LT= Threatened
PE= Proposed Endangered
PT= Proposed Threatened

Ohio Status Codes

Animals: (Assigned by the Ohio Division of Wildlife)

E= State Endangered
* T= Threatened (not a legal designation)
* S= Special Interest (not a legal designation)
* X= Extirpated from Ohio

* Animals without a status are inventoried by the Division of Natural Areas & Preserves, but have not been assigned a state status by the Ohio Division of Wildlife.

Plants: (Assigned by the Division of Natural Areas & Preserves)

E= State Endangered
T= State Threatened
* P= Potentially threatened (not a legal designation)
* X= Presumed extirpated from Ohio
* A= A species recently added to the inventory, a state endangerment status has not yet been determined.

* Administrative statuses, these are not legal designations.

\96

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF NATURAL AREAS & PRESERVES
BUTLER COUNTY: RARE ANIMAL & PLANT SPECIES

FEDERAL STATUS	OHIO STATUS	SCIENTIFIC NAME	COMMON NAME
	T	BARTRAMIA LONGICAUDA	UPLAND SANDPIPER
		CAMBARUS ORTMANNI	CINCINNATI CRAYFISH
	T	CLONOPHIS KIRTLANDII	KIRTLAND'S SNAKE
	E	EURYCEA LUCIFUGA	CAVE SALAMANDER
	T	EXOGLOSSUM LAURAE	TONGUETIED MINNOW
	S	HIODON TERGISUS	MOONEYE
	E	IXOBRYCHUS EXILIS	LEAST BITTERN
LE	E	MYOTIS SODALIS	INDIANA BAT
	T	NYCTICORAX NYCTICORAX	BLACK-CROWNED NIGHT-HERON
	T	ORCONECTES SLOANII	SLOAN'S CRAYFISH
	S	PORZANA CAROLINA	SORA
	P	ARABIS HIRSUTA VAR. ADPRESSIPILIS	SOUTHERN HAIRY ROCK-CRESS
	E	ARABIS HIRSUTA VAR. PYCNOCARPA	WESTERN HAIRY ROCK-CRESS
	X	CUSCUTA PENTAGONA	FIVE-ANGLED DODDER
	E	ECHINODORUS ROSTRATUS	BUR-HEAD
	T	LOPHOTOCARPUS CALYCINUS	SOUTHERN WAPATO
	E	PRENANTHES CREPIDINEA	NODDING RATTLESNAKE-ROOT
	E	RIBES MISSOURIENSE	MISSOURI GOOSEBERRY
	T	SALIX CAROLINIANA	CAROLINA WILLOW
	T	SILENE NIVEA	SNOWY CAMPION
	E	VIBURNUM MOLLE	SOFT-LEAVED ARROW-WOOD

21 Records Processed

7-21

8212

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FEDERAL STATUS	OHIO STATUS	SCIENTIFIC NAME	COMMON NAME
	S	ACCIPITER STRIATUS	SHARP-SHINNED HAWK
	E	ACIPENSER FULVESCENS	LAKE STURGEON
	S	ANODONTA SUBORBICULATA	FLAT FLOATER
		APALONE MUTICA	SMOOTH SOFTSHELL
	E	BOTAURUS LENTIGINOSUS	AMERICAN BITTERN
	E	CHONDESTES GRAMMACUS	LARK SPARROW
	T	CICINDELA MARGINIPENNIS	COBBLESTONE TIGER BEETLE
	E	CISTOTHORUS PLATENSIS	SEDGE WREN
	T	CLONOPHIS KIRTLANDII	KIRTLAND'S SNAKE
	E	CYCLEPTUS ELONGATUS	BLUE SUCKER
	S	CYCLONAIAS TUBERCULATA	PURPLE WARTYBACK
	E	ELLIPSARIA LINEOLATA	BUTTERFLY
	E	ELLIPTIO CRASSIDENS CRASSIDENS	ELEPHANT-EAR
	E	EPIOBLASMA TRIQUETRA	SNUFFBOX
	E	EURYCEA LUCIFUGA	CAVE SALAMANDER
	E	FUSCONAIA EBENA	EBONYSHELL
	S	GRAPTEMYS PSEUDOGEOGRAPHICA	FALSE MAP TURTLE
		HETERODON PLATIRHINOS	EASTERN HOGNOSE SNAKE
	S	HIODON TERGISUS	MOONEYE
	T	ICHTHYOMYZON UNICUSPIS	SILVER LAMPREY
	E	LANIUS LUDOVICIANUS	LOGGERHEAD SHRIKE
	S	LOTA LOTA	BURBOT
	E	MEGALONAIAS NERVOSA	WASHBOARD
	S	MOXOSTOMA CARINATUM	RIVER REDHORSE
	T	NOTROPIS BOOPS	BIGEYE SHINER
	E	NOTURUS ELEUTHERUS	MOUNTAIN MADTOM
	E	NOTURUS STIGMOSUS	NORTHERN MADTOM
	E	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON
	T	NYCTICORAX NYCTICORAX	BLACK-CROWNED NIGHT-HERON
	T	OBLIQUARIA REFLEXA	THREEHORN WARTYBACK
	E	OBOVARIA OLIVARIA	HICKORYNUT
	S	OPHEODRYS AESTIVUS	ROUGH GREEN SNAKE

FEDERAL STATUS	OHIO STATUS	SCIENTIFIC NAME	COMMON NAME
	T	ORCONECTES SLOANII	SLOAN'S CRAYFISH
	S	PERCINA PHOXOCEPHALA	SLENDERHEAD DARTER
	T	PERCINA SHUMARDI	RIVER DARTER
	E	PLETHOBASUS CYPHYUS	SHEEPNOSE
	E	PLEUROBEMA CORDATUM	OHIO PIGTOE
	S	PORZANA CAROLINA	SORA
		POTAMILUS OHIENSIS	PINK PAPERSHELL
	E	QUADRULA METANEVRA	MONKEYFACE
	E	QUADRULA NODULATA	WARTYBACK
		TRACHEMYS SCRIPTA ELEGANS	RED-EARED SLIDER
	T	TRUNCILLA DONACIFORMIS	FAWNSFOOT
	S	TRUNCILLA TRUNCATA	DEERTOE
	T	CORALLORHIZA WISTERIANA	SPRING CORAL-ROOT
	P	DESMODIUM PAUCIFLORUM	FEW-FLOWERED TICK-TREFOIL
	P	ELEOCHARIS QUADRANGULATA	FOUR-ANGLED SPIKERUSH
	P	JUGLANS CINEREA	BUTTERNUT
	T	LIPOCARPHA MICRANTHA	DWARF BULRUSH
	T	LOPHOTOCARPUS CALYCINUS	SOUTHERN WAPATO
	P	PASPALUM FLUITANS	RIVERBANK PASPALUM
	T	PASSIFLORA INCARNATA	PASSION-FLOWER
	P	PHACELIA BIPINNATIFIDA	FERN-LEAF SCORPION-WEED
	P	RUELLIA CAROLINIENSIS	CAROLINA RUELLIA
	P	SAGITTARIA AUSTRALIS	LONG-BEAKED ARROWHEAD
	T	SALIX CAROLINIANA	CAROLINA WILLOW
	P	SCIRPUS PURSHIANUS	PURSH'S BULRUSH
	P	SIDA HERMAPHRODITA	VIRGINIA MALLOW
	P	SPERMACOCE GLABRA	SMOOTH BUTTONWEED
LE	E	TRIFOLIUM STOLONIFERUM	RUNNING BUFFALO CLOVER
	P	TRILLIUM RECURVATUM	PRAIRIE WAKE-ROBIN
	T	TRIPHORA TRIANTHOPHORA	THREE-BIRDS-ORCHID
	P	VIBURNUM RUFIDULUM	SOUTHERN BLACK-HAW

63 Records Processed

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8212

FEDERAL STATUS	OHIO STATUS	SCIENTIFIC NAME	COMMON NAME
	S	ACCIPITER STRIATUS	SHARP-SHINNED HAWK
	S	CAECIDOTEA ROTUNDA	FROST CAVE ISOPOD
	S	CAPRIMULGUS CAROLINENSIS	CHUCK-WILL'S-WIDOW
	T	CLINOSTOMUS FUNDULOIDES	ROSYSIDE DACE
	E	CROTALUS HORRIDUS	TIMBER RATTLESNAKE
	E	EPIOBLASMA TRIQUETRA	SNUFFBOX
	E	FUSCONAIA EBENA	EBONYSHELL
	S	GRAPTEMYS PSEUDOGEOGRAPHICA	FALSE MAP TURTLE
	E	HIODON ALOSOIDES	GOLDEYE
	S	HIODON TERGISUS	MOONEYE
	T	ICHTHYOMYZON UNICUSPIS	SILVER LAMPREY
	S	LAMPROPELTIS GETULA NIGRA	BLACK KINGSNAKE
	E	LAMPSILIS TERES ANODONTOIDES	YELLOW SANDSHELL
	E	LEPISOSTEUS PLATOSTOMUS	SHORTNOSE GAR
	S	MOXOSTOMA CARINATUM	RIVER REDHORSE
	T	NOTROPIS BOOPS	BIGEYE SHINER
	T	OBLIQUARIA REFLEXA	THREEHORN WARTYBACK
	S	OPHEODRYS AESTIVUS	ROUGH GREEN SNAKE
	E	PLETHOBASUS CYPHYUS	SHEEPNOSE
	T	POLYODON SPATHULA	PADDLEFISH
		POTAMILUS OHIENSIS	PINK PAPERSHELL
	E	THRYOMANES BEWICKII	BEWICK'S WREN
	T	TRUNCILLA DONACIFORMIS	FAWNSFOOT
	S	TRUNCILLA TRUNCATA	DEERTOE
	P	ARABIS HIRSUTA VAR. ADPRESSIPILIS	SOUTHERN HAIRY ROCK-CRESS
	P	ARENARIA STRICTA	ROCK SANDWORT
	P	ARISTIDA PURPURASCENS	PURPLE TRIPLE-AWNED GRASS
	P	ASCLEPIAS AMPLEXICAULIS	BLUNTLEAF MILKWEED
	P	ASCLEPIAS VIRIDIFLORA	GREEN MILKWEED
	T	ASPLENIUM BRADLEYI	BRADLEY'S SPLEENWORT
	T	ASPLENIUM RUTA-MURARIA	WALL-RUE
	T	ASTER SOLIDAGINEUS	NARROW-LEAVED ASTER

FEDERAL STATUS	OHIO STATUS	SCIENTIFIC NAME	COMMON NAME
	P	BAPTISIA LACTEA	PRAIRIE FALSE INDIGO
	T	BUCHNERA AMERICANA	BLUEHEARTS
	P	CAREX DEBILIS VAR. DEBILIS	WEAK SEDGE
	T	CAREX JUNIPERORUM	JUNIPER SEDGE
	P	CAREX RETROFLEXA VAR. RETROFLEXA	REFLEXED SEDGE
	P	CASTANEA DENTATA	AMERICAN CHESTNUT
	P	CELTIS TENUIFOLIA	DWARF HACKBERRY
	P	CLITORIA MARIANA	BUTTERFLY-PEA
	P	CYPRIPEDIUM CALCEOLUS VAR. PUBESCENS	LARGE YELLOW LADY'S-SLIPPER
	P	CYSTOPTERIS TENNESSEENSIS	TENNESSEE BLADDER FERN
	T	DESCURAINIA PINNATA	TANSY-MUSTARD
	T	DRABA CUNEIFOLIA	WEDGE-LEAF WHITLOW-GRASS
	E	ECHINODORUS ROSTRATUS	BUR-HEAD
	T	EUPATORIUM ALBUM	WHITE THOROUGHWORT
	E	EUPHORBIA PURPUREA	GLADE SPURGE
	E	GALACTIA VOLUBILIS	MILK-PEA
	P	GRATIOLA VISCIDULA	SHORT'S HEDGE-HYSSOP
	P	HEDYOTIS NIGRICANS	NARROW-LEAVED SUMMER BLUETS
	P	HELIANTHUS OCCIDENTALIS	WESTERN SUNFLOWER
	P	JUGLANS CINEREA	BUTTERNUT
	E	JUNCUS DIFFUSISSIMUS	DIFFUSE RUSH
	T	JUNCUS INTERIOR	INLAND RUSH
	T	JUNCUS SECUNDUS	ONE-SIDED RUSH
	T	LEAVENWORTHIA UNIFLORA	MICHAUX'S LEAVENWORTHIA
	T	LECHEA MINOR	THYME-LEAF PINWEED
	T	LIATRIS CYLINDRACEA	SLENDER BLAZING-STAR
	P	LILIUM SUPERBUM	TURK'S-CAP LILY
	P	LINUM SULCATUM	GROOVED FLAX
	P	LONICERA RETICULATA	GRAPE HONEYSUCKLE
	P	MALAXIS UNIFOLIA	GREEN ADDER'S-MOUTH
	P	MATELEA OBLIQUA	ANGLE-POD
	E	MELICA NITENS	THREE-FLOWERED MELIC

FEDERAL STATUS	OHIO STATUS	SCIENTIFIC NAME	COMMON NAME
	P	ONOSMODIUM HISPIDISSIMUM	FALSE GROMWELL
	P	OPUNTIA HUMIFUSA	PRICKLY PEAR
	P	ORBEXILUM PEDUNCULATUM	FALSE SCURF-PEA
	P	PANICUM LAXIFLORUM	PALE GREEN PANIC-GRASS
	E	PANICUM VERRUCOSUM	WARTY PANIC-GRASS
	P	PHACELIA BIPINNATIFIDA	FERN-LEAF SCORPION-WEED
	P	PHASEOLUS POLYSTACHIOS	WILD KIDNEY BEAN
	E	PHYLLANTHUS CAROLINIENSIS	CAROLINA LEAF-FLOWER
	T	POLYGALA INCARNATA	PINK MILKWORT
	P	QUERCUS MARILANDICA	BLACKJACK OAK
	P	RHEXIA VIRGINICA	VIRGINIA MEADOW-BEAUTY
	E	RHODODENDRON CALENDULACEUM	FLAME AZALEA
	P	RHODODENDRON NUDIFLORUM VAR. ROSEUM	NORTHERN ROSE AZALEA
	P	SAGITTARIA AUSTRALIS	LONG-BEAKED ARROWHEAD
	P	SCIRPUS PURSHIANUS	PURSH'S BULRUSH
	P	SCLERIA TRIGLOMERATA	TALL NUT-RUSH
	P	SCUTELLARIA INTEGRIFOLIA	HYSSOP SKULLCAP
	E	SILENE CAROLINIANA VAR. WHERRYI	WHERRY'S CATCHFLY
	P	SILENE ROTUNDIFOLIA	ROUND-LEAVED CATCHFLY
	P	SPARGANIUM ANDROCLADUM	KEELED BUR-REED
	P	SPIRANTHES LUCIDA	SHINING LADIES'-TRESSES
	P	SPIRANTHES OVALIS	LESSER LADIES'-TRESSES
	T	STENANTHIUM GRAMINEUM	FEATHER-BELLS
	P	SULLIVANTIA SULLIVANTII	SULLIVANTIA
	E	TRICHOSTEMA DICHOTOMUM VAR. LINEARE	NARROW-LEAVED BLUECURLS
	E	TRIFOLIUM REFLEXUM	BUFFALO CLOVER
	P	VERBESINA HELIANTHOIDES	HAIRY WING-STEM
	E	VERBESINA OCCIDENTALIS	YELLOW CROWNBEARD

92 Records Processed

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DATA REQUEST

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF NATURAL AREAS AND PRESERVES
HERITAGE DATA SERVICES
1889 FOUNTAIN SQUARE COURT, BUILDING F-1
COLUMBUS, OHIO 43224
PHONE: 614-265-6453; FAX: 614-267-3096

INSTRUCTIONS:
Please fill out both sides of this data request form, sign it and return it to the address or fax number listed above along with: **(1)** a letter formally requesting data and describing your project, and **(2)** a map detailing the boundaries of your study area. A photocopy from the pertinent portion of a USGS 7.5 minute topographic map is preferred but other maps are acceptable. Our turnaround time is two weeks, although we can often respond more quickly.

FEES:
Fees are determined by the amount of time it takes to complete your project. The charge is $25.00 per ½ hour with a ½ hour minimum. We can perform a data search manually or by computer. The Heritage Data Services staff will determine the most cost-efficient method of doing your search. A cost estimate can be provided upon request. Unless otherwise specified, an invoice will accompany the data services response.

****

This request is being submitted by: ☐ fax ☐ mail ☐ both

Date: _____

Your
Agency/Organization: _____

Your Name/Title: _____

Address: _____

City/State/Zip: _____

Phone/Fax: _____

Project Name/Number: _____

Project is located on the following USGS 7.5 minute topographic map(s): _____

_____

If there is a program or contracting agency requiring this information, please give the name and phone number of a contact person:

_____

DNR 5203
REV 9/97

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

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Ecological Services
6950 Americana Parkway, Suite H
Reynoldsburg, Ohio 43068-4132

March 12, 1999

James L. Elmore, Ph.D.
Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831

Dear Dr. Elmore:

This responds to your request for information about federally listed endangered and threatened species that could be affected by the transfer of Uranium containing materials from the Fernald Environmental Management Project (FEMP) to the Portsmouth Gaseous Diffusion Plant (PORTS), both facilities being located in Ohio. Our comments apply only to the PORTS site in Pike County, Ohio, and do not apply to to FEMP or the route of transfer.

ENDANGERED SPECIES COMMENTS: The project lies within the range of the Indiana bat, a federally listed endangered species. Due to the project type, size, and location, the proposed project will have no effect on this species. This precludes the need for further action on this project under the 1973 Endangered Species Act, as amended. Should the project be modified or new information become available that indicates listed or proposed species may be affected, consultation should be initiated with this office.

Two divisions of the Ohio Department of Natural Resources, the Division of Wildlife (614-265-6300) and the Division of Natural Areas and Preserves (614-265-6472), maintain lists of plants and animals of concern to the State of Ohio. If you have not already done so, you may wish to contact each of these agencies to obtain site-specific information on species of state concern.

If you have questions or we may be of further assistance in this matter, please contact Mr. Bill Kurey of this office at 614-469-6923 ext. 14.

Sincerely,

Kent E. Kroonemeyer

Kent E. Kroonemeyer
Supervisor

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cc: J. Marshall, ODOW

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

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March 26, 1999

Dr. James L. Elmore
U.S. Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831

Dear Dr. Elmore:

Thank you for your letter and enclosures of March 4, 1999, regarding the preparation of an Environmental Assessment (EA) for the Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project Site. Proposed storage locations include the Paducah Gaseous Diffusion Plant in McCracken County, Kentucky, and two sites on the Oak Ridge Reservation in Anderson and Roane Counties, Tennessee. U.S. Fish and Wildlife Service (Service) personnel have reviewed the information submitted and offer the following comments for consideration.

According to our records, the following federally listed endangered species are known to occur near the potential project impact areas:

Paducah Gaseous Diffusion Plant
Indiana bat (*Myotis sodalis*)
Orange-foot pimpleback pearlymussel (*Plethobasus cooperianus*)

Oak Ridge Reservation
Gray bat (*Myotis griesescens*)
Pink mucket pearlymussel (*Lampsilis abrupta*)

Qualified biologists should assess potential impacts and determine if the proposed project may affect the species. We recommend that you submit a copy of your assessment and finding to this office for review and concurrence. A finding of "may affect" could require the initiation of formal consultation procedures.

These constitute the comments of the U.S. Department of the Interior in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.). We appreciate the opportunity to comment. Should you have any questions or need further assistance, please contact Steve Alexander of my staff at 931/528-6481, ext. 210.

Sincerely,

Lee A. Barclay, Ph.D.
Field Supervisor

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DONALD S. DOTT, JR.
DIRECTOR

PAUL E. PATTON
GOVERNOR

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COMMONWEALTH OF KENTUCKY
KENTUCKY STATE NATURE PRESERVES COMMISSION
801 SCHENKEL LANE
FRANKFORT, KENTUCKY 40601-1403
(502) 573-2886 VOICE
(502) 573-2355 FAX

March 17, 1999

James L. Elmore, Ph.D.
Department of Energy
P.O. Box 2001
Oak Ridge, TN 37831

Data Request 99-145

Dear Mr. Elmore:

This letter is in response to your data request of 10 March 1999 for the Paducah Gaseous Diffusion Plant project. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Kentucky State Nature Preserves Commission occur in the area specified on the Heath, Ky. and Joppa, Ill.-Ky. USGS 7.5 minute series topographic quadrangles. Based on our most current information, we have determined that twelve occurrences of the plants or animals and no occurrences of the exemplary natural communities that are monitored by KSNPC are reported as occurring in the specified area. A data report is attached to this response.

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed, and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

If you have any questions or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Amy Covert

Amy Covert
Acting Data Manager

BDF/ALC

Enclosures: Data Interpretation Key
Endangered, Threatened, and Special Concern Plants and Animals of Kentucky
Plants and Animals Presumed Extinct or Extirpated from Kentucky
Monitored Natural Communities of Kentucky

Data Key for Element and Occurrence Reports (v. 3.98)
Kentucky State Nature Preserves Commission
Natural Heritage Program Data Services

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Many of the data fields on the enclosed report are easily understood. Other fields, however, use abbreviations and formats that are not always self-explanatory. A key to these fields follows. Your report may contain some or all of the following data fields.

BEARING: Bearing in degrees from a center point to an occurrence's latitude and longitude. This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U, and Q precision occurrence records.

BESTSOURCE: Best available reference to the occurrence: literature citation, collector, collection number, museum or herbarium code, etc.

COMMENTS: Additional information about the occurrence including identification, taxonomy, or date of occurrence.

DIRECTIONS: Directions to an occurrence. This field is masked for sensitive occurrences; contact KSNPC in these cases.

DISTANCE: Distance from a center point to an occurrence's latitude and longitude. Units coded as M (miles), K (kilometers), and F (feet). This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U, and Q precision occurrence records.

ELCODE: Element (species) code.

EOCODE: Element (species) code, occurrence number (last three digits), and state.

EODATA: Occurrence population data: date of observation, number of individuals, health, size of colony, flowering data, etc.

EORANK: Judgement of occurrence quality: A = excellent, B = good, C = marginal, D = poor, E = verified extant but quality not judged, O = obscure (not found at reported site but more searching needed), H = historically known from site but no known observation or collection since 1975, X = extirpated from site.

FIRSTOBS: Year of first known observation or collection.

GENDESC: Description of an occurrence's habitat.

GRANK: Estimate of element abundance on a global scale: G1 = extremely rare, G2 = rare, G3 = uncommon, G4 = common, G5 = very common, GH = historically known and expected to be rediscovered, GU = uncertain, GX = extinct. Subspecies and variety abundances are coded with a 'T' suffix; the 'G' portion of the rank then refers to the entire species.

HABITAT: General description of the element's habitat across its range.

IDENT: Whether the identification has been checked by a reliable individual and is believed to be correctly identified: Y = identification confirmed and believed correct, N = No, identification determined to be wrong despite reports to the contrary, ? = Whether identification is correct or not is confusing or disputed, blank or U = unknown whether identification correct or not, assumed correct.

KSNPC: Kentucky State Nature Preserves Commission status: N or blank = none, E = endangered, T = threatened, S = special concern, H = historic, X = extirpated.

LASTOBS: Year(-month-date) of most recent known observation or collection.

LAT: Latitude. This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U and Q precision occurrences.

LONG: Longitude. This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U and Q precision occurrences.

MAP NUMBER: Number used to location the element on KSNPC Heritage maps.

MARGNUM: See MAP NUMBER.

PREC: See PRECISION.

PRECISION: Precision of the latitude, longitude, directions, and plotted location: S = location accurate to within three seconds of latitude-longitude, M = location accurate to within

one minute of latitude-longitude, G = location plotted according to general locality information and accurate to one USGS 7.5 minute quadrangle, Q = element known from the quadrangle but site-specific locations are not recorded by KSNPC because the species may be relatively frequent on the quadrangle or is known to frequently move, U or blank = accuracy of location unknown or not specified.

The accuracy of an occurrence's location is designated by the precision code assigned to the record. Only 'S' precision occurrence records are reliably mapped at or near their precise locations. While an attempt is made to map 'M' precision occurrences as accurately as possible, the plotted locations, lat, long, directions, bearing, and distance data fields may or may not be correct. 'G' and 'Q' precision occurrence locations are very unreliable and only should be used to indicate the possibility that the species is in the area.

SPROT: See KSNPC.

SRANK: Estimate of element abundance in Kentucky: S1 = extremely rare, S2 = rare, S3 = uncommon, S4 = many occurrences, S5 = very common, SA = accidental in state, SE = exotic, SH = historically known in state, SN = migratory or nonbreeding, SR = reported but without persuasive documentation, SRF = reported falsely in literature, SU = uncertain, SX = extirpated.

USESA: U.S. Fish and Wildlife Service status: N or blank = none, C1 = category 1 status review, C2 = category 2 status review, 3A = considered to be extinct, 3B = not considered a species under the Endangered Species Act, 3C = considered to be more abundant than previously thought, LT = listed as threatened, LE = listed as endangered, PT = proposed as threatened, PE = proposed as endangered.

WATERBODY: Name of the the EPA Waterbody in which the occurrence is plotted. Codes used are: D--downstream, M--mainstem, T--tributary.

WATERSHED: See WATERBODY.

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky

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Kentucky State Nature Preserves Commission
July, 1997

	STATUS KSNPC	US
NONVASCULAR PLANTS		
Sphagnum quinquefarium A sphagnum moss	E	
Tortula norvegica Tortula	E	
VASCULAR PLANTS		
Acer spicatum Mountain maple	E	
Aconitum uncinatum Blue monkshood	T	
Adiantum capillus-veneris Southern maidenhair-fern	T	
Adlumia fungosa Climbing fumitory	E	
Aesculus pavia Red buckeye	T	
Agalinis obtusifolia Ten-lobe false foxglove	E	
Agalinis skinneriana Pale false foxglove	E	
Ageratina luciae-brauniae Lucy Braun's white snakeroot	S	
Agrimonia gryposepala Tall hairy groovebur	T	
Amianthium muscitoxicum Fly-poison	T	
Amsonia tabernaemontana var. *gattingeri* Eastern blue-star	T	
Anemone canadensis Canada anemone	H	
Angelica triquinata Filmy angelica	E	
Apios priceana Price's potato-bean	E	LT
Arabis missouriensis Missouri rock cress	E	
Arabis perstellata Braun's rock cress	T	LE
Aristida ramosissima Branched three-awn grass	H	
Armoracia lacustris Lake cress	T	
Aster concolor Eastern silvery aster	T	
Aster drummondii var. *texanus* Texas aster	T	
Aster hemisphericus Tennessee aster	E	
Aster phyllolepis Western silky aster	S	
Aster pilosus var. *priceae* White heath aster	T	
Aster saxicastellii Rockcastle aster	T	
Aureolaria patula Spreading false foxglove	S	
Baptisia australis var. *minor* Blue wild indigo	S	
Baptisia bracteata var. *leucophaea* Cream wild indigo	S	
Baptisia tinctoria Yellow wild indigo	T	
Bartonia virginica Yellow screwstem	T	
Berberis canadensis American barberry	E	
Berchemia scandens Supplejack	T	
Botrychium matricariifolium Matricary grapefern	E	
Botrychium oneidense Blunt-lobe grapefern	E	
Boykinia aconitifolia Brook saxifrage	T	
Cabomba caroliniana Carolina fanwort	T	
Calamagrostis canadensis var. *macouniana* Blue-joint reed grass	E	
Calamagrostis porteri ssp. *insperata* Reed bent grass	E	

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	STATUS KSNPC	STATUS US
Calamagrostis porteri ssp. *porteri* Porter's reed grass	T	
Callirhoe alcaeoides Clustered poppy-mallow	H	
Calopogon tuberosus Grass-pink	E	
Calycanthus floridus var. *glaucus* Sweetshrub	T	
Calylophus serrulatus Yellow evening primrose	H	
Carex aestivalis Summer sedge	E	
Carex alata Broadwing sedge	T	
Carex atlantica ssp. *capillacea* Prickly bog sedge	E	
Carex austrocaroliniana Tarheel sedge	S	
Carex buxbaumii Brown bog sedge	E	
Carex comosa Bristly sedge	H	
Carex crawei Crawe's sedge	S	
Carex crebriflora Coastal plain sedge	T	
Carex decomposita Epiphytic sedge	T	
Carex gigantea Large sedge	T	
Carex hystericina Porcupine sedge	H	
Carex joorii Cypress-swamp sedge	E	
Carex juniperorum Cedar sedge	E	
Carex lanuginosa Woolly sedge	E	
Carex leptonervia Finely-nerved sedge	E	
Carya aquatica Water hickory	T	
Castanea dentata American chestnut	E	
Castanea pumila Allegheny chinkapin	T	
Castilleja coccinea Scarlet Indian paintbrush	E	
Ceanothus herbaceus Prairie redroot	T	
Cheilanthes alabamensis Alabama lip fern	E	
Cheilanthes feei Fee's lip fern	E	
Chelone obliqua var. *obliqua* Red turtlehead	E	
Chelone obliqua var. *speciosa* Rose turtlehead	S	
Chrysogonum virginianum Green-and-gold	E	
Chrysosplenium americanum American golden-saxifrage	E	
Cimicifuga rubifolia Appalachian bugbane	T	
Circaea alpina Small enchanter's-nightshade	S	
Clematis crispa Blue jasmine leather-flower	T	
Coeloglossum viride var. *virescens* Long-bract green orchis	H	
Collinsonia verticillata Whorled horse-balm	E	
Comptonia peregrina Sweet-fern	E	
Conradina verticillata Cumberland-rosemary	E	LT
Convallaria montana American lily-of-the-valley	E	
Corallorrhiza maculata Spotted coralroot	E	
Coreopsis pubescens Star tickseed	S	
Crataegus engelmannii Engelmann's hawthorn	H	
Cymophyllus fraserianus Fraser's sedge	E	
Cyperus plukenetii Plukenet's cyperus	H	
Cypripedium candidum Small white lady's-slipper	E	
Cypripedium kentuckiense Kentucky lady's-slipper	S	

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

	STATUS KSNPC	US
Cypripedium parviflorum Small yellow lady's-slipper	T	
Cypripedium reginae Showy lady's-slipper	H	
Delphinium carolinianum Carolina larkspur	T	
Deschampsia cespitosa ssp. *glauca* Tufted hair grass	E	
Deschampsia flexuosa Crinkled hair grass	T	
Dichanthelium boreale Northern witch grass	S	
Didiplis diandra Water-purslane	S	
Dodecatheon frenchii French's shooting-star	S	
Draba cuneifolia Wedge-leaf whitlow-grass	E	
Drosera brevifolia Dwarf sundew	E	
Drosera intermedia Spoon-leaved sundew	H	
Dryopteris carthusiana Spinulose wood fern	S	
Dryopteris ludoviciana Southern shield wood fern	H	
Echinodorus berteroi Burhead	T	
Echinodorus parvulus Dwarf burhead	E	
Eleocharis olivacea Olivaceous sedge	S	
Elodea nuttallii Waterweed	T	
Elymus svensonii Svenson's wild rye	S	
Eriophorum virginicum Tawny cotton-grass	E	
Eryngium integrifolium Blue-flower coyote-thistle	E	
Erythronium rostratum Golden-star	S	
Eupatorium maculatum Spotted joe-pye-weed	H	
Eupatorium semiserratum Small-flowered thoroughwort	E	
Eupatorium steelei Steele's joe-pye-weed	E	
Euphorbia mercurialina Mercury spurge	T	
Fimbristylis puberula Hairy fimbristylis	T	
Forestiera ligustrina Upland privet	S	
Gentiana decora Showy gentian	S	
Gentiana flavida Yellow gentian	E	
Gentiana puberulenta Prairie gentian	E	
Glandularia canadensis Rose verbena	T	
Glyceria acutiflora Sharp-scaled manna grass	T	
Gnaphalium helleri var. *micradenium* Small rabbit-tobacco	H	
Gratiola pilosa Shaggy hedge-hyssop	T	
Gratiola viscidula Short's hedge-hyssop	S	
Gymnopogon ambiguus Bearded skeleton grass	S	
Gymnopogon brevifolius Shortleaf skeleton grass	E	
Halesia tetraptera Common silverbell	T	
Hedeoma hispidum Rough pennyroyal	T	
Helianthemum bicknellii Plains frostweed	T	
Helianthemum canadense Canada frostweed	E	
Helianthus eggertii Eggert's sunflower	T	PT
Helianthus silphioides Silphium sunflower	E	
Heracleum lanatum Cow-parsnip	E	
Heteranthera dubia Grassleaf mud-plantain	S	
Heteranthera limosa Blue mud-plantain	S	

	STATUS KSNPC	US
Heterotheca subaxillaris var. *latifolia* Broad-leaf golden-aster	T	
Hexastylis contracta Southern heartleaf	E	
Hexastylis heterophylla Variable-leaved heartleaf	S	
Hieracium longipilum Hairy hawkweed	T	
Houstonia serpyllifolia Michaux's bluets	E	
Hydrocotyle americana American water-pennywort	E	
Hydrolea ovata Ovate fiddleleaf	E	
Hydrophyllum virginianum Virginia waterleaf	S	
Hypericum adpressum Creeping St. John's-wort	H	
Hypericum crux-andreae St. Peter's-wort	T	
Hypericum nudiflorum Pretty St. John's-wort	H	
Hypericum pseudomaculatum Large spotted St. John's-wort	H	
Iris fulva Copper iris	E	
Isoetes butleri Butler'squillwort	E	
Isoetes melanopoda Blackfoot quillwort	E	
Juglans cinerea White walnut	S	
Juncus articulatus Jointed rush	S	
Juncus elliottii Bog rush	E	
Juncus filipendulus Long-styled rush	T	
Juniperus communis var. *depressa* Ground juniper	T	
Koeleria macrantha June grass	E	
Lathyrus palustris Vetchling peavine	T	
Lathyrus venosus Smooth veiny peavine	S	
Leavenworthia exigua var. *laciniata* Glade cress	T	
Leavenworthia torulosa Necklace glade cress	T	
Leiophyllum buxifolium Sand-myrtle	H	
Lesquerella globosa Lesquereux's bladderpod	T	
Lesquerella lescurii Lescur's bladderpod	S	
Leucothoe recurva Fetterbush	E	
Liatris cylindracea Slender blazingstar	T	
Lilium philadelphicum Wood lily	T	
Lilium superbum Turk's cap lily	T	
Limnobium spongia American frog's-bit	T	
Liparis loeselii Loesel's twayblade	T	
Listera australis Southern twayblade	E	
Listera smallii Kidney-leaf twayblade	T	
Lobelia appendiculata var. *gattingeri* Gattinger's lobelia	E	
Lobelia nuttallii Nuttall's lobelia	T	
Lonicera dioica var. *orientalis* Wild honeysuckle	E	
Lonicera reticulata Grape honeysuckle	E	
Ludwigia hirtella Hairy ludwigia	E	
Lycopodiella appressa Southern bog club-moss	E	
Lycopodiella clavatum Running-pine	E	
Lycopodiella inundatum Northern bog club-moss	E	
Lysimachia fraseri Fraser's loosestrife	E	
Lysimachia radicans Trailing loosestrife	H	

	STATUS KSNPC	US
Lysimachia terrestris Swamp-candles	E	
Maianthemum canadense Wild lily-of-the-valley	T	
Maianthemum stellatum Starflower false solomon's-seal	E	
Malus angustifolia Southern crabapple	S	
Malvastrum hispidum Hispid false mallow	T	
Marshallia grandiflora Barbara's-buttons	E	
Matelea carolinensis Carolina anglepod	E	
Melampyrum lineare var. *latifolium* American cow-wheat	T	
Melampyrum lineare var. *pectinatum* American cow-wheat	E	
Melanthium parviflorum Small-flowered false hellebore	E	
Melanthium virginicum Virginia bunchflower	E	
Melanthium woodii False hellebore	T	
Minuartia cumberlandensis Cumberland sandwort	E	LE
Minuartia glabra Appalachian sandwort	T	
Mirabilis albida Pale umbrella-wort	E	
Monarda punctata Spotted beebalm	E	
Monotropsis odorata Sweet pinesap	T	
Muhlenbergia bushii Bush's muhly	E	
Muhlenbergia cuspidata Plains muhly	T	
Muhlenbergia glabrifloris Hair grass	S	
Myriophyllum heterophyllum Broadleaf water-milfoil	S	
Myriophyllum pinnatum Cutleaf water-milfoil	T	
Najas gracillima Thread-like naiad	S	
Nemophila aphylla Small-flower baby-blue-eyes	T	
Nestronia umbellula Conjurer's-nut	E	
Oenothera linifolia Thread-leaf sundrops	E	
Oenothera oakesiana Evening primrose	H	
Oenothera perennis Small sundrops	E	
Oenothera triloba Stemless evening-primrose	T	
Oldenlandia uniflora Clustered bluets	E	
Onosmodium molle ssp. *hispidissimum* Hairy false gromwell	E	
Onosmodium molle ssp. *molle* Soft false gromwell	E	
Onosmodium molle ssp. *occidentale* Western false gromwell	E	
Orobanche ludoviciana Louisiana broomrape	H	
Orontium aquaticum Goldenclub	T	
Oxalis priceae Price's yellow wood sorrel	H	
Parnassia asarifolia Kidney-leaf grass-of-parnassus	E	
Parnassia grandifolia Largeleaf grass-of-parnassus	E	
Paronychia argyrocoma Silverling	E	
Paspalum boscianum Bull paspalum	S	
Paxistima canbyi Canby's mountain-lover	T	
Pedicularis lanceolata Swamp lousewort	H	
Perideridia americana Eastern eulophus	T	
Phacelia ranunculacea Blue scorpion-weed	S	
Philadelphus inodorus Mock orange	T	
Philadelphus pubescens Hoary mock orange	E	

	STATUS KSNPC	US
Phlox bifida ssp. *bifida* Cleft phlox	T	
Phlox bifida ssp. *stellaria* Starry cleft phlox	T	
Plantago cordata Heartleaf plantain	H	
Platanthera cristata Yellow-crested orchid	T	
Platanthera integrilabia White fringeless orchid	T	
Platanthera psycodes Small purple-fringed orchid	E	
Poa saltuensis Drooping blue grass	E	
Podostemum ceratophyllum Threadfoot	S	
Pogonia ophioglossoides Rose pogonia	E	
Polygala cruciata Cross-leaf milkwort	E	
Polygala nuttallii Nuttall's milkwort	H	
Polygala polygama Racemed milkwort	T	
Polymnia laevigata Tennessee leafcup	E	
Pontederia cordata Pickerel-weed	T	
Potamogeton illinoensis Illinois pondweed	S	
Potamogeton pulcher Spotted pondweed	T	
Prenanthes alba White rattlesnake-root	E	
Prenanthes aspera Rough rattlesnake-root	E	
Prenanthes barbata Barbed rattlesnake-root	E	
Prenanthes crepidinea Nodding rattlesnake-root	T	
Psoralidium tenuiflorum Few-flowered scurf-pea	E	
Ptilimnium capillaceum Mock bishop's-weed	T	
Ptilimnium nuttallii Nuttall's mock bishop's-weed	E	
Pycnanthemum albescens White-leaved mountain-mint	E	
Pyrola americana American wintergreen	H	
Ranunculus ambigens Water-plantain	S	
Rhododendron canescens Hoary azalea	E	
Rhynchosia tomentosa Hairy snout-bean	E	
Rhynchospora globularis Globe beaked-rush	S	
Rhynchospora macrostachya Tall beaked-rush	E	
Rubus canadensis Smooth blackberry	E	
Rubus whartoniae Wharton's dewberry	T	
Rudbeckia subtomentosa Sweet coneflower	E	
Sabatia campanulata Slender marsh-pink	E	
Sagittaria graminea Grass-leaf arrowhead	T	
Sagittaria rigida Sessile-fruit arrowhead	E	
Salix amygdaloides Peachleaf willow	H	
Salix discolor Pussy willow	H	
Salvia urticifolia Nettle-leaf sage	E	
Sambucus racemosa ssp. *pubens* Red elderberry	E	
Sanguisorba canadensis Canada burnet	E	
Saxifraga michauxii Michaux's saxifrage	T	
Saxifraga micranthidifolia Lettuce-leaf saxifrage	E	
Saxifraga pensylvanica Swamp saxifrage	H	
Schisandra glabra Bay starvine	E	
Schizachne purpurascens Purple-oat	T	

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	STATUS KSNPC	STATUS US
Schwalbea americana Chaffseed	H	LE
Scirpus expansus Woodland beak-rush	E	
Scirpus fluviatilis River bul-rush	E	
Scirpus hallii Hall's bul-rush	E	
Scirpus heterochaetus Slender bul-rush	E	
Scirpus microcarpus Small-fruit bul-rush	E	
Scirpus verecundus Bashful bul-rush	E	
Scleria ciliata var. *ciliata* Fringed nut-rush	E	
Scleria muelenbergii Pitted nut-rush	H	
Scutellaria saxatilis Rock skullcap	T	
Sedum telephioides Allegheny stonecrop	T	
Sida hermaphrodita Virginia-mallow	S	
Silene ovata Ovate catchfly	E	
Silene regia Royal catchfly	E	
Silphium laciniatum var. *laciniatum* Compassplant	E	
Silphium laciniatum var. *robinsonii* Compassplant	T	
Solidago albopilosa White-haired goldenrod	T	LT
Solidago buckleyi Buckley's goldenrod	S	
Solidago caesia var. *curtisii* Curtis' goldenrod	T	
Solidago puberula Downy goldenrod	S	
Solidago roanensis Roan mountain goldenrod	T	
Solidago shortii Short's goldenrod	E	LE
Solidago simplex ssp. *randii* Rand's goldenrod	S	
Solidago squarrosa Squarrose goldenrod	H	
Sparganium eurycarpum Large bur-reed	E	
Sphenopholis pensylvanica Swamp wedgescale	S	
Spiraea alba Narrow-leaved meadowsweet	E	
Spiraea virginiana Virginia spiraea	T	LT
Spiranthes lucida Shining ladies'-tresses	T	
Spiranthes magnicamporum Great plains ladies'-tresses	T	
Spiranthes odorata Sweetscent ladies'-tresses	E	
Sporobolus clandestinus Rough dropseed	T	
Sporobolus heterolepis Northern dropseed	E	
Stachys eplingii Epling's hedge-nettle	E	
Stellaria fontinalis Water stichwort	T	
Stellaria longifolia Longleaf stitchwort	S	
Streptopus roseus var. *perspectus* Rosy twistedstalk	E	
Symphoricarpos albus Snowberry	E	
Talinum calcaricum Limestone fameflower	E	
Talinum teretifolium Roundleaf fameflower	T	
Taxus canadensis Canadian yew	T	
Tephrosia spicata Spiked hoary-pea	E	
Thaspium pinnatifidum Cutleaf meadow-parsnip	T	
Thermopsis mollis Soft-haired thermopsis	E	
Thuja occidentalis Northern white-cedar	T	
Torreyochloa pallida Pale manna grass	E	

	STATUS KSNPC	US
Toxicodendron vernix Poison sumac	E	
Tragia urticifolia Nettle-leaf noseburn	E	
Trepocarpus aethusae Trepocarpus	T	
Trichostema setaceum Narrow-leaved bluecurls	E	
Trientalis borealis Northern starflower	E	
Trifolium reflexum Buffalo clover	E	
Trifolium stoloniferum Running buffalo clover	T	LE
Trillium nivale Snow trillium	E	
Trillium pusillum var. *ozarkanum* Ozark least trillium	E	
Trillium pusillum var. *pusillum* Least trillium	E	
Trillium undulatum Painted trillium	T	
Triplasis purpurea Purple sand grass	H	
Ulmus serotina September elm	S	
Utricularia macrorhiza Greater bladderwort	E	
Vallisneria americana Eel-grass	S	
Vernonia noveboracensis New York ironweed	S	
Veronica americana American speedwell	H	
Viburnum molle Missouri arrow-wood	T	
Viburnum nudum Possum haw viburnum	E	
Viola septemloba var. *egglestonii* Eggleston's violet	S	
Viola walteri Walter's violet	T	
Vitis rupestris Sand grape	T	
Woodsia appalachiana Mountain woodsia	E	
Xerophyllum asphodeloides Eastern turkeybeard	H	
Xyris difformis Carolina yellow-eye-grass	E	
Zizania palustris var. *interior* Indian wild rice	H	
Zizaniopsis miliacea Southern wild rice	T	

ANIMALS

Gastropods

Anguispira rugoderma Pine Mountain disc	T	
Antroselatus spiralis Shaggy cavesnail	S	
Glyphyalinia raderi Maryland glyph	S	
Glyphyalinia rhoadsi Sculpted glyph	T	
Helicodiscus notius specus A snail	T	
Helicodiscus punctatellus Punctate coil	S	
Leptoxis praerosa Onyx rocksnail	S	
Lithasia armigera Armored rocksnail	S	
Lithasia geniculata Ornate rocksnail	S	
Lithasia salebrosa Muddy rocksnail	S	
Lithasia verrucosa Varicose rocksnail	S	
Mesodon chilhoweensis Queen crater	S	
Mesodon panselenus Virginia bladetooth	S	
Mesodon wetherbyi Clifty covert	S	
Mesomphix rugeli Wrinkled button	T	
Pilsbryna sp. 1 A snail (undescribed)	E	
Pleurocera alveare Rugged hornsnail	S	

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	STATUS KSNPC	US
Pleurocera curta Shortspire hornsnail	S	
Rabdotus dealbatus Whitewashed rabdotus	T	
Rhodacme elatior Domed ancylid	S	
Triodopsis dentifera Big-tooth whitelip	T	
Triodopsis multilineata Striped whitelip	T	
Vertigo bollesiana Delicate vertigo	E	
Vertigo clappi Cupped vertigo	E	
Vitrinizonites latissimus Glassy grapeskin	T	
Unionids (Mussels)		
Alasmidonta atropurpurea Cumberland elktoe	E	LE
Alasmidonta marginata Elktoe	T	
Anodontoides denigratus Cumberland papershell	E	
Cumberlandia monodonta Spectaclecase	E	
Cyprogenia stegaria Fanshell	E	LE
Epioblasma brevidens Cumberlandian combshell	E	LE
Epioblasma capsaeformis Oyster mussel	E	LE
Epioblasma obliquata obliquata Catspaw	E	LE
Epioblasma torulosa rangiana Northern riffleshell	E	LE
Epioblasma triquetra Snuffbox	S	
Fusconaia subrotunda subrotunda Long-solid	T	
Lampsilis abrupta Pink mucket	E	LE
Lampsilis ovata Pocketbook	E	
Lasmigona compressa Creek heelsplitter	E	
Lasmigona subviridis Green floater	E	
Lexingtonia dolabelloides Slabside pearlymussel	H	
Obovaria retusa Ring pink	E	LE
Pegias fabula Little-wing pearlymussel	E	LE
Plethobasus cooperianus Orange-foot pimpleback	E	LE
Plethobasus cyphyus Sheepnose	S	
Pleurobema clava Clubshell	E	LE
Pleurobema oviforme Tennessee clubshell	E	
Pleurobema plenum Rough pigtoe	E	LE
Pleurobema pyramidatum Pyramid pigtoe	E	
Potamilus capax Fat pocketbook	E	LE
Potamilus purpuratus Bleufer	E	
Ptychobranchus subtentum Fluted kidneyshell	T	
Quadrula cylindrica cylindrica Rabbitsfoot	T	
Simpsonaias ambigua Salamander mussel	T	
Toxolasma lividum Purple lilliput	E	
Toxolasma texasensis Texas lilliput	E	
Villosa fabalis Rayed bean	E	
Villosa lienosa Little spectaclecase	S	
Villosa ortmanni Kentucky creekshell	T	
Villosa trabalis Cumberland bean	E	LE
Villosa vanuxemensis Mountain creekshell	T	

	STATUS KSNPC	STATUS US
Crustaceans		
Barbicambarus cornutus Bottlebrush crayfish	S	
Bryocamptus morrisoni elegans A copepod	T	
Caecidotea barri Clifton Cave isopod	E	
Cambarellus puer A dwarf crayfish	E	
Cambarellus shufeldtii Cajun dwarf crayfish	S	
Cambarus parvoculus A crayfish	E	
Cambarus veteranus A crayfish	S	
Gammarus bousfieldi Bousfield's amphipod	E	
Macrobrachium ohione Ohio shrimp	E	
Orconectes australis A crayfish	T	
Orconectes bisectus Crittenden crayfish	T	
Orconectes inermis A crayfish	S	
Orconectes jeffersoni Louisville crayfish	E	
Orconectes lancifer A crayfish	E	
Orconectes palmeri A crayfish	E	
Orconectes pellucidus A crayfish	S	
Palaemonias ganteri Mammoth Cave shrimp	E	LE
Procambarus viaeviridis A crayfish	T	
Stygobromus vitreus An amphipod	S	
Insects		
Celithemis verna Double-ringed pennant	S	
Cheumatopsyche helma Helma's net-spinning caddisfly	H	
Dryobius sexnotatus Sixbanded longhorn beetle	T	
Litobrancha recurvata A burrowing mayfly	S	
Lordithon niger Black lordithon rove beetle	H	
Lytrosis permagnaria A geometrid moth	E	
Manophylax butleri A limnephilid caddisfly	S	
Nicrophorus americanus American burying beetle	T	LE
Ophiogomphus howei Pygmy snaketail	S	
Papaipema eryngii Rattlesnake-master borer moth	E	
Phyciodes batesii Tawny crescent	T	
Pseudanophthalmus abditus Concealed cave beetle	T	
Pseudanophthalmus audax Bold cave beetle	T	
Pseudanophthalmus caecus Clifton Cave beetle	T	
Pseudanophthalmus calcareus Limestone Cave beetle	T	
Pseudanophthalmus catoryctos Lesser Adams Cave beetle	E	
Pseudanophthalmus conditus Hidden cave beetle	T	
Pseudanophthalmus exoticus Exotic cave beetle	H	
Pseudanophthalmus frigidus Icebox Cave beetle	T	
Pseudanophthalmus globiceps Round-headed cave beetle	T	
Pseudanophthalmus horni Garman's cave beetle	S	
Pseudanophthalmus hypolithos Ashcamp cave beetle	T	
Pseudanophthalmus inexpectatus Suprising cave beetle	T	
Pseudanophthalmus major Beaver Cave beetle	T	
Pseudanophthalmus parvus Tatum Cave beetle	T	

Endangered, Threatened, Special Concern, and Historic Plants and Animals of Kentucky (July, 1997)

	STATUS KSNPC	US
Pseudanophthalmus pholeter Greater Adams Cave beetle	E	
Pseudanophthalmus pubescens intrepidus A cave beetle	T	
Pseudanophthalmus puteanus Old Well Cave beetle	T	
Pseudanophthalmus rogersae Rogers' cave beetle	T	
Pseudanophthalmus scholasticus Scholarly Cave beetle	T	
Pseudanophthalmus simulans Cub Run Cave beetle	T	
Pseudanophthalmus tenebrosus Stevens Creek Cave beetle	T	
Pseudanophthalmus troglodytes Louisville cave beetle	T	
Pyrgus wyandot Appalachian grizzled skipper	T	
Speyeria idalia Regal fritillary	H	
Stenonema bednariki A heptageniid mayfly	S	
Stylurus notatus Elusive clubtail	H	
Fishes		
Acipenser fulvescens Lake sturgeon	E	
Alosa alabamae Alabama shad	E	
Amblyopsis spelaea Northern cavefish	S	
Ammocrypta clara Western sand darter	E	
Ammocrypta pellucida Eastern sand darter	S	
Atractosteus spatula Alligator gar	E	
Clinostomus funduloides Rosyside dace	S	
Cyprinella camura Bluntface shiner	S	
Cyprinella venusta Blacktail shiner	S	
Erimystax insignis Blotched chub	E	
Erimyzon sucetta Lake chubsucker	T	
Esox niger Chain pickerel	S	
Etheostoma chienense Relict darter	E	LE
Etheostoma cinereum Ashy darter	S	
Etheostoma fusiforme Swamp darter	E	
Etheostoma lynceum Brighteye darter	S	
Etheostoma maculatum Spotted darter	T	
Etheostoma microlepidum Smallscale darter	E	
Etheostoma nigrum susanae Johnny darter	T	
Etheostoma parvipinne Goldstripe darter	S	
Etheostoma percnurum Duskytail darter	E	LE
Etheostoma proeliare Cypress darter	T	
Etheostoma pyrrhogaster Firebelly darter	S	
Etheostoma sagitta spilotum Arrow darter	S	
Etheostoma swaini Gulf darter	S	
Fundulus chrysotus Golden topminnow	E	
Fundulus dispar Starhead topminnow	E	
Hybognathus hayi Cypress minnow	E	
Hybognathus placitus Plains minnow	S	
Hybopsis amnis Pallid shiner	H	
Ichthyomyzon castaneus Chestnut lamprey	S	
Ichthyomyzon fossor Northern brook lamprey	T	

	STATUS KSNPC	US
Ichthyomyzon gagei Southern brook lamprey	H	
Ichthyomyzon greeleyi Mountain brook lamprey	T	
Ictiobus niger Black buffalo	S	
Lampetra appendix American brook lamprey	T	
Lepomis marginatus Dollar sunfish	E	
Lepomis miniatus Redspotted sunfish	T	
Lota lota Burbot	S	
Macrhybopsis gelida Sturgeon chub	H	C
Macrhybopsis meeki Sicklefin chub	H	C
Menidia beryllina Inland silverside	T	
Moxostoma poecilurum Blacktail redhorse	S	
Nocomis biguttatus Hornyhead chub	S	
Notropis albizonatus Palezone shiner	E	LE
Notropis hudsonius Spottail shiner	S	
Notropis maculatus Taillight shiner	T	
Notropis sp. Sawfin shiner (undescribed)	E	
Noturus exilis Slender madtom	E	
Noturus hildebrandi Least madtom	S	
Noturus phaeus Brown madtom	S	
Noturus stigmosus Northern madtom	S	
Percina macrocephala Longhead darter	T	
Percina squamata Olive darter	E	
Percopsis omiscomaycus Trout-perch	S	
Phenacobius uranops Stargazing minnow	S	
Phoxinus cumberlandensis Blackside dace	T	LT
Platygobio gracilis Flathead chub	S	
Rhinichthys cataractae Longnose dace	E	
Scaphirhynchus albus Pallid sturgeon	E	LE
Thoburnia atripinnis Blackfin sucker	S	
Typhlichthys subterraneus Southern cavefish	S	
Umbra limi Central mudminnow	T	

Amphibians

Amphiuma tridactylum Three-toed Amphiuma	E	
Eurycea longicauda guttolineata Three-lined Salamander	T	
Hyla avivoca Bird-voiced Treefrog	T	
Hyla cinerea Green Treefrog	S	
Hyla gratiosa Barking Treefrog	S	
Hyla versicolor Gray Treefrog	S	
Plethodon cinereus Redback Salamander	S	
Plethodon wehrlei Wehrle's Salamander	E	
Rana areolata circulosa Northern Crawfish Frog	S	
Rana pipiens Northern Leopard Frog	S	

Reptiles

Apalone mutica mutica Midland Smooth Softshell	S	
Chrysemys picta dorsalis Southern Painted Turtle	S	

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	STATUS KSNPC	US
Clonophis kirtlandii Kirtland's Snake	E	
Elaphe guttata guttata Corn Snake	S	
Eumeces anthracinus anthracinus Northern Coal Skink	T	
Eumeces anthracinus pluvialis Southern Coal Skink	E	
Eumeces inexpectatus Southeastern Five-lined Skink	S	
Farancia abacura reinwardtii Western Mud Snake	S	
Lampropeltis triangulum elapsoides Scarlet Kingsnake	S	
Macroclemys temminckii Alligator Snapping Turtle	T	
Nerodia cyclopion Mississippi Green Water Snake	E	
Nerodia erythrogaster neglecta Copperbelly Water Snake	S	PT
Nerodia fasciata confluens Broad-banded Water Snake	E	
Ophisaurus attenuatus longicaudus Eastern Slender Glass Lizard	T	
Pituophis melanoleucus melanoleucus Northern Pine Snake	T	
Sistrurus miliarius streckeri Western Pigmy Rattlesnake	T	
Thamnophis proximus proximus Western Ribbon Snake	T	
Thamnophis sauritus sauritus Eastern Ribbon Snake	S	

Birds

Accipiter striatus Sharp-shinned Hawk	S	
Actitis macularia Spotted Sandpiper	E	
Aimophila aestivalis Bachman's Sparrow	E	
Ammodramus henslowii Henslow's Sparrow	S	
Anas discors Blue-winged Teal	E	
Ardea alba Great Egret	E	
Ardea herodias Great Blue Heron	S	
Asio flammeus Short-eared Owl	E	
Asio otus Long-eared Owl	E	
Bartramia longicauda Upland Sandpiper	H	
Botaurus lentiginosus American Bittern	H	
Bubulcus ibis Cattle Egret	S	
Certhia americana Brown Creeper	E	
Chondestes grammacus Lark Sparrow	T	
Circus cyaneus Northern Harrier	T	
Cistothorus platensis Sedge Wren	S	
Corvus corax Common Raven	E	
Corvus ossifragus Fish Crow	S	
Dendroica fusca Blackburnian Warbler	T	
Dolichonyx oryzivorus Bobolink	S	
Egretta caerulea Little Blue Heron	E	
Empidonax minimus Least Flycatcher	E	
Fulica americana American Coot	H	
Gallinula chloropus Common Moorhen	T	
Haliaeetus leucocephalus Bald Eagle	E	LE
Ictinia mississippiensis Mississippi Kite	S	
Ixobrychus exilis Least Bittern	T	
Junco hyemalis Dark-eyed Junco	S	
Lophodytes cucullatus Hooded Merganser	T	

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	STATUS KSNPC	US
Nyctanassa violacea Yellow-crowned Night-Heron	T	
Nycticorax nycticorax Black-crowned Night-Heron	T	
Pandion haliaetus Osprey	T	
Passerculus sandwichensis Savannah Sparrow	S	
Phalacrocorax auritus Double-crested Cormorant	H	
Pheucticus ludovicianus Rose-breasted Grosbeak	S	
Picoides borealis Red-cockaded Woodpecker	E	LE
Podilymbus podiceps Pied-billed Grebe	E	
Pooecetes gramineus Vesper Sparrow	E	
Rallus elegans King Rail	E	
Riparia riparia Bank Swallow	S	
Sterna antillarum athalassos Interior Least Tern	E	LE
Thryomanes bewickii Bewick's Wren	S	
Tyto alba Barn Owl	S	
Vermivora chrysoptera Golden-winged Warbler	T	
Vireo bellii Bell's Vireo	S	
Wilsonia canadensis Canada Warbler	S	

	STATUS KSNPC	US
Mammals		
Clethrionomys gapperi maurus Kentucky Red-backed Vole	S	
Corynorhinus rafinesquii Rafinesque's Big-eared Bat	T	
Corynorhinus townsendii virginianus Virginia Big-eared Bat	E	LE
Mustela nivalis Least Weasel	S	
Myotis austroriparius Southeastern Myotis	E	
Myotis grisescens Gray Myotis	E	LE
Myotis leibii Eastern Small-footed Myotis	E	
Myotis sodalis Indiana Myotis	E	LE
Nycticeius humeralis Evening Bat	T	
Peromyscus gossypinus Cotton Mouse	T	
Sorex cinereus Masked Shrew	S	
Sorex dispar blitchi Long-tailed Shrew	E	
Spilogale putorius Eastern Spotted Skunk	S	
Ursus americanus Black Bear	S	

Key to Status Categories

(KSNPC) Kentucky State Nature Preserves Commission

E: Endangered. A taxon in danger of extirpation and/or extinction throughout all or a significant part of its range in Kentucky.

T: Threatened. A taxon likely to become endangered within the foreseeable future throughout all or a significant part of its rang in Kentucky.

S: Special Concern. A taxon that should be monitored because (a) it exists in a limited geographic area, (b) it may become threatened or endangered due to modification or destruction of habitat, (c) certain characteristics or requirements make it especially vulnerable to specific pressures, (d) experienced researchers have identified other factors that may jeopardize it, or (e) it is thought to be rare or declining but insufficient information exists for assignment to the threatened or endangered status categories.

H: Historic. A taxon documented from Kentucky but not observed reliably since 1975.

(US) Endangered Species Act of 1973

For status category definitions see:

United States Fish and Wildlife Service. 1992. Endangered Species Act of 1973 as amended through the 100th Congress. United States Government Printing Office, Washington, District of Columbia;

United States Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants; review of plant taxa for listing as endangered or threatened species. Federal Register 58:51144-51190; and

United States Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates for listing as endangered or threatened species. Federal Register 61:7596-7613.

US statuses were taken from:

United States Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants. United States Government Printing Office, Washington, District of Columbia;

United States Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates for listing as endangered or threatened species. Federal Register 61:7596-7613; and

United States Fish and Wildlife Service. 1997. Endangered and threatened wildlife and plants; determination of endangered status for the Cumberland elktoe, Oyster mussel, Cumberlandian combshell, Purple bean, and Rough rabbitsfoot. Federal Register 62:1647-1658.

LE: Listed Endangered
LT: Listed Threatened
PT: Proposed Threatened
C: Candidate

Kentucky State Nature Preserves Commission
801 Schenkel Lane
Frankfort, KY 40601-1403
(502) 573-2886 phone
(502) 573-2355 fax

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2178

Plants and Animals Presumed Extinct or Extirpated from Kentucky

Kentucky State Nature Preserves Commission
July, 1997

	US STATUS
PLANTS	
Caltha palustris var. *palustris* Marsh Marigold	
Orbexilum stipulatum Stipuled Scurf-pea	3A
Physostegia intermedia Slender Dragon-head	
Polytaenia nuttallii Prairie Parsley	
ANIMALS	
Unionids (Mussels)	
Dromus dromas Dromedary pearlymussel	LE
Epioblasma arcaeformis Sugarspoon	3A
Epioblasma biemarginata Angled riffleshell	3A
Epioblasma flexuosa Leafshell	3A
Epioblasma florentina florentina Yellow blossom	LE
Epioblasma florentina walkeri Tan riffleshell	LE
Epioblasma haysiana Acornshell	3A
Epioblasma lewisii Forkshell	3A
Epioblasma obliquata perobliqua White catspaw	LE
Epioblasma personata Round combshell	3A
Epioblasma propinqua Tennessee riffleshell	3A
Epioblasma sampsonii Wabash riffleshell	
Epioblasma stewardsoni Cumberland leafshell	3A
Epioblasma torulosa torulosa Tubercled blossom	LE
Hemistena lata Cracking pearlymussel	LE
Leptodea leptodon Scaleshell	
Plethobasus cicatricosus White wartyback	LE
Quadrula fragosa Winged mapleleaf	LE
Quadrula tuberosa Rough rockshell	
Insects	
Pentagenia robusta Robust pentagenian burrowing mayfly	3A
Fishes	
Ammocrypta vivax Scaly sand darter	
Crystallaria asprella Crystal darter	
Erimystax x-punctatus Gravel chub	
Etheostoma microperca Least darter	
Hemitremia flammea Flame chub	
Moxostoma lacerum Harelip sucker	
Moxostoma valenciennesi Greater redhorse	
Percina burtoni Blotchside logperch	
Reptiles	
Masticophis flagellum flagellum Eastern Coachwhip	
Birds (* extirpated as nesting species)	
Anhinga anhinga Anhinga	
Campephilus principalis Ivory-billed Woodpecker	LE

Plants and Animals Presumed Extinct or Extirpated from Kentucky (July, 1997)

	US STATUS		US STATUS
Chlidonias niger *		**Mammals**	
Black Tern			
Conuropsis carolinensis		*Bos bison*	
Carolina Parakeet		American Bison	
Ectopistes migratorius		*Canis lupus*	LE
Passenger Pigeon		Gray Wolf	
Elanoides forficatus forficatus		*Canis rufus*	LE
Swallow-tailed Kite		Red Wolf	
Falco peregrinus *	LE	*Cervus elaphus*	
Peregrine Falcon		Elk	
Tympanuchus cupido		*Felis concolor cougar*	LE
Greater Prairie-chicken		Eastern Cougar	
Vermivora bachmanii	LE		
Bachman's Warbler			

Key to Status Categories

(US) Endangered Species Act of 1973

For status category definitions see:

United States Fish and Wildlife Service. 1992. Endangered Species Act of 1973 as amended through the 100th Congress. United States Government Printing Office, Washington, District of Columbia; and

United States Fish and Wildlife Service. 1993. Plant taxa for listing as endangered or threatened species; notice of review. Federal Register 58:51144-51190.

US statuses were taken from:

United States Fish and Wildlife Service. 1989. Endangered and threatened wildlife and plants; animal notice of review. Federal Register 54:554-579;

United States Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants; review of plant taxa for listing as endangered or threatened species. Federal Register 58:51144-51190; and

United States Fish and Wildlife Service. 1996. Endangered and threatened wildlife and plants. United States Government Printing Office, Washington, District of Columbia.

LE: Listed Endangered

3A: Considered extinct

Kentucky State Nature Preserves Commission
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Monitored Natural Communities of Kentucky

Kentucky State Nature Preserves Commission
March, 1998

The Kentucky State Nature Preserves Commission monitors exemplary examples of the following natural communities. Exemplary natural communities are relatively undisturbed or have recovered sufficiently from previous disturbances and have the flora and fauna that represents, to the best of our knowledge, the natural communities that existed in Kentucky at the time of European colonization.

LACUSTRINE COMMUNITY

Floodplain lake

PALUSTRINE COMMUNITIES

Riparian forest
Alluvial forest
Floodplain ridge/terrace forest
Bottomland hardwood forest
Wet prairie
Bottomland marsh
Sinkhole/depression marsh
Sinkhole/depression pond
Floodplain slough
Coastal plain slough
Acid seep
Calcareous seep
Cretaceous hills forested acid seep
Appalachian open acid seep
Depression swamp
Cypress/tupelo swamp
Shrub swamp
Bottomland hardwood swamp

RIVERINE COMMUNITIES

Sand bar
Mud flat
Typic gravel/cobble bar
Cumberland plateau gravel/cobble bar

TERRESTRIAL COMMUNITIES

Deep soil mesophytic forest
Acidic mesophytic forest
Calcareous mesophytic forest
Acidic sub-xeric forest
Calcareous sub-xeric forest
Xeric acidic forest
Xeric calcareous forest
Xerohydric flatwoods
Appalachian mesophytic forest
Appalachian sub-xeric forest
Cumberland highlands forest
Coastal plain mesophytic cane forest
Bluegrass mesophytic cane forest
Appalachian pine-oak forest
Redcedar-oak forest
Hemlock-mixed forest
Virginia pine forest
Siltstone/shale glade
Limestone slope glade
Limestone flat rock glade
Dolomite glade
Cumberland plateau sandstone glade
Shawnee hills sandstone glade
Sandstone prairie
Limestone prairie
Tallgrass prairie
Sandstone barrens
Shale barrens
Limestone barrens
Bluegrass savanna-woodland
Pine savanna-woodland

Standard Occurrence Report
Monitored Elements
Reported From the Heath, Ky. and Joppa, Ill.-Ky. Quadrangles

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	IDENT	LASTOBS	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
***Vascular Plants																	
PDFAB0G041*913*KY	BAPTISIA BRACTEATA VAR LEUCOPHAEA	CREAM WILD INDIGO	G4G 5T4T 5	S3	S		Y	1997-05-11	S	C	McCracken	HEATH, KY.	370603N	884816W	BAYOU CREEK BASIN	WEST KY WMA, RD AROUND NUCLEAR PLANT (DYKE RD).	PRAIRIES AND OPEN WOODS ON SANDY SOIL.
PDAST8L082*025*KY	SILPHIUM LACINIATUM VAR ROBINSONII	COMPASS PLANT	G5T?	S2	T			1993-07	S	C	McCracken	HEATH, KY.	370543N	884947W	BAYOU CREEK BASIN	WEST KENTUCKY WILDLIFE MANAGEMENT AREA BETWEEN SPRING BAYOU (BAYOU CREEK) AND ACID RD, CA 0.5 AIR MI NNW OF SPRING BAYOU CHURCH.	PRAIRIES INCL. REMNANTS OF THIS FLORA ON ROADSIDES AND FIELDS.
PDAST8L082*016*KY	SILPHIUM LACINIATUM VAR ROBINSONII	COMPASS PLANT	G5T?	S2	T		Y	1993-07	S	A	McCracken	HEATH, KY.	370601N	884949W	BAYOU CREEK BASIN	WEST KENTUCKY WILDLIFE MANAGEMENT AREA, ALONG BOTH SIDES OF UNNAMED GRAVEL RD, CA 0.1 AIR MI S OF SOUTH ACID RD (MARGNUM 23), (MARGNUM 32, 370610N, 884935W), (MARGNUM 40, 370553N, 884949W), (MARGNUM 41, 370548N, 884952W), (MARGNUM 42, 370546N, 884945W), (MARGNUM 43, 370544N, 884953W), (MARGNUM 44, 370541N, 884957W).	PRAIRIES INCL. REMNANTS OF THIS FLORA ON ROADSIDES AND FIELDS.

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Sel

Standard Occurrence Report
Monitored Elements
Reported From the Heath, Ky. and Joppa, Ill.-Ky. Quadrangles

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	IDENT	LASTOBS	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
PDAST8L082*015*KY	SILPHIUM LACINIATUM VAR ROBINSONII	COMPASS PLANT	G5T?	S2	T		Y	1993-07	S	B	McCracken	HEATH, KY.	370503N	884859W	BAYOU CREEK BASIN	WEST KENTUCKY WILDLIFE MANAGEMENT AREA, N OF KY 725 BETWEEN KY 726 AND KY 1154 (MARGNUM 34, 370505N, 884838W), (MARGNUM 35, 370513N, 884859W), (MARGNUM 36, 370521N, 884906W), (MARGNUM 37, 370515N, 884908W), (MARGNUM 38, 370517N, 884916W); JCT OF MAGRUDER RD AND ILL GULF CENTRAL RR TRACKS (MARGNUM 22); S SIDE OF KY 725, CA 0.3 RD MI E OF KY 1154 (MARGNUM 39, 370513N, 884913W).	PRAIRIES INCL. REMNANTS OF THIS FLORA ON ROADSIDES AND FIELDS.
***Fishes																	
AFCJC07030*027*KY	ICTIOBUS NIGER	BLACK BUFFALO	G5	S2	S		Y	1997-03	S	D	McCracken	JOPPA, ILL.-KY.	370736N	884928W	BAYOU CREEK BASIN	BIG BAYOU CREEK (CA. 0.4 STREAM KM S OF WEST BOONE RD CROSSING).	RESERVOIRS AND MEDIUM TO LARGE RIVERS WITH MODERATE TO LOW GRADIENT AND SOMETIME SWIFT CURRENT (BECKER 1983, PFLIEGER 1975, SMITH 1979, TRAUTMAN 1981, AND BURR AND WARREN 1986).
AFCOB11120*032*KY	LEPOMIS MINIATUS	REDSPOTTED SUNFISH	G5	S2	T		Y	1997-03	S	D	McCracken	HEATH, KY.	370650N	884710W	BAYOU CREEK BASIN	LITTLE BAYOU CK AT KY 358 (SITE 12).	OCCURS IN WELL-VEGETATED SWAMPS, SLOUGHS, BOTTOMLAND LAKES, AND LOW GRADIENT STREAMS (BURR AND MAYDEN 1979, PFLIEGER 1975, SMITH 1979, BURR AND WARREN 1986, ETNIER AND STARNES 1993).
***Amphibians																	
AAABH01014*014*KY	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	G4T4	S3	S		Y	1991-03-18	S	C	McCracken	JOPPA, ILL.-KY.	370750N	884917W	BAYOU CREEK BASIN	WEST KENTUCKY WILDLIFE MANAGEMENT AREA, CA 0.6 RD MI SW OF JCT KY 995 AND KY 358, CA 0.15 AIR MI W OF KY 995, CA 0.5 RD MI SW OF AREA OFFICE (LODGE).	BREEDS IN PONDS IN FARMLAND AND EDGE. REMAINS UNDERGROUND THROUGHOUT MOST OF THE YEAR, USING CRAYFISH BURROWS IN MOIST GRASSLANDS AND MEADOWS.

Standard Occurrence Report
Monitored Elements
Reported From the Heath, Ky. and Joppa, Ill.-Ky. Quadrangles

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	IDENT	LASTOBS	PREC	GEORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
AAABH01014 008 KY	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	G4T4	S3	S		Y	1991-03-20	S	C	McCracken	HEATH, KY.	370530N	885002W	BAYOU CREEK BASIN	CIRCA 0.4 AIR MI NW OF SPRING BAYOU CHURCH ON KY 725 (MARGNUM 11). CA 0.7 RD MI W OF SPRING BAYOU CHURCH ON KY 725 ON N SIDE OF RD (MARGNUM 12, 370524N, 885030W).	BREEDS IN PONDS IN FARMLAND AND EDGE. REMAINS UNDERGROUND THROUGHOUT MOST OF THE YEAR, USING CRAYFISH BURROWS IN MOIST GRASSLANDS AND MEADOWS.
AAABH01014 009 KY	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	G4T4	S3	S		Y	1991-03-18	S	C	McCracken	HEATH, KY.	370648N	884944W	BAYOU CREEK BASIN	WEST KENTUCKY WILDLIFE MANAGEMENT AREA, N SIDE WATER WORKS RD JUST W OF FILTRATION PLANT.	BREEDS IN PONDS IN FARMLAND AND EDGE. REMAINS UNDERGROUND THROUGHOUT MOST OF THE YEAR, USING CRAYFISH BURROWS IN MOIST GRASSLANDS AND MEADOWS.
AAABH01014 010 KY	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	G4T4	S3	S		Y	1991-03-20	S	C	McCracken	HEATH, KY.	370710N	884728W	BAYOU CREEK BASIN	WEST KENTUCKY WILDLIFE MANAGEMENT AREA, CA 0.3 RD MI NNW JCT KY 358 AND OGDEN LANDING RD (MARGNUM 14). WEST KY WMA, CA 1.3 RD MI W JCT KY 996 AND KY 358 ON N SIDE KY 358 (MARGNUM 15, 370723N, 884736W). WEST KY WMA, 1.5 RD MI W OF JCT KY 996 AND KY 358, 0.15 AIR MI S OF KY 358 (MARGNUM 16, 370718N, 884755W). WEST KY WMA, CA 1.7 RD MI W OF JCT KY 358 AND KY 996, CA 0.10 AIR MI S OF KY 358 (MARGNUM 17, 370725N, 884805W).	BREEDS IN PONDS IN FARMLAND AND EDGE. REMAINS UNDERGROUND THROUGHOUT MOST OF THE YEAR, USING CRAYFISH BURROWS IN MOIST GRASSLANDS AND MEADOWS.
AAABH01014 015 KY	RANA AREOLATA CIRCULOSA	NORTHERN CRAWFISH FROG	G4T4	S3	S		Y	1998-02-27	S	C	McCracken	JOPPA, ILL.-KY.	370757N	884845W	BAYOU CREEK BASIN	WEST KENTUCKY WILDLIFE MANAGEMENT AREA, CA 0.1 RD MI NW OF JCT KY 358 AND KY 995, DOWN ROAD JUST SE OF LODGE (MARGNUM 36), AND CA 0.15 RD MI NW OF JCT KY 358 AND KY 995, DOWN RD JUST SE OF LODGE (MARGNUM 39).	BREEDS IN PONDS IN FARMLAND AND EDGE. REMAINS UNDERGROUND THROUGHOUT MOST OF THE YEAR. USING CRAYFISH BURROWS IN MOIST GRASSLANDS AND MEADOWS.

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***Birds

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Standard Occurrence Report
Monitored Elements
Reported From the Heath, Ky. and Joppa, Ill.-Ky. Quadrangles

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	IDENT	LASTOBS	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
ABPBW01110*002*KY	VIREO BELLII	BELL'S VIREO	G5	S2S 3B	S		Y	1994-05-05	S	C	McCracken	JOPPA, ILL.-KY.	370735N	884905W	BAYOU CREEK BASIN	WEST KENTUCKY WMA, W SIDE OF MAIN GRAVEL RD, CA 1.0 MI S OF ENTRANCE ON KY 358.	DENSE BRUSH, MESQUITE, STREAMSIDE THICKETS, AND SCRUB OAK, IN ARID REGIONS BUT OFTEN NEAR WATER (B83COM01NA); MOIST WOODLAND, BOTTONLANDS, WOODLAND EDGE, SCATTERED COVER AND HEDGEROWS IN CULTIVATED AREAS. OPEN WOODLAND, BRUSH IN WINT.

12 Records Processed.

E 2178

Education, Arts and Humanities Cabinet

KENTUCKY HERITAGE COUNCIL
The State Historic Preservation Office

Paul E. Patton
Governor
Roy Peterson
Cabinet Secretary

David L. Morgan
Executive Director
and SHPO

April 6, 1999

Mr. Ray T. Moore
DOE ORO Cultural Resources
Management Coordinator
Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831

Re: Proposed Receipt and Storage of Uranium Materials from the Fernald Environmental Project
Paducah Gaseous Diffusion Plant, McCracken County, Kentucky

Dear Mr. Moore:

Thank you for your letter concerning the above referenced project. Our review of this project indicates that it will have no effect on any property listed in or eligible for listing in the National Register of Historic Places. Therefore, I have no objections.

If you have any questions concerning this project please feel free to contact David Pollack of my staff at 502-564-7005.

Sincerely,

David L. Morgan

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

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Frankfort, Kentucky 40601
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OHIO HISTORICAL SOCIETY
SINCE 1885

April 5, 1999

Ray T. Moore
DOE ORO Cultural Resources
Department of Energy, Oak Ridge
P.O. Box 2001
Oak Ridge, TN 37831

Re: Storage of Uranium Materials from Fernald
Portsmouth Gaseous Diffusion Plant, Pike County, Ohio

Dear Mr. Moore,

This is in response to correspondence from your office dated March 9, 1999 (received March 10) regarding the above referenced project. The comments of the Ohio Historic Preservation Office (OHPO) are submitted in accordance with provisions of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 [36 CFR 800]).

Portsmouth Gaseous Diffusion Plant is being considered as one alternative to receive and store uranium materials from Fernald. The materials would be stored within existing facilities or within one or two specially constructed structures. It is our understanding that the use of existing structures will not require alterations or modifications of qualities or characteristics that give significance to this facility. The proposed new structures, if needed, are of small scale relative to other structures within the facility and would be located in an area where there has been previous construction. Based on the information presented in your correspondence, we concur with your assessment that the proposed project will have no effect on any property that is eligible for inclusion or included in the National Register of Historic Places. The finding of no effect ends the requirement for consultation with this office for this project. If changes in the scope of work could result in changes or modifications that would have an effect, even if the effect is not considered to be adverse, then further coordination with this office is recommended.

Any questions concerning this matter should be addressed to David Snyder at (614) 297-2470, between the hours of 8 am. to 5 pm. Thank you for your cooperation.

Sincerely,

David Snyder

David Snyder, Archaeology Reviews Manager
Resource Protection and Review

DMS/ds

xc: DeWintus Perkins, U.S. Department of Energy, Portsmouth Site Office, P.O. Box 700, Piketon, OH 45661-0700

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APPENDIX A

DOE-FEMP NEPA COVERAGE FOR DISPOSITION OF NUCLEAR MATERIAL INVENTORY

APPENDIX A. DOE-FEMP NEPA COVERAGE FOR DISPOSITION OF NUCLEAR MATERIAL INVENTORY

This appendix is provided to demonstrate that the analysis for packaging and transportation of FEMP uranium materials was included in previous NEPA and other environmental evaluations.

The Department of Energy - Fernald Environmental Management Project (DOE-FEMP) has addressed compliance with the National Environmental Policy Act for disposition of nuclear material from the Fernald Site to off-site locations pursuant to DOE's NEPA Implementing Regulations at 10 CFR 1021. The disposition of nuclear material inventories from the Fernald Site was initiated as part of Removal Actions #12, Safe Shutdown of the former production facilities at the FEMP. DOE determined that the implementation of the Safe Shutdown Removal Action (including material disposition) was excluded from requiring a detailed NEPA evaluation (e.g., an Environmental Assessment).[1]

In 1994, DOE-FEMP developed an integrated Proposed Plan-Environmental Assessment (PP-EA) that identified the dismantling and decontamination of all structures contained within Operable Unit (OU) 3 as an appropriate Interim Remedial Action at the FEMP. The PP-EA followed the process required by 10 CFR 1021 for preparation of Environmental Assessments, including public involvement. The PP-EA identified a number of removal actions that required completion as part of the remediation of Operable Unit 3. One of the removal actions was the Safe Shutdown which included the disposition of nuclear materials from the FEMP to off-site receptors. The public was provided an opportunity to comment on the PP/EA during the public review period held in 1994. An Interim Record of Decision[2] was approved in July of 1994 for implementation of the Interim Remedial Action after completion of the public involvement process.

In 1996, DOE-FEMP developed an Integrated Remedial Investigation/Feasibility Study which evaluated the appropriate final remedial action for Operable Unit 3. Pursuant to DOE's revised policy statement on NEPA issued in June, 1994, NEPA values were incorporated into the Integrated RI/FS and the public involvement process pursuant to CERCLA was followed. The integrated RI/FS did not reconsider decisions made in previous documents (e.g., OU 3 IROD), but it once again identified the Removal Actions (including Safe Shutdown) that required completion as part of the remediation of OU 3. The final ROD[3] for OU 3 was approved in September of 1996 after completion of the public involvement process.

The disposition of nuclear materials is a fundamental component of the CERCLA actions being conducted at the FEMP. The DOE's NEPA Implementing Regulations consider transportation as an activity that is necessary and included within the scope of CERCLA Removal Actions. All material shipped from the FEMP will be packaged in accordance with Title 49 Code of Federal Regulations. Although DOE excludes CERCLA Removal Actions from requiring detailed NEPA documentation, two separate integrated CERCLA/NEPA processes (with full public involvement) were carried out at the FEMP which identified the disposition of nuclear material as a fundamental component of the remediation of OU 3. The documents referenced above are available in the Fernald Public Environmental Information Center at (513) 648-7480.

The outbound shipments from ORO will move in DOE approved packaging, subject to DOE radiation, contamination or fissile controls and other DOE Federal or State requirements.

1. Letter; Kim Hayes to Thomas Rowland, April 12, 1993; subject: Safe Shutdown Environmental Assessment.

2. June 1994; Operable Unit 3 Record of Decision for Interim Remedial Action. Fernald Environmental Management Project, Fernald Ohio.

3. August 1996; Operable Unit 3 Record of Decision for Final Remedial Action. Fernald Environmental Management Project, Fernald Ohio.

APPENDIX B

FEMP URANIUM INVENTORY
PROPOSED TO BE MOVED TO OTHER DOE SITE(S)

Potential Movement of FEMP Uranium to Other DOE Site(s)

Normal Uranium	Pounds (millions)	MTU*	Justification for Movement
Metal:			
Fuel Elements	0.030	14	Blend Stock
Ingots	0.041	19	Blend Stock
Recycle Pieces	0.353	156	Blend Stock
Total Metal	0.424	189	
UF_4	0.010	4	Blend Stock
Total All Normal	**0.434**	**193**	

*Metric Tons Uranium

WAREHOUSE SPACE REQUIREMENTS FOR NORMAL URANIUM

DESCRIPTION/ TOTAL NET.LBS.	CONTAINER COUNT (AS STORED)	ASSUMED PACKAGING	REQUIRED NO.OF PKGS. (AS SHPD)	COMMENT	NO.OF FINISHED UNITS ON FLOOR	SQ.FT. EACH	TOTAL SQ.FT.
PRIMARY INGOTS 112,956	16 SKIDS	STRONG/TIGHT G4273-5 OR 6 WOODEN BOX	83	PACK 2/BOX STACKED 5 HIGH	17	8	136
PRODUCT INGOTS 40,979	7 SKIDS	STRONG/TIGHT G4273-5 OR 6 WOODEN BOX		PACK IN BOXES STACKED 5 HIGH			
DERBIES 8,384	3 SKIDS	STRONG/TIGHT G4214 WOODEN BOX	12	PACK IN BOXES STACKED 5 HIGH	3	4	12
CORES 30,633	51 DRUMS	STRONG/TIGHT DRUMS		SHIP AS IS IN DRUMS PALLETIZED 4/PALLET STACKED 3 HIGH			
CLAD METAL 60,239	77 DRUMS	STRONG/TIGHT DRUMS	350	PALLETIZE 4/PALLET, STACK ED 3 HIGH	30	16	480
RECYCLE METAL 169,239	222 VARIOUS	STRONG/TIGHT DRUMS		1000 LBS./BOX STACKED 3 HIGH			
				TOTAL UNITS ON FLOOR	50		628
TOTAL NET LBS.: 422,430		TOTAL PACKAGES AS SHIPPED	445				

* For the wooden boxes, the assumptions are within the guidelines of the Safety Analysis Report NLCO-1107, Rev. 1., which allows stacking the boxes five (5) high.

Potential Movement of FEMP Uranium to Other DOE Site(s)

Depleted Uranium	Pounds (millions)	MTU*	Justification for Movement
Metal:			
Fuel Elements	1.331	604	Shielding
Ingots	1.505	683	Shielding
Recycle Pieces	0.108	50	Shielding
Total Metal	2.944	1,337	
UF_4	4.141	1,424	Army Use
Total All Depleted	**7.085**	**2,761**	

*Metric Tons Uranium

ESTIMATED WAREHOUSE SPACE REQUIREMENTS FOR DEPLETED URANIUM - MAY VARY DEPENDING UPON FINAL PACKAGING DECISIONS

DESCRIPTION/ TOTAL NET.LBS.	PIECE/CONT. COUNT (AS STORED)	ASSUMED PACKAGING	REQUIRED NO.OF PKGS. (AS SHPD)	COMMENT	AISLE SPACING	NO.OF FINISHED UNITS ON FLOOR	SQ.FT. EACH	TOTAL SQ.FT.
					3' ON ALL SIDES			2157
UF4	14490 10-G	TOC METAL BOX (~9000 LBS/BOX)	483	TOC BOXES STACKED 3 HIGH = 170 STACKS/4 ROWS	(ASSUMES BACK-TO-BACK PKGS, AISLES EVERY 2 ROWS)	161	33	5313
4,141,234	64 T-H	"AS IS" (~14000 LBS/EA)	64	DOUBLE-STACKED		32	16	512
			547			193		7982
					3' ON ALL SIDES			810
PRIMARY INGOTS 735,531	138 WMB	STRONG/TIGHT METAL BOX (~9000 LBS/EA)	138	HALF-HIGH METAL STACKED 3 HIGH 46 STACKS/2 ROWS	(ASSUMES BACK-TO-BACK PKGS)	46	33	1518
								2328
				HALF-HIGH METAL	3' ON ALL SIDES			660
PRODUCT INGOTS 769,820	107 WMB	STRONG/TIGHT METAL BOX (~9000 LBS/EA)	107	STACKED 3 HIGH 36 STACKS/2 ROWS	(ASSUMES BACK-TO-BACK PKGS)	36	33	1188
								1848
					3' ON ALL SIDES			2230
CORES 1,329,318	1512 WOODEN BOXES	STRONG/TIGHT METAL BOX (~9000 LBS/EA)	222	ASSUMED 6000 LBS./BOX STACKED 3 HIGH 74 STACKS/2 ROWS	(ASSUMES BACK-TO-BACK PKGS)	74	33	2442
								4672
					3' ON ALL SIDES			141
RECYCLE METAL 109,410	122 VARIOUS	TOC METAL BOX (~9000 LBS/EA)	18	ASSUMED 6000 LBS./BOX STACKED 3 HIGH 6 STACKS/1 ROW	(ASSUMES BACK-TO-BACK PKGS)	6	33	198
								339
TOTAL NET LBS.: 7,085,313		TOTAL PACKAGES AS SHIPPED	1032			GRAND TOTAL		17169

MTC - Material Description Code
G - Gallon
LSA - Low Specific Activity (Shipping designation)
T-H - T-hopper
TOC - Thorium Overpack Container
WMB - white metal box

Potential Movement of FEMP Uranium to Other DOE Site(s)

Low Enriched Uranium	Pounds (millions)	MTU*	Justification for Movement
Miscellaneous UO_2	0.006	2.5	Recovery
Miscellaneous Metals, Oxides, Compounds (commercial sale)	1.555	540.0	Interim Storage
UO_3 and Derbies (Programmatic Use)	0.644	256.0	Interim Storage
	2.205	798.5	

*Metric Tons Uranium

ESTIMATED PACKAGINGS AND SPACE REQUIREMENTS
(ENRICHED URANIUM PRODUCT)

SITE	DESCRIPTION	QUANTITY (NET LBS.)	QUANTITY (MTU)*	PLANNED PACKAGING	REQUIRED NO. OF PACKAGES (AS SHIPPED)	EST. TRUCKS/ PKGS/TRK	SQ.FT. PER PACKAGE	ESTIMATED TOTAL SQ.FT.
1	>1% U235 UO3 OXIDE	432,887	162	BU-J 196 lbs/net 450 lbs./gross	2208	31 TRKS 72 PKGS	16 AISLE SPACING (4 DRUMS/PALLET) STACKED 4 HIGH	2208 1404
2	0.72 - 1.0% U235 U308 OXIDE	709,433	222	55-GALLON DRUM 880 lbs. net ea. ~930 lbs./gross	806	25 TRKS 32 PKGS#	16 AISLE SPACING (INCL WITH ITEM 3) (4 DRUMS/PALLET) STACKED 4 HIGH	806
3	>1% U235 U308 OXIDE	240,021	73	BU-J 196 lbs/net 450 lbs/gross	1224	17 TRKS 72 PKGS	16 AISLE SPACING (4 DRUMS/PALLET) STACKED 4 HIGH	1224 1380
4	0.72 - 1.00% U235 UF4	16,344	5	55-GALLON DRUM 880 lbs. net ea. ~930 lbs./gross	19	0.5 TRKS	16	16
5	1.0 - 2.0% U235 UF4 COMPOUND	112,910	38	30-GALLON INNER 55-GALLON OUTER ~75 lbs/net (350gU235) ~928 lbs/gross	1,744	24 TRKS 72 PKGS**	16 AISLE SPACING (4 DRUMS/PALLET) STACKED 4 HIGH	1744 1194
6	1.25% U235 PRIMARY INGOTS METAL	42,768	20	WOODEN BOX 1 PER BOX ~2000 lbs/net ~2200 lbs/gross	25	3 TRKS 9 PKGS**	7.28 STACKED 5 HIGH	37
7	1.25% U235 PRODUCT INGOTS METAL	5,094	2	WOODEN BOX ~2000 lbs/net ~2200 lbs/gross	3	PARTIAL	7.28 STACKED 5 HIGH	22
8	<1% U235 CLAD METAL	61,724	28	WOODEN BOX ~1252 lbs/net ~1332 lbs/gross	49	7 TRKS 7 PKGS**	7.28 STACKED 5 HIGH	39
9	>1% U235 CLAD METAL	7,302	4	WOODEN BOX ~1252 lbs/net 1332 lbs/gross	6	1 TRK	3.92 STACKED 5 HIGH	8
10	1.25% U235 DERBY METAL	208,268	94	WOODEN BOX 800 lbs/net 800 lbs/gross	355	15 TRKS 24 PKGS**	3.92 STACKED 5 HIGH	278
11	1.25% U235 RECYCLE METAL	148,662	67	WOODEN BOX ~1252 lbs/net ~1332 lbs/gross	119	17 TRKS 7 PKGS**	3.92	93
12	0.95% U235 RECYCLE METAL	180,883	82	WOODEN BOX ~1252 lbs/net ~1332 lbs/gross	144	21 TRKS 7 PKGS**	3.92 STACKED 5 HIGH	114
13	1.0 - 19.9% U235 UO2	6,413	2		176	3 TRKS 72 PKGS**	16 AISLE SPACKING AISLE SPACING FOR ITEMS 6 - 12	176 424 1302
	TOTAL	2,172,729	799		6,878	164 TRKS		12469

- Weight restriction

**.Certificate of Compliance or Department of Transportation regulation restriction.

Note: Aisle spacing assumes a double-row, back-to-back arrangement; if that is not feasible, add 2878 sq ft

ASSUMED PACKAGING FOR URANIUM STORAGE

Container Type	Outside Dimensions	Gross Weight, lb/container	Description
T-Hopper	~6 ft long × 4 ft wide	14,000	Steel, cone-bottom container with bolted openings on opposite ends, enclosed in a steel frame.
Thorium Overpack Container	83 in. long × 56.5 in. wide × 46 in. high	9,000	Steel box, certified to pass 4-ft drop test, equipped with lifting straps on lid and interior plywood inserts that allow several layers of drums or cans to be placed inside the box.
Strong, tight metal boxes • Full size • Half-high	83.5 in. long × 47.5 in. wide ×: • 44.5 in. high • 20.5 in. high	Depends on size	Steel boxes with wood shoring between stored items to prevent contact and shifting; steel lids secured with locks; equipped with lifting straps on lid.
Strong, tight wooden box	Variety of sizes	Variety of capacities	Wooden boxes strengthened with horizontal and vertical steel bands. There are two types: a box with a cover and a pallet with an inverted box as the cover. The steel bands are closed with notched seals. All wood boxes are mounted on two or three wooden skids to allow handling via forklifts.
Strong, tight metal drums • 55-gal • 30-gal inner, 55-gal outer	• 24 in. diam × 34 in. high • 20 in. diam × 28.5 in. high	930 930 (350 g U-235 limit)	Steel drums with tops secured by locking rings.
Sea-land containers	Variety of sizes	Variety of capacities	Designed as an overpack container to be used for storing wooden boxes after they are received at the storage location in order to protect them from rain or water inleakage.

APPENDIX C

RELEASE ASSUMPTIONS AND ACCIDENT MODELING RESULTS

APPENDIX C. RELEASE ASSUMPTIONS AND ACCIDENT MODELING RESULTS

C.1 PUBLIC AND WORKER RISK

This section describes risks to the public, co-located worker, and facility worker due to continued storage of uranium materials at the Fernald Environmental Management Project (FEMP) site, or receipt and storage of these materials at other Oak Ridge Operations (ORO) sites described in Sect. 2. Risks are evaluated for routine operations and non-routine (accident) conditions.

C.1.1 Routine Operations

During storage of uranium materials at any of the proposed sites, workers could be exposed to direct radiation from surface contamination on storage containers. However, all containers will have been checked, overpacked if deemed necessary, and certified for transport before storage. Therefore, worker exposure due to routine operations associated with surveillance and maintenance of stored materials is expected to be less than detectable levels.

In addition to surface contamination, radiation dose from the stored uranium materials can be expected. Dose rates from any single stored container are no more than 3 to 4 mrem/h. The dose rate at a distance of 1 ft from a container is ~1 mrem/h, and the rate at a distance of 20 ft is <0.5 mrem/h (approximately the same as normal background radiation doses). These dose rates are not affected by stacking the containers because the containers and the materials themselves provide significant shielding. These dose rates are considered negligible to any receptor (facility worker, co-located worker, or public).

C.1.2 Accidents

Accidents that could occur under the proposed action(s) are analyzed in this section. Potential accidents could be initiated during facility operations or could be caused by natural phenomena (earthquake and wind). Reasonably foreseeable accidents have been screened to identify the accident with the greatest consequences to co-located workers and the public. These are the "bounding" accidents that provide an envelope for the consequences of other potential accidents with less impact.

The analysis is based on accidents that could occur during storage in the facilities described in Sect. 2 as the proposed action and alternatives. The inventories for each option are the same and are shown in Table B.1.

Each facility is assumed to consist of one or more storage areas. Fire suppression systems may be available for storage in existing buildings. On-site fire department response, however, is assumed for all options.

C.1.2.1 Postulated Accident Scenarios

Postulated accidents have been identified by a review of current safety documentation, such as Bases for Interim Operations for current storage locations at the FEMP site.

Table C.1. Inventory and Storage Requirements

	Inventory (lb)	MTU	Assumed Physical Form	Assumed Packaging[a]	Number of Packages	Average Inventory per Package
Normal uranium						
Primary ingots	1.13E+05	4.99E+01	Solid metal	Wooden boxes	6.10E+01	8.18E-01
Product ingots	4.10E+04	1.90E+01	Solid metal	Wooden boxes	2.20E+01	8.64E-01
Derbies	8.38E+03	3.71E+00	Solid metal	Wooden boxes	1.20E+01	3.09E-01
Cores	3.06E+04	1.40E+01	Solid metal	Drums	5.10E+01	2.75E-01
Clad metal	6.02E+04	2.66E+01	Solid metal	Drums	7.70E+01	3.46E-01
Recycle metal	1.69E+05	7.48E+01	Solid metal	Drums	2.22E+02	3.37E-01
Total normal	4.22E+05	1.88E+02			4.45E+02	
Depleted uranium						
Primary ingots	7.36E+05	3.34E+02	Solid metal	Metal boxes	1.38E+02	2.42E+00
Product ingots	7.70E+05	3.49E+02	Solid metal	Metal boxes	1.07E+02	3.26E+00
Cores	1.33E+06	6.04E+02	Solid metal	Metal boxes	2.22E+02	2.72E+00
Recycle metal	1.09E+05	5.00E+01	Solid metal	Metal boxes	1.80E+01	2.78E+00
UF_4	4.14E+06	1.42E+03	Composite solid	Metal boxes	5.47E+02	2.60E+00
Total depleted	7.09E+06	2.76E+03			1.03E+03	
Low-enriched uranium						
>1% ^{235}U UO_3 oxide	4.33E+05	1.62E+02	Composite solid	Wooden boxes	2.21E+03	7.34E-02
0.72-1.0% U_3O_8 oxide	7.09E+05	2.22E+02	Composite solid	Drums	8.06E+02	2.75E-01
>1% ^{235}U U_3O_8 oxide	2.40E+05	7.30E+01	Composite solid	Wooden boxes	1.22E+03	5.96E-02
0.72-1.0% ^{235}U UF_4	1.63E+04	5.00E+00	Composite solid	Drums	1.90E+01	2.63E-01
1-2% ^{235}U UF_4	1.13E+05	3.80E+01	Composite solid	Drums	1.74E+03	2.18E-02
1.25% ^{235}U primary ingots	4.28E+04	2.00E+01	Solid metal	Wooden boxes	2.50E+01	8.00E-01
1.25% ^{235}U product ingots	5.09E+03	2.00E+00	Solid metal	Wooden boxes	3.00E+00	6.67E-01
<1% ^{235}U clad metal	6.17E+04	2.80E+01	Solid metal	Wooden boxes	4.90E+01	5.71E-01
>1% ^{235}U clad metal	7.30E+03	4.00E+00	Solid metal	Wooden boxes	6.00E+00	6.67E-01
1.25% ^{235}U derby metal	2.08E+05	9.40E+01	Solid metal	Wooden boxes	3.55E+02	2.65E-01
1.25% ^{235}U recycle metal	1.49E+05	6.70E+01	Solid metal	Wooden boxes	1.19E+02	5.63E-01
0.95% ^{235}U recycle metal	1.81E+05	8.20E+01	Solid metal	Wooden boxes	1.44E+02	5.69E-01
1.0-19.9% ^{235}U UO_2	6.41E+03	2.00E+00	Composite solid	Wooden boxes	1.76E+02	1.14E-02
Additional aisle spacing						
Total low enriched	2.17E+06	7.99E+02			6.88E+03	
Total	9.68E+06	3.75E+03			8.36E+03	

[a]All wooden boxes placed in metal, sea-land container upon receipt prior to storage.
MTU = metric tons of uranium.

Types of accidents that could occur during implementation of the proposed action(s) can be grouped into two classes. As shown in Table B.2, these classes are fire and mechanical upset. External events such as natural phenomena are potential initiating mechanisms for both classes of accidents. The accidents shown in Table B.2 are determined to be "credible," a term that is used in safety analysis to mean that the accident has an annual probability of 1E-6 or greater. U.S. Department of Energy (DOE) Standard 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports* (DOE 1994a), defines frequency classes as shown in Table B.3.

Table C.2. Postulated Accidents Identified for Uranium Storage Facility

	Operational Events		External Events
Operation	**Fire**	**Container Breach**	**Natural Phenomena**
Handling	Forklift fire affecting small number of containers	Forklift impact with storage containers	Not applicable; containers handled for short period of time
		Container(s) dropped during handling	
Storage (includes surveillance and maintenance)	Large fire affecting storage containers in single storage area	Forklift impact with storage containers	Release, small fires in all storage areas
	Small fire affecting limited number of storage containers	Corrosion, degradation of storage containers	

Table C.3. Frequency Classes Considered in Accident Analysis

Frequency Class	Frequency, events/year	Definition
Likely	>1E-2	May be expected to occur once or more during the lifetime of the facility
Unlikely	1E-4 to 1E-2	Not expected but may occur during the lifetime of the facility
Extremely unlikely	1E-6 to 1E-4	Will probably not occur during the lifetime of the facility
Not credible	<1E-6	Has extremely low probability of occurring

The accidents shown in Table B.2 were selected to represent the range of postulated accidents that could occur under the proposed action and alternatives. Accidents are shown for general handling and storage operations. Bounding accidents are discussed below.

Fires

Fires resulting in release of uranium are postulated for both handling and storage operations. The types of fires include gasoline/diesel fuel fires caused by forklift accidents and fires involving storage containers. An unmitigated fire could spread to all storage containers in a single storage area; therefore, the entire contents of all containers in that area become the material at risk (MAR). However, this is an extremely unlikely event due to minimal ignition sources and combustible loading. Small fires, involving limited numbers of containers, are more likely but result in substantially smaller releases to the atmosphere.

Container Breach

Container breach includes events such as releases from leaking containers (primarily due to long-term corrosion), forklift puncture during movement of other containers, and dropping containers during placement into long-term storage. The container breach would result in small releases to the atmosphere.

Single-container handling accidents are considered "bounding" because these events dominate the radiological risk to workers due to the relatively high frequency of such events and the proximity of the workers to any release. Such events include handling and movement of storage containers from the loading dock to the final storage location. These operations are prone to mechanical stresses in industrial accidents, such as drops and releases from a container or punctures by a forklift; however, airborne releases resulting from breaches in a single container are relatively insignificant compared with releases involving fires. As a result, these handling accidents usually constitute little hazard to the general public.

Natural Phenomena

Natural phenomena events such as high wind and earthquake have the potential to cause damage to buildings and structures leading to consequences that equal or exceed the consequences of operational accidents. For natural phenomena events, evaluation criteria for design basis events are based on the Performance Category 3 natural phenomena intensities specified for each site for Hazard Category 2 nuclear facilities and are shown in Table B.4 (doe 1994b).

Table C.4. Natural Phenomena Intensities

Site	Event	Intensity	Frequency/year
Fernald	Earthquake	0.16 g	5E-4
	Straight wind	70 mph	2E-2
	Tornado	139 mph	1E-3
Portsmouth	Earthquake	0.19 g	5E-4
	Straight wind	70 mph	2E-2
	Tornado	110 mph	1E-3
Paducah	Earthquake	0.35 g	5E-4
	Straight wind	70 mph	2E-2
	Tornado	144 mph	1E-3
Oak Ridge	Earthquake	0.19 g	5E-4
	Straight wind	70 mph	2E-2
	Tornado	113 mph	1E-3

During the seismic event defined above, all facility structures are assumed to be destroyed, and nothing but rubble remains. All utilities are lost. All releases are at ground level. Radiological materials that can be suspended in air in respirable form and be available for transport are considered to be released from direct seismic accelerations.

Following the seismic event, a number of small fires may occur due to electrical shorts or downed power lines. Any fires would be scattered throughout the rubble and would be exposed to the outside elements since no building structure remains. The top layer of rubble would consist primarily of noncombustible materials such as reinforced concrete and structural steel from buildings, or structural supports from TSSs. The fire is assumed to be slow-burning amid the rubble and fallen/breached storage containers. All fire mitigation facilities are assumed destroyed, and all roadways are blocked by debris. Therefore, there is no fire mitigation by either the on-site fire department or other outside agencies.

Seismic events are used as the surrogate initiator for straight winds or tornadoes for the overriding reason that standard atmospheric dispersion modeling predicts greater dispersion (and hence greatly reduced airborne concentration) for high wind conditions than for the stable wind conditions assumed to be present during earthquakes. Existing analyses in DOE safety analysis reports suggest that seismic events generally bound the risks of winds or tornadoes, including the risks from wind-driven projectiles. With respect to such projectiles, unpublished preliminary analyses for waste drums stored on outdoor pads show that damage from projectiles could exceed damage caused by seismic events primarily because of the stability of the drum-stacking arrangement and the lack of protection against projectiles. The same phenomenon is assumed to apply to the containers proposed for uranium storage. To appropriately bound potential damage by projectiles to unprotected storage areas, the damage assumed for seismic events is conservatively defined to have higher damage ratios than those that might otherwise be used to bound the damage caused by high winds or wind-driven projectiles.

Although not explicitly determined, it is assumed that the uranium storage facility is a Hazard Category 2 facility based on the criteria of DOE-STD-1027-92 (DOE 1992). The frequencies shown in Table B.4 represent the frequencies of facility failure under challenge from natural phenomena.

C.1.2.2 Development of Source Terms for Accident Sequences

The approach taken in this assessment is to convert MAR quantities to atmospheric source terms using conservative release factors. These source term factors, based on DOE-HDBK-3010-94 (DOE 1994c), take into account the physical mechanism through which material becomes airborne as well as the fraction of airborne materials in the respirable particle size range (<10 microns). The source term associated with each accident is the product of four factors that vary for type of material and container affected by the accident:

$$\text{Source term} = \text{MAR} \times \text{DR} \times \text{ARF} \times \text{RF}$$

where:

- MAR = material at risk,
- DR = damage ratio,
- ARF = airborne release fraction,
- RF = respirable fraction.

C.1.2.3 Evaluation of Source Term Parameters and Frequencies

This section discusses the development of frequency and source term data for general handling accidents and storage accidents.

General Handling Accidents

The dominant contributor to worker risk from radioactive material releases is expected to result from mechanical breaches of storage containers during handling accidents. This expectation stems from the relatively high frequency of such occurrences and the proximity of the worker to the point of release in such events. Handling accidents include container breaches caused by drops or forklifts or other vehicular impact.

Although one container would generally be breached in an accident, rupture of multiple containers could occur in instances when several containers are being handled at a time.

Source Term Parameters. The MAR for handling operations with stacked arrays generally varies from one to four drums, depending on the method of stacking and the arrangement of the array. The maximum MAR for a pallet of four drums containing normal uranium-clad metal is 0.35 metric tons of uranium (MTU) per drum. The maximum MAR for a single box is 2.6 MTU UF_4 in the form of composite or aggregate solids or 3.3 MTU product ingots (both depleted uranium). The damage ratio (DR) for the MAR depends on several factors, including physical form of the MAR and the severity of the accident stress. In general, breached containers with solid metal uranium forms (ingots, derbies, cores, recycle metals) are assumed to have DRs of no greater than 0.10 (i.e., no more than 10% of the material is directly impacted or damaged by the event). For other containers with UF_4 and U_3O_8 (assumed to be in the form of a composite or aggregate solid), the single-container DR is assumed to be 0.25. The combined airborne release fraction/respirable fraction (ARF/RF) for composite solids subjected to free-fall spill and impaction stress is ~1E-5. The combined ARF/RF for metals is essentially negligible but is estimated to be 1E-6 as a conservative assumption.

Frequency. On the basis of numerous studies evaluated for other environmental impact statements, a probability of one handling error per 10,000 containers handled is used in this analysis. It is assumed that two severe breaches of confinement occur for each inventory of 10,000 containers handled. All containers will be moved into place within a relatively short period of time (assumed to be no more than 6 months) and will not be handled again after they are placed in storage. Based on the estimated total number of containers handled at the storage facility (see Table B.1), the frequency of handling breaches is 3.3/year (anticipated).

Storage Area Fires

For the purposes of this assessment, the single largest storage area, based on estimated storage area, is assumed to bound the risk to workers and the public. This event is a fire that involves the entire inventory of depleted uranium stored primarily in metal boxes.

Source Term Parameters. The MAR is the entire inventory of depleted uranium (see Table B.1). The DR for materials in metal containers exposed to fires is 0.1. The ARF and RF for airborne release of particulates during complete oxidation of uranium metal mass are 1E-3 and 1.0, respectively. For composite solids, the ARF and RF are 6E-3 and 1E-2, respectively.

Frequency. Although fire data from DOE sites indicate that facility fires are credible, fires of this magnitude in storage facilities with low combustible loading and limited ignition sources are considered extremely unlikely.

Storage Area Seismic Event

The dominant contributor to risk from uranium releases is expected to result from breaches of storage containers in an earthquake followed by a number of small fires. The event would impact all storage containers in the facility.

Source Term Parameters. The MAR is shown in Table B.1. DRs for stacked storage containers are estimated to be 0.075 for metal boxes and drums (all wooden boxes placed in metal sea-land containers before storage). The combined ARF/RFs for metals and composite solids are the same as those for general handling accidents. Release factors for subsequent fires are the same as those described for storage area fires; however, the MAR is 10% of the actual inventory because the fires are small, distributed throughout the storage areas, and impact only the outside layers of the rubble and fallen/breached storage containers.

Frequency. The annual frequencies of seismic events exceeding the design basis for Hazard Category 2 facilities were shown in Table B.4. Conditional probabilities are estimated to be 0.05 for inducing a number of unmitigated fires. The overall frequency for each site is 2.5E-5/year (unlikely).

C.1.2.4 Results

Radiological source terms and consequences for the bounding accident scenarios are presented in this section.

Source Terms for Bounding Accident Scenarios

Airborne source terms are estimated based on MARs and release parameters identified in Sect. B.1.2.3 and are expressed in units of grams. The activity (Ci/g) for each type of material released is based on enrichment estimates shown in Table B.1. Normal and depleted uranium is considered to be no more than 0.71% ^{235}U with specific activity of 3.5E-7 Ci/g. Low-enriched uranium (LEU) can have enrichments up to 20% ^{235}U with specific activities as high as 7.0E-7 Ci/g. These activities are used to estimate airborne source terms in units of curies. These source term estimates are shown in Table B.5.

Consequences for Bounding Accident Scenarios

Consequences to facility workers, co-located workers (assumed to be located 100 m from the release point), and the public are estimated for each bounding accident scenario at each proposed facility location. For the facility worker and co-located worker, the consequences are the same regardless of site. For the public, consequences vary depending on distances to the site boundaries. Distances and associated dispersion parameters for each site are shown in Table B.6 for ground-level releases (general handling events and direct seismic event). For elevated releases (15 m) due to hot air buoyancy effects from fires, the maximum dispersion parameter occurs at a distance of 270 m from the release point. This value (3.51E-4 s/m^3) is used for releases due to fires for all sites regardless of distance to the site boundary and is, therefore, conservative (i.e., dispersion parameters due to elevated releases for receptors located at other distances are lower). Dispersion parameters are based on a point-source Gaussian dispersion model described in *Handbook on Atmospheric Diffiusion* (DOE/TIC-11223, Hanna et al. 1982) and are evaluated for F-Class wind stability with windspeed of 1.5 m/s. All receptors are considered to be at ground level.

Consequences are shown in Table B.7 for all receptors for the facility at each site with the largest dispersion parameter (i.e., closest distance to site boundary). The exception is the ETTP site where one facility (K-1066F) is less than 100 m from the site boundary and is evaluated separately. Other parameters included in estimating consequences include:

- Breathing rate of 3.3E-4 m^3/s based on recommendations from the International Commission on Radiological Protection.

- Inhalation 50-year committed effective dose equivalent dose conversion faction (DCF) for uranium of 1.2E+8 rem/Ci (*Internal Dose Conversion Factors for Calculation of Dose to the Public,* DOE/EH-0071, DOE 1988*)*.

Table C.5. Source Terms for Bounding Accident Scenarios

	Type of Uranium	MAR, MTU	Assumed Physical Form	Assumed Packaging	DR	ARF	RF	Airborne Source Term (g)	Activity (Ci/g)	Airborne Source Term (Ci)
General Handling Accidents										
Clad metal	Normal	1.38E+00	Solid metal	Drums	1.00E-01	1.00E-06	1.00E+00	1.26E-01	3.50E-07	4.39E-08
Product ingots	Depleted	3.26E+00	Solid metal	Metal boxes	1.00E-01	1.00E-06	1.00E+00	2.96E-01	3.50E-07	1.03E-07
UF_4	Depleted	2.60E+00	Composite solid	Metal boxes	2.50E-01	1.00E-05	1.00E+00	5.90E+00	3.50E-07	1.24E-04
Storage Area Fire										
Solid metal	Depleted	1.34E+03	Solid metal	Metal boxes	1.00E-01	1.00E-03	1.00E+00	1.21E+05	3.50E-07	4.24E-02
UF_4	Depleted	1.42E+03	Composite solid	Metal boxes	1.00E-01	6.00E-03	1.00E-02	7.73E+03	3.50E-07	2.70E-03
Total										4.51E-02
Storage Area Seismic Event										
Solid metal	Normal	7.26E+01	Solid metal	Metal boxes	7.50E-02	1.00E-06	1.00E+00	4.94E+00	3.50E-07	0
Solid metal	Normal	1.15E+02	Solid metal	Drums	7.50E-02	1.00E-06	1.00E+00	7.85E+00	3.50E-07	2.75E-06
Solid metal	Depleted	1.34E+03	Solid metal	Metal boxes	7.50E-02	1.00E-06	1.00E+00	9.09E+01	3.50E-07	3.18E-05
UF_4	Depleted	1.42E+03	Composite solid	Metal boxes	7.50E-02	1.00E-05	1.00E+00	9.66E+02	3.50E-07	3.38E-04
U_3O_8, UF_4	Low-enriched	2.37E+02	Composite solid	Metal boxes	7.50E-02	1.00E-05	1.00E+00	1.61E+02	7.02E-07	0.000113
U_3O_8, UF_4	Low-enriched	2.65E+02	Composite solid	Drums	7.50E-02	1.00E-05	1.00E+00	1.80E+02	3.74E-07	0.00007
Solid metal	Low-enriched	2.97E+02	Solid metal	Metal boxes	7.50E-02	1.00E-06	1.00E+00	2.02E+01	3.60E-07	0
Total										0.000562
Storage Area Seismic Event Fire										
Solid metal	Normal	7.26E+01	Solid metal	Metal boxes	7.50E-02	1.00E-03	1.00E+00	6.59E+04	3.50E-07	0.000173
Solid metal	Normal	1.15E+02	Solid metal	Drums	7.50E-02	1.00E-03	1.00E+00	7.85E+03	3.50E-07	0.000275
Solid metal	Depleted	1.34E+03	Solid metal	Metal boxes	7.50E-02	1.00E-03	1.00E+00	9.09E+04	3.50E-07	3.18E-03
U_4	Depleted	1.42E+03	Composite solid	Metal boxes	7.50E-02	6.00E-03	1.00E-02	5.80E+03	3.50E-07	2.03E-04
U_3O_8, UF_4	Low-enriched	2.37E+02	Composite solid	Metal boxes	7.50E-02	6.00E-03	1.00E-02	1.29E+04	7.02E-07	6.79E-05
U_3O_8, UF_4	Low-enriched	2.65E+02	Composite solid	Drums	7.50E-02	6.00E-03	1.00E-02	1.08E+03	3.74E-07	0.00004
Solid metal	Low-enriched	2.97E+02	Solid metal	Metal boxes	7.50E-02	1.00E-03	1.00E+00	2.02E+04	3.60E-07	0.000727
Total										0.00467

MAR = material at risk.
MTU = metric tons of uranium.

Table C.6. Distances and Dispersion Parameters for Ground-Level Releases for Bounding Accident Scenarios

Site	Building	Distance to Site Boundary (m)	Dispersion Parameter X/Q (s/m^3)
All sites	--	1.00E+02	3.43E-02
Fernald	Plant 1 Pad	3.35E+02	3.21E-03
Portsmouth	X-3001	8.76E+02	5.43E-04
	X-3002	1.07E+03	3.84E-04
	X-7725A	7.82E+02	6.68E-04
	X-7745R	1.06E+03	3.84E-04
	Lithium Storage	7.86E+02	6.68E-04
	X-744K	8.70E+02	5.43E-04
	X-744G	7.15E+02	8.47E-04
Paducah	C-752/greenfield	5.11E+02	1.56E-03
Y-12 Plant	9204-4	5.37E+02	1.56E-03
	9720-33	5.37E+02	1.56E-03
ETTP	K-1066F	7.60E+01	5.33E-02
	K-131, 631	8.38E+02	6.68E-04
	K-861 Open Area	6.10E+02	1.12E-03

ETTP = East Tennessee Technology Park.

Table C.7. Consequences to Facility and Co-Located Workers for Bounding Accident Scenarios

Accident	Site	Airborne Source Term (Ci)	Breathing Rate (m^3/s)	DCF (rem/Ci)	Worker Dose (rem)[b]	Co-located Worker[a]		Public		Maximum Consequence Category
						X/Q (s/m^3)	Dose (rem)	X/Q (s/m^3)	Dose (rem)	
General handling	Fernald	2.06E-06	3.33E-04	1.20E+08	3.14E-03	3.43E-02	2.82E-03	3.21E-03	2.64E-04	Negligible
	Portsmouth	2.06E-06	3.33E-04	1.20E+08	3.14E-03	3.43E-02	2.82E-03	8.47E-04	6.97E-05	Negligible
	Paducah	2.06E-06	3.33E-04	1.20E+08	3.14E-03	3.43E-02	2.82E-03	1.56E-03	1.28E-04	Negligible
	Y-12 Plant	2.06E-06	3.33E-04	1.20E+08	3.14E-03	3.43E-02	2.82E-03	1.56E-03	1.28E-04	Negligible
	ETTP (K-1066F)	2.06E-06	3.33E-04	1.20E+08	3.14E-03	5.33E-02	4.39E-03	5.33E-02	4.39E-03	Negligible
	ETTP (other)	2.06E-06	3.33E-04	1.20E+08	3.14E-03	3.43E-02	2.82E-03	1.12E-03	9.22E-05	Negligible
Storage area fire	All	4.51E-02	3.33E-04	1.20E+08	n/a	3.51E-04	6.33E-01	0.0004	6.33E-01	Low
Storage area seismic	Fernald	5.62E-04	3.33E-04	1.20E+08	n/a	3.43E-02	7.70E-01	3.21E-03	7.21E-02	
	Portsmouth	5.62E-04	3.33E-04	1.20E+08	n/a	3.43E-02	7.70E-01	8.47E-04	1.90E-02	
	Paducah	5.62E-04	3.33E-04	1.20E+08	n/a	3.43E-02	7.70E-01	1.56E-03	3.50E-02	
	Y-12 Plant	5.62E-04	3.33E-04	1.20E+08	n/a	3.43E-02	7.70E-01	1.56E-03	3.50E-02	
	ETTP (K-1066F)	5.62E-04	3.33E-04	1.20E+08	n/a	5.33E-02	1.20E+00	5.33E-02	1.20E+00	
	ETTP (other)	5.62E-04	3.33E-04	1.20E+08	n/a	3.43E-02	7.70E-01	1.12E-03	2.52E-02	
Storage area seismic fire	All	4.67E-03	3.33E-04	1.20E+08	n/a	3.51E-04	6.55E-02	3.51E-04	6.55E-02	
Total seismic	Fernald						8.36E-01		0.138	Low
	Portsmouth						8.36E-01		8.45E-02	Negligible
	Paducah						8.36E-01		1.01E-01	Low
	Y-12 Plant						8.36E-01		1.01E-01	Low
	ETTP (K-1066F)						1.26E+00		1.26	Low
	ETTP (other)						8.36E-01		9.07E-01	Negligible

[a]Maximum downwind exposure assumed for both co-located worker and public.
[b]Facility workers assumed to evacuate during fire or seismic event before significant exposure can occur.
DCF = dose conversion factor.
ETTP = East Tennessee Technology Park.

- Worker dose estimates based on instantaneous dispersion into a hemisphere 10 m in diameter. The worker walks through the hemisphere at a rate of 1 m/s for a maximum exposure time of 10 s. Consequences to facility workers during fires or natural phenomena events are considered to be negligible because these workers are assumed to evacuate the area before significant exposure can occur. This assumption is based on standard DOE site emergency response procedures that require facility worker evacuation in the event of accidents.

- It is assumed that the co-located workers and the public are both exposed to the maximum downwind consequence. This is a conservative assumption because in most cases the location of maximum consequence occurs at a distance beyond the location of the co-located worker (i.e., 270 m versus 100 m for the co-located worker). If actual dispersion parameters for elevated releases and receptors at 100 m were used, the estimated consequences would be significantly less.

- Exposure duration is assumed to be the same as release duration for all events. This is a conservative assumption for fires because downwind receptors are not likely to remain in a smoke plume once it is detected, and fire duration is several hours. For handling events or direct release from a seismic event, it is also a conservative assumption because the materials forms are such that the radioactive materials must be dislodged before they become airborne, and the overall airborne release rate is slow relative to the rate of uptake by the receptor.

Table C.7 also indicates the maximum consequence level for each scenario at each site. These levels are based on the consequence categories shown below.

Descriptive Word	Radiological Consequence Levels	
	Public	Facility and Co-located Worker
Negligible	≤0.1 rem	≤1 rem
Low	≥0.1 to <5 rem	>1 to ≤5 rem
Moderate	>5 to ≤25 rem	>5 to ≤100 rem
High	>25 rem	>100 rem

C.1.3 Public and Worker Risk Summary

Public and worker risks due to normal operations and accidents are shown in Table B.8. The risk categories are based on the accident frequency and maximum radiological consequence level as shown in Figure B.1. Those accident scenarios that fall within regions 7, 8, and 9 of the matrix are considered high risk and those accident scenarios that fall within regions 4, 5, and 6 are considered moderate risks. Those accident scenarios that fall within regions 1 through 3 of the matrix are considered low risk and represent less than a marginal concern.

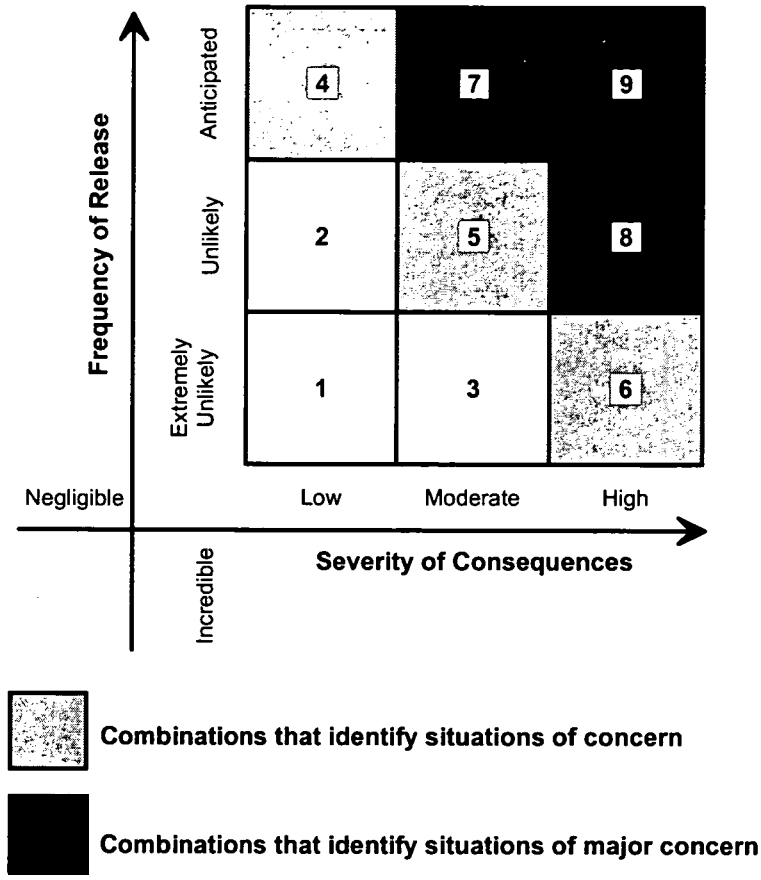

Figure C.1. Risk Ranking Matrix

Table C.8. Public and Worker Risks due to Normal Operations and Accidents

Accident Scenario	Site	Frequency	Facility Worker Dose	Co-Located Worker Dose	Public Dose	Risk
Normal operations	All	Anticipated	Negligible	Negligible	Negligible	Negligible
General handling	Fernald	Anticipated	0.003 rem	0.003 rem	<0.001 rem	Negligible
	Portsmouth	Anticipated	0.003 rem	0.003 rem	<0.001 rem	Negligible
	Paducah	Anticipated	0.003 rem	0.003 rem	<0.001 rem	Negligible
	Y-12 Plant	Anticipated	0.003 rem	0.003 rem	<0.001 rem	Negligible
	ETTP (K-1066F)	Anticipated	0.003 rem	0.004 rem	0.004 rem	Negligible
	ETTP (other)	Anticipated	0.003 rem	0.003 rem	<0.001 rem	Negligible
Storage area fire	All	Extremely unlikely	Negligible	0.63 rem	0.63 rem	Low
Seismic	Fernald	Unlikely	Negligible	0.84 rem	0.14 rem	Low
	Portsmouth	Unlikely	Negligible	0.84 rem	0.08 rem	Negligible
	Paducah	Unlikely	Negligible	0.84 rem	0.10 rem	Low
	Y-12 Plant	Unlikely	Negligible	0.84 rem	0.10 rem	Low
	ETTP (K-1066F)	Unlikely	Negligible	1.26 rem	1.26 rem	Low
	ETTP (other)	Unlikely	Negligible	0.84 rem	0.09 rem	Negligible

ETTP = East Tennessee Technology Park.

C.2 REFERENCES

DOE (U.S. Department of Energy) 1988. *Internal Dose Conversion Factors for Calculation of Dose to the Public.* DOE/EH-0071. July.

DOE 1992. *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.* DOE-STD-1027-92. December.

DOE 1994a. *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports.* DOE Standard 3009-94. July.

DOE 1994b. *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities.* DOE-STD-1020-94. April.

DOE 1994c. *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities.* October.

Hanna, S. R., et al. 1982. *Handbook on Atmospheric Diffusion.* DOE/TIC-11223. 1982.

APPENDIX D

URANIUM METAL TOXICITY AND AQUATIC BIOTA

APPENDIX D. URANIUM METAL TOXICITY AND AQUATIC BIOTA

This appendix describes the methods used to estimate the uranium metal toxicity effects to aquatic life at sites with bodies of water close to the proposed uranium material storage locations. The source of the uranium is from fires from various accident scenarios analyzed in Appendix B.

D.1 Description of how the Risks of Impacts Were Estimated for Aquatic Biota at the ETTP Site

At the ETTP, the K-131/K-631 location was evaluated for the upper-bound risks to aquatic biota from the four accidental release scenarios. This location was chosen for the upper-bound risks because of it's very close proximity to Poplar Creek, and the prevailing winds from the southwest which would mean a maximal deposition of aerial contamination in the surrounding Poplar Creek during the accident scenarios. Impacts to aquatic biota from accidents associated with the uranium being stored at either of the two alternative locations at ETTP (i.e., the open area or 1066-F) would be very similar to, but not likely greater than, those evaluated for the K-131/K-163 location.

Risks to aquatic biota were evaluated by calculating estimated deposition mass of uranium for each accident scenario (Table D.1) to calculate an estimated concentration in the volume of Poplar Creek water receiving the deposition, and comparing to acute and chronic non radionuclide toxicity benchmarks. For the General Handling and Storage Area Seismic Event accident scenarios, only composite solid uranium mass is used for the airborne source term because the solid metal is not presumed to be bioavailable to aquatic biota. However, for the Storage Area Fire scenario and Storage Area Seismic Event Fire scenario, both the composite solid and solid metal forms of uranium are used to calculate the airborne source term because fire could volatize the uranium solid metal. Estimates of the percentage of the aerial plume that would be expected to deposit in Poplar Creek were derived by calculating the area of Poplar Creek within a 2400 ft perimeter of the boundaries of the K-131/K-631 location, and dividing that creek area by the total perimeter area that is 2400 ft from the K-131/K631 boundaries. The total deposited uranium for each accident scenario was then calculated by multiplying the total aerial source term by the estimated percentage of aerial plume expected to deposit in Poplar Creek (Table D.2). The volume of water in the affected portion of Polar Creek was estimated by assuming an average stream width of 225 ft , along with a estimated average depth of 4 ft, and stream length of 14770 ft (1.329E+07 cu.ft = 3.7462E+08 L). Estimated uranium concentrations in Poplar Creek for each accident scenario were derived using the estimated mass of aerial deposition (in ug) into 3.7462E+08 L. Becuase uranium compoudns are relatively insoluble (Clayton & Clayton 1981) the dissolved uranium fraction was estimated to be 0.001 of the net aerial deposition amount

Potential adverse affects to populations of aquatic biota were evaluated by dividing estimated concentrations of uranium in Poplar Creek by non radiological toxicity benchmarks for uranium. The toxicity benchmarks used for this analysis were EPA Tier II values. The EPA Tier II secondary acute and chronic toxicity benchmark values for uranium are 46 ug/L and 2.6 ug/L, respectively (Suter and Tsao 1996). The Tier II values are developed for chemicals without national ambient water quality criteria (NAWQC), and are concentrations that are expected to exceed NAWQC only 20% of the time. The acute NAWQC are intended to correspond to concentrations that would cause less than 50% mortality in 5% of exposed aquatic biota populations during a brief exposure. The estimated uranium concentrations in the pond were divided by the acute and chronic toxicity benchmarks to obtain acute and chronic HQs. HQs greater than 1 indicate potential adverse affects to populations of aquatic biota.

Table D.1. Source terms for bounding accident scenarios for aquatic biota at ETTP locations

	Types of uranium	Airborne source term (μg)
General Handling Accidents		
UF4	Depleted	5.90E+06
Total		5.90E+06
Storage Area Fire		
Solid metal	Solid metal	1.21E+11
UF4	Composite solid	7.73E+09
Total		1.29E+11
Storage Area Seismic Event		
UF4	Depleted	9.66E+08
U3O8, UF4	Low-enriched	1.61E+08
U3O8, UF4	Low-enriched	1.80E+08
Total		1.30E+09
Storage Area Seismic Event Fire		
Solid metal	Normal	6.59E+10
Solid metal	Normal	7.85E+09
Solid metal	Depleted	9.09E+10
UF4	Depleted	5.80E+09
U308, UF4	Low-enriched	1.29E+10
U308, UF4	Low-enriched	1.08E+09
Solid metal	Low-enriched	2.02E+04
Total		2.05E+11

Table D.2. Summary of uranium deposition, concentrations in Poplar Creek, and acute and chronic Hazard Quotients for biota at ETTP

Total airborne source term (µg)	Plume deposition factor	Net aerial deposition (µg)	Total Dissolved Uranium[a] (µg)	Estimated maximum uranium concentration in Poplar Creek[b] (µg/L)	Acute HQ	Chronic HQ
General Handling Accidents						
5.90E+06	1.25E-01	7.38E+05	7.38E+02	2.57E-05	5.59E-07	9.89E-06
Storage Area Fire						
1.287E+11	1.25E-01	1.61E+10	1.61E+07	5.61E-01	1.22E-02	2.16E-01
Storage Area Seismic Event						
1.31E+09	1.25E-01	1.63E+08	1.63E+05	5.70E-03	1.24E-04	2.19E-03
Storage Area Seismic Event Fire						
2.05E+11	1.25E-01	2.56E+10	2.56E+07	8.92E-01	1.94E-02	3.43E-01

Plume deposition factor = (area of Poplar Creek within 2400 ft perimeter around K-131/K-163 boundaries)/(total area of the 2400 ft perimeter around the K-131/K-163 boundaries).
Net aerial deposition = (total airborne source term) * (plume deposition factor).
[a]Dissolved uranium = net aerial deposition/1000 (to account for insolubility of U-308 and UF_4.
[b]Dissolved uranium/volume of Poplar Creek in affected area (where volume is 2.867E+08 L).
Acute HQ = Estimated maximum concentration of uranium in Poplar Creek/Tier II secondary acute value of 46 mg/L.
Chronic HQ = Estimated maximum concentration of uranium in Poplar Creek/Tier II secondary chronic value of 2.6 mg/L.

D.2 Impacts to Aquatic Biota from Accident Scenarios at ETTP

For all accident scenarios (Table D.2), uranium metal toxicity to aquatic biota for both acute and chronic exposure is negligible with all Hazard Quotients (HQs) less than 1. Also, the uranium would tend to be flushed out of Poplar Creek via stream flow and be bound up in the sediments.

D.3 Description of How the Risks of Impacts Were Estimated for Aquatic Biota at the Portsmouth Gaseous Diffusion Plant

Risks to aquatic biota were evaluated by calculating estimated deposition mass of uranium for each accident scenario (Table D.3) to calculate an estimated concentration in the volume of Holding Pond water receiving the deposition, and comparing to acute and chronic non radionuclide toxicity benchmarks. For the General Handling and Storage Area Seismic Event accident scenarios, only composite solid uranium mass is used for the airborne source term because the solid metal is not presumed to be bioavailable to aquatic biota. However, for the Storage Area Fire scenario and Storage Area Seismic Event Fire scenario, both the composite solid and solid metal forms of uranium are used to calculate the airborne source term because fire could volatize the uranium solid metal. Estimates of the percentage of the aerial plume that would be expected to deposit in the X-2230M Holding Pond were derived by calculating the area of the pond, and dividing it by the total perimeter area that is 2400 ft from the X-3340 boundaries. The total deposited uranium for each accident scenario was then calculated by multiplying the total aerial source term by the estimated percentage of aerial plume expected to deposit in pond (Table D.3). The volume of water in the X-2230M Holding Pond was estimated by assuming a length of 675 ft on two sides, and a width of 112.5 ft on the west end, for a total area of 37800 sq. ft. The pond is assumed to have an average depth of 4 ft. Thus the total estimated volume is 1.512E+05 cu. ft., which equals 4.28E+06 L. Estimated uranium concentrations in the X-2230M Holding Pond for each accident scenario were derived using the estimated mass of aerial deposition (in μg) into 4.28E+06 L. Uranium solubilities were estimated in similar fashion as described for ETTP.

The EPA Tier II secondary acute and chronic toxicity benchmark values for uranium, 46 μg/L and 2.6 μg/L, respectively (Suter and Tsao 1996) were also used to evaluate the risks to aquatic biota. The estimated uranium concentrations in the pond were divided by the acute and chronic toxicity benchmarks to obtain acute and chronic HQs. HQs greater than 1 indicate potential adverse affects to populations of aquatic biota.

D.4 Impacts to Aquatic Biota from Accident Scenarios at the Portsmouth Gaseous Diffusion Plant

For all accident scenarios (Table D.3), uranium metal toxicity to aquatic biota for both acute and chronic exposure is negligible with all HQs less than 1.

D.5 References

Clayton, G. D. and F.E. Clayton. 1981. *Patty's Industrial Hygiene and Toxicology. Vol. 2A: Toxicology*, 3rd edition. John Wiley & Sons, New York.

Table D.3. Summary of uranium deposition, concentration on Holding Pond, and acute and chronic hazard quotients

Location	Total airborne source (µg)	Total aerial deposition area (sq. ft.)	Area of the Pond (sq. ft.)	Plume deposition factor	Net aerial deposition in pond (µg)	Dissolved Uranium (µg)	Estimated volume of pond (L)	Estimated uranium conc in pond (µg/L)	Acute HQ	Chronic HQ
X-3340										
General Handling Accidents										
	5.90E+06	7.80E+06	3.78E+04	4.84E-03	2.86E+04	2.86E+01	4.28E+06	6.68E-03	1.45E-07	2.57E-06
Storage Area Fire										
	1.29E+11	7.80E+06	3.78E+04	4.84E-03	6.24E+08	6.24E+05	4.28E+06	1.46E-01	3.17E-03	5.60E-02
Storage Area Seismic Event										
	1.31E+09	7.80E+06	3.78E+04	4.84E-03	6.35E+06	6.35E+03	4.28E+06	1.48E-03	3.22E-05	5.70E-04
Storage Area Seismic Event Fire										
	2.05E+11	7.80E+06	3.78E+04	4.84E-03	9.93E+08	9.93E+05	4.28E+06	2.32E-01	5.04E-03	8.92E-02

Total aerial deposition area is area within 2400 ft perimeter of the X-3340 boundaries.
Plume deposition factor is the ratio of area of the X-2230M Holding Pond and total aerial deposition area.
Net aerial deposition in pond is total airborne source*plume deposition factor.
Acute HQ = estimated maximum concentration of uranium in the pond/Tier II secondary acute value of 46 µg/L.
Chronic HQ = estimated maximum concentration of uranium in the pond/Tier II secondary chronic value of 2.6 µg/L.

APPENDIX E

COMMENTS AND RESPONSES

APPENDIX E. COMMENTS AND RESPONSES

**Response to Comments on the Environmental Assessment
for the U. S. Department of Energy, Oak Ridge Operations
Receipt and Storage of Uranium Materials
from the
Fernald Environmental Management Project Site (DOE/ORO-2078)**

Walter Frazier
[redacted]

1. Mr. Frazier indicates that he has 53 acres of land in Texas which he offers would be willing to discuss with DOE as a possible storage site.
Response: The uranium materials discussed in this EA are not suitable for storage without proper surveillance. The cost of establishing a new site is likely prohibitively expensive and could not be done in the time required. As noted in section 2.8.1 no commercial facilities were considered.

Mr. Alfred B. Puckett
[redacted]

1. I am opposed to the DOE plan to make west Kentucky a nuclear waste dump. The Paducah plant site is on a major earthquake fault and our experts say the big one could happen anytime and be a major disaster. We don't need any more nuclear waste; in fact, the nuclear waste we now have should be sent someplace else.
Response: The uranium material discussed in this EA is not a waste; it is a product. Comment noted.

Robert Peele
[redacted]

1. I found no information on the toxic effects of uranium other than the radioactivity.
Response: Information on the toxic effects of uranium metal, especially to aquatic organisms, has been added to the EA.

2. The reader is told of the distance from Poplar Creek of prospective storage locations at ETTP, but the elevation above creek level and flooding history were not mentioned.
Response: Information in section 3.5.3 indicates that most of the ETTP site is above the probable maximum flood. Text has been added to specifically state that all proposed storage locations at ETTP are above the 100-year flood level. According to the USGS topographic map for ETTP (DOE 1999), storage location K-131/K-631 elevation is approximately 780 ft, which is about 40 feet above the Poplar Creek level of 735-740 ft. The open area location elevation is about 760 ft, some 20 feet above the Poplar Creek level. Storage location K-1066 F elevation is also approximately 780 feet.

Water levels in Poplar Creek, which is a tributary of the Clinch River, are controlled to a large extent by Melton Hill Dam approximately 18 km (11 miles) upstream from the confluence of Poplar Creek and the Clinch River. All three locations are outside the 100-year flood plain boundary of Poplar Creek.

3. No information is given on the average isotopic composition of the depleted uranium present. If the U has nearly natural composition, then the material could compete as feed material for gaseous diffusion. If it has the 0.3 or 0.4% U-235 content usual for depleted uranium, the likelihood of sale in the near future may be small.
Response: For the purposes of the risk assessment, as stated on page B-9 of the Draft EA, for normal and depleted uranium is considered to be no more than 0.71% U235. This value is considered conservative. The uranium materials discussed in this EA or slated to be marketed or used.

4. I could not readily determine the basis of the risk calculations. Statements about air concentrations near the ORR seem questionable. Pg. 3-1 suggests the normal background dose rate is 0.5mrem/hr. Unusual!
The information provided on page 3-1 on radiation dose rates from stored uranium materials at Fernald is (and the association to background) is from a personal communication. This has been added. Information on ORR air concentrations were taken from documented sources.

5. The description of the hypothetical accidents was inconsistent or at least so obscure I could not follow it.
Response: DOE attempted to help the reader by providing details on methodology, assumptions, and results in Appendix B. DOE believes the results to be consistent with the methods employed.

6. How on earth did this project become such an emergency that work must be completed this fiscal year, so adequate comment time cannot be afforded.
Response: The comment period on this EA was extended to one month.

7. Why did DOE/ORO agree to accept the material before the EA was available.
Response: DOE determined that the uranium material was a valuable product and its safe storage and eventual use was appropriate to DOE's mission.

8. Regardless of the above points, it appears to this reader that the facility in Portsmouth is the logical choice for storage because:

- an appropriate building has been identified where the material can be accommodated
- storage of such material is aligned with the site mission more correctly at considered locations other than ETTP in Oak Ridge
- at Portsmouth the material will stay within the same regulatory framework as at present, and
- since the EA was issued, I read that Tennessee (TDEC) has been promised that stores of depleted uranium hexafluoride will be removed from the state within ten years. If so, there would be little sense in shipping a supply of a different fluoride to Tennessee in the near future.

Response: Comment noted.

Mark Donham
Kristi Hanson
RACE/Heartwood
[redacted]
502-443-3082(W)

1. The purpose of an EA is to determine the potential significance of a proposed action. Certain factors are required by the CEQ in their NEPA regs to be considered by the agency in making this determination. These factors are found at 40 CFR 1508.27. This is, in fact, a site-specific project, and therefore, requires a site-specific context in applying these factors in the significance determination. It is our opinion that a compliant application of these factors would not result in a finding of no significant impact. Factor # 7 is the requirement that the agency look at cumulative effects during the significance determination. Some courts (for example, the 5th circuit) have ruled that during the threshold determination of significance, the duty to look at cumulative effects is even more detailed that during the EIS process, for if a FONSI is issued, this will be the only look at cumulative effects of the proposal.
Response: Cumulative impacts were examined and documented in section 4.8. DOE used the definition of cumulative effects defined in the CEQ Regulations. The effects of the proposed action when combined with past, present, and reasonably foreseeable future actions do not result in significant adverse impacts.

2. On its face, this EA is deficient. The EA inappropriately segments the actions into transportation, storage, and final disposition for purposes of NEPA analysis. This is a clear violation of NEPA. In a convoluted "Addendum", the agency tries to fast talk its way out of its duties to consider the combined effects of the storage, transportation, and long-term disposal, but this fails miserably. This is a site specific proposal, and a 1994 EA done for another part of the project, which, while it should have included the entire process, could not have because the proposal to move the material had not been made, cannot be adequate to meet the public information and scrutiny aspects of NEPA. This is not fully informing the public.
Response: As shown in the Addendum, DOE fully considered transportation of the uranium materials in several documents beginning in 1994. NEPA and CERCLA were followed and public review and comment were solicited on these actions. Further, the outbound shipments from ORO will move in DOE-approved packaging, subject to DOE radiation, contamination or fissile controls and other DOE Federal or State requirements.

3. In addition, there are cumulative effects from other ongoing projects at Paducah. These are clearly documented in the site management plan, which has not undergone NEPA review. While the management at Paducah keeps repeating as it mantra that the CERCLA analysis meets all the requirements of NEPA, the transportation addendum flatly contradicts this, stating, (finally) that "...DOE excludes Removal actions from requiring detailed NEPA documentation..." There is no doubt that there needs to be a cumulative effects analysis done of ALL the action ongoing at the site, and segmenting each individual project into a discreet analysis unit is not in compliance with NEPA. If such an analysis were undertaken, there would be no doubt that the impact would be potentially significant and require an EIS. This would and should be the site-wide EIS we have been calling for years. At a bare minimum, this should require a supplement to the EIS process ongoing for the depleted uranium, but DOE isn't even doing this. This EIS process is fatally flawed unto itself for being segmented into a discreet unit, while there are considerable and significant other actions ongoing at the site with cumulative impacts.
Response: The complete quotation from the Addendum states " Although DOE excludes CERCLA Removal Actions from requiring detailed NEPA documentation, two separate integrated CERCLA/NEPA processes (with full public involvement) were carried out at FEMP which identified

the disposition of nuclear material as a fundamental component of the remediation of OU 3." Further, see responses to comments 1 and 2 above.

4. Two other factors which are potentially significant relevant to this process are the effects on public health and safety, and the scientific uncertainly surrounding the proposal. Clearly, if there is emissions and escape of radio nuclides or uranium element into the environment which gets distributed into the food chain or into an environmental media which could cause any kind of ecological or human exposure, there is clearly a public health and safety concern which is significant. While DOE, as typical, attempts to brush these concerns off with a broad brush of statements of no impact, these conclusory statements are supported on the record with nothing. They do not comply with NEPA, which requires that findings such as this be supported with valid, objective data, which can be obtained by the public, and which is clearly identified in the record. Conclusory statements of no impact impress us not, and are in violation of NEPA. What are the emission rates of the various materials, and what are the exposure routes. What are the ecological effects, and what is the time span these effects could continue. These questions are not adequately answered or supported in the EA.

Response: As indicated in the DEA, emissions under normal operating conditions are effectively zero. The outside of the containers in which this material is packaged can be safely handled and workers require no special protection when working near the containers. Under accident situations, the doses (facility worker, co-located worker, and the public) are computed and the risk of exposure determined (see Table B.8).

5. The biggest scientific uncertainly associated with the Paducah site is the seismic hazard. It is common knowledge that the site is within a high risk seismic zone. Just recently, there has been renewed media stories about the Central Midwest Consortium's annual meeting and their call for earthquake preparedness in our region. Yet, DOE brushes this off inexplicably. This is clearly potentially significant, and needs a hard look site-wide.

Response: The radiological risk associated with seismic events at all sites was evaluated in Sections C.1.2.1 and C.1.2.3. Although the intensity for a seismic event with a frequency of 5E-4/yr is higher at the Paducah site (0.35g) than at other sites (e.g., 0.19g at Portsmouth), the same assumptions concerning damage and release were applied at all sites. These conservative assumptions include loss of all structures and utilities, fires subsequent to the initial seismic event, and ground-level releases. In reality these effects would be less at the sites with the lower seismic intensities; however, because the actual seismic design criteria for the sites are unknown, the same assumptions were applied to all sites.

6. In addition, just the fact that DOE is calling this a temporary move because they don't know what to do with the materials long term is clear evidence that there is strong scientific uncertainly associated with these materials.

Response: The uranium materials are being moved from FEMP in order to comply with a regulatory commitment made to the state of Ohio. DOE expects to use these materials as commercial product.

7. Another factor is the effects on federally listed species. While the EA lists the evening bat as federally listed, we don't believe that is correct. However, the Indiana Bat is clearly critically endangered. The conclusion that it does not occur on the plant site is not supported by the record. A clear look at the record on Indiana Bats shows that their foraging range could easily put them into the range of impact. They could easily consume insects which have become contaminated with emissions from this material. If this affects their reproductive capacity, which some evidence suggests, then this could be construed as "harm", which would be a take. It is the opinion of the commentors that an incidental take permit is necessary at this point to continue any cleanup or production activities at the plant, and failure to have completed formal Section

7 consultation to implement conservation guidelines to minimize the take is a violation of the Endangered Species Act, which would be potentially significant also under the CEQ guidelines.
Response: DOE is consulting with the U. S. Fish and Wildlife Service and state fish and game departments regarding any potential adverse impact to protected species.

8. Another potential regulatory requirement which is not mentioned in the EA is the possible requirement for a point source runoff permit for the storage area and the immediate adjacent lands. Where will this area drain, and what kind of contamination can we expect in these runoffs? Finally, wouldn't this require a RCRA permit? How would the lands being proposed for storage be regulated? What capacities would be allowed? What storage requirements would be set? How would the public be involved in this process?
Response: DOE will comply with all regulatory requirements. DOE expects no contamination from surface runoff with the possible exception of minor erosion from the construction activities.

Mr. Graham E. Mitchell
Chief, Office of Federal Facilities Oversight
Ohio EPA
State of Ohio Environmental Protection Agency
401 East Fifth Street
Dayton, OH 45402-2911

Listed below are Ohio EPA's comments on the Uranium Receipt and Storage EA:

General Comments
1. Ohio EPA concurs with the EA conclusion that the DOE Fernald site does need to remove 3800 metric tons of uranium from the site in order to complete cleanup activities at Fernald.
Response: Comment noted.

2. If the ultimate location for this material is to be at the DOE of Oak Ridge facility in Tennessee, we would recommend that the material be sent there directly from Fernald to Oak Ridge. This will reduce overall shipping costs and reduce transportation risks by handling this material only once.

If any of this material is shipped to the Portsmouth Gaseous Diffusion Plant for interim or long term storage, funding should be provided to the Portsmouth site to cover the costs of managing this material. The Portsmouth cleanup budgets have been out significantly in the past several years and this storage effort should not further impact the Portsmouth cleanup program.
Response: Comment noted.

Specific Comments
3. Page 3.1.8 Infrastructure
Fernald discharges treated effluent to the Great Miami River not the Little Miami River.
Response: Text changed to reflect comment.

Ms. Susan L. Gawarecki, Ph.D., P.G.
Executive Director
LOC Inc
Oak Ridge Reservation
Local Oversight Committee
136 S. Illinois Ave., Suite 208
Oak Ridge, TN 37830

1. The Oak Ridge Reservation (ORR) Local Oversight Committee, Inc. (LOC) submits the following comments on the subject draft EA. The LOC Board of Directors voted unanimously to comment that the LOC would have no objection to storage of uranium materials at Y-12 that are consistent with its mission.
Response: Comment noted.

2. However, the LOC objects to storage of additional uranium materials at K-25, also known as East Tennessee Technology Park (ETTP), considering that the uranium hexafluoride (UF6) cylinders currently stored there are disincentive to re-industrialization and a potential hazard to workers.
Response: Comment noted.

3. The LOC is a non-profit regional organization funded by the State of Tennessee and established to provide local government and citizen input into the environmental management and operation of the DOE ORR. The board of Directors of the LOC is composed of the County Executives of Anderson , Knox, Loudon, Meigs, Morgan, Rhea, and Roane Counties; the Mayor of the City of Oak Ridge; and the Chairs of the Roane County Environmental Review Board, the City of Oak Ridge Environmental Quality Review Board, and the LOC Citizens' Advisory Panel (CAP). The CAP has up to 20 volunteer members with diverse backgrounds who represent the greater ORR region.

No preferred alternative is given in the EA. The CAP proposes that storage of the uranium materials at the Portsmouth Gaseous Diffusion Plant be the preferred alternative, for the following reasons:

The Portsmouth facility offers the most options and even has an empty building (X-3002) suitable for storing the uranium material. The proposed action is consistent with the current mission at Portsmouth. Storing the uranium material at Portsmouth also avoids transfer of materials across state lines.

Receipt and storage of these materials is not consistent with the current ETTP mission. The Oak Ridge public and the Tennessee state regulators are increasingly unwilling to accept the continued storage of the depleted UF6 at ETTP, as there is no defined use for the material in the foreseeable future and the cylinders require ongoing surveillance and maintenance to ensure that they are not breached. DOE should not propose storage of additional depleted uranium when the existing stockpile is destined for removal and/or conversion to a stable oxide form.

Most of the uranium is depleted (2761 metric tons); locating it at Y-12 in its doubly secure area is not in keeping with the current Y-12 mission. However, locating the 799 metric tons of low-enriched uranium (LEU) at Y-12 until its sale is finalized appears commensurate with the plant's mission.

The Paducah site is limited in space and has increased earthquake and wind hazards. The action is otherwise consistent with its mission, although it is a less advantageous location than Portsmouth for these reasons and due to the transportation distance.
Response: Comments on the various alternatives sites and reasons for recommending Portsmouth are noted.

2178

Mr. Ronald Lamb

[redacted]

I wish to submit my comments on the Fernald EA. There are several reasons for not moving the uranium metal to Paducah. The first is Paducah is a small site and has more than our fair share of waste, such as 40,000 cylinders of our own and several tons of scrap metals. Paducah does not have a facility to store this metal and would have to build one. The second reason is that the Paducah plant is near the New Madrid earthquake zone. Geologists predict a severe quake to strike the region in the next few years. For this reason the Paducah plant should move our waste out of the region. I feel certain that the Department of Energy would disagree since a lot of our waste lies in 14 ton cylinders, but these cylinders have small 2 inch fill valves with very little protection. I feel there will be a numerous breaches of these fill valves during an earthquake. I believe we should be reducing the waste at Paducah instead of bringing more to this area for storage. I have included information of the fault from the earthquake consortium and a list of seismic data activity.

Response: The uranium materials are considered by DOE to be valuable product, not waste. DOE appreciates the information supplied on the New Madrid Fault. Seismic activity was considered in the accident analysis for this EA.

Paducah Gaseous Diffusion Plant
Site Specific Advisory Board

General Comments:

1. The Paducah SSAB recommends that Fernald pursue amendments to the appropriate regulatory documents allowing the uranium materials to be retained at the Fernald site pending resolution of the long-term disposition strategy.

Notwithstanding this recommendation, if the DOE decides to move the uranium materials, the Paducah SSAB recommends that the uranium materials should be moved the least distance possible to reduce the environmental impact of transportation hazards.

Response: DOE must move these materials in order to comply with a state of Ohio regulatory commitment. Recommendation for reducing transportation hazards noted.

Specific Comments:

2. Page 2-7: Drawing is out of date even though it says rev. 1/20/99. There are buildings and pads in the general area designated for the storage area.

Response: Figure updated **to show some additional buildings and pads in this general area; however, the area proposed for the storage of uranium is an open field.**

3. Page 2-11, Paragraph 1: What is the benefit of using a combination of sites?

Response: There are several possible advantages. The risk of accidental release due to fire or other natural events is lessened somewhat by having materials in different locations. Some plants, such as Y-12, are already storing LEU and it would be comparatively easy administratively to add more LEU at Y-12 than some of the other inventory materials. Also using a combination of sites could result in using existing buildings to a greater extent than might otherwise be the case, negating the need for greater ground disturbance associated with TSS construction.

4. Page 2-11, Paragraph 2: The first sentence appears to be poor planning, not a justification for not considering commercial facilities.
Response: Comment noted.

5. Page 2-11, Paragraph 4: "to support compliance with regulatory requirement" seems to use this as an excuse for poor planning and as a hammer to make something happen.
Response: Comment noted.

6. Page 3-6, Paragraph 4: Change "PGDP" to "DOE" reservation."
Response: Sentence modified to "PGDP reservation".

7. Page 3-6, Paragraph 5: Where did these numbers come from? Is this 1992 data?
Response: Numbers came from the Final Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (DOE/EIS-0200-F).

8. Page 3-6, Paragraph 6: Using 1992 data seems outdated.
Response: Comment noted.

9. Page 3-6, Paragraph 7: Why not look at 1998 or even 1997 radionuclides sources rather than 1992? If you bother checking, we believe you will find the vapor degreasers in C-400 are no longer operating. Didn't anyone visit the site or talk to the people at the Paducah Site?
Response: text has been updated to cite information from the USEC SAR dated December 15, 1997. Corrected text includes removal of the vapor degreasers in C-400 as an emission source since they are now out of operation.

10. Page 3-7, Paragraph 2: Check on numbers of plumes—believe there are 3 now (major or minor?).
Response: There are two major ground water plumes generally recognized at the plant.

11. Page 3-7, Paragraph 5: List source of the identification of the federally listed species. A 1994 Corp Study did not list the evening bat in this area and identified the pearly mussel as endangered. Also, none of these species should be included.
Response: DOE is consulting with the U. S. Fish and Wildlife Service and state fish and game departments regarding any potential adverse impact to protected species.

12. Page 3-8, Paragraph 4: Sewage is treated "onsite" not "offsite."
Response: Text modified.

13. Page 3-8, Paragraph 5: The Corp has performed a cultural resources survey. I believe it was completed in 1994.
Response: The Corps of Engineers archaeological survey covered the area outside the immediate plant boundary. There has been no systematic cultural resources survey completed which addresses resources within the plant boundary and covers historic buildings and well as archaeological sites. Text not modified.

14. Page 4-5, Paragraph 4: What about waste from the construction/site preparation. I believe soil in that area is PCB contaminated. There are building and pads that are not depicted on your map, will their existence change preferred location?
Response: Possibly there are traces of PCBs in the soil but nothing of significance. The construction of concrete pads over any soil would have the effect of reducing mobility of soil contaminants.

15. Page 4-9, Paragraph 3: I believe USEC might disagree that cleanup is the major priority at the site. I would like the source of the baseline identified and a list of "future changes."
Response: The baseline refers to the environmental baseline discussed in the Affected Environment chapter.

16. Page 5-1: Why wasn't up-to-date information about Paducah used?
Response: Sources used ranged from publication dates of 1990 to 1998. Some later information has been considered.

17. Page 6-1: Appears "walk-downs" were performed at Portsmouth and Fernald, why not Paducah and Oak Ridge?
Response: Building walk-downs were done at various sites but not Paducah. PGDP personnel provided a map location of a brownfield site (open area); it was assumed there would be little gained by a special trip to view such a site.

18. Page B-9, Paragraph 6: What goes in the blank?
Response: This breathing rate is based on recommendations from the International Commission on Radiological Protection. This source information has been added.

19. The information used was significantly out of date, and in some cases, totally incorrect. The general impression of this project is that Fernald has a regulatory driver and it will be met. How long has this project been going on? It appears this part of the project is being rushed.
Response: Comment addressed above.

Mary Byrd Davis
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Georgetown, KY 40324

1. I believe that the 3800 metric tons of depleted uranium now at Fernald should stay where they are until they are sold, rather than be moved to any of the alternative sites. Surely the agreement between the Department of Energy and the State of Ohio can be amended to make this common sense step possible. If the material is valuable, can it not be sold within a short time period?
Response: Comment noted. DOE does not project transfer to DOD within the regulatory time period allotted.

2. The storage at the alternative sites may not itself involve risks, but there is always risk in transportation. The tonnage involved would mean a major shipping initiative. Furthermore, transportation would mean a waste of resources: the consumption of fossil fuels and the consequent increase air pollution.
Response: These risks were examined earlier and found to be minor.

Diana Cahall

[redacted]

Note: Due to the length of several comments, they are summarized here. The reader can find the full text of Ms. Cahall's comments in the letters/comments portion of this appendix.

1. Although I definitely feel that a 30 day comment period fails to provide sufficient time for public review and comment by all parties who have an interest in the proposed action, extension of the public comment period does provide opportunity for limited review and participation by a few members of the public other than those representing the interests of the Fernald Environmental Project Site (FEMP).
Comment noted.

2. **The commentor provided several paragraphs dealing with the proposed sale of uranium and the failure of DOE to properly declare this material "excess".**
Response: The uranium meets DOE's mission if not FEMP's. DOE expects much of the material to be transferred via an interagency transfer to the DOD. At the present time, the uranium is not "excess"; should any be declared excess in the future, then public notification would occur at that time.

3. DOE cannot reasonably assert that materials with hazardous and toxic characteristics can be safely isolated from the human and natural environment simply by calling them "nuclear materials" with an economic value rather than waste.
Response: DOE makes no such assertion. The EA evaluates the potential impacts to the human and natural environment under both normal operating conditions and under accident conditions at each of the possible storage sites.

4. Draft EA defines the economic impact of the proposed action much too narrowly. A structure to temporarily store 3,800 metric tons of nuclear materials at other DOE sites until sale of transfer does not address the total foreseeable economic impacts of the DOE action. Five million dollars and three new worker jobs to monitor materials in the interim fails to include: (1) packaging costs for transport from FEMP, (2) transportation costs to one or more of DOE's candidate receiving sites, (3) transportation from the candidate/host site, (4) revenue from the sale of the materials, (5) cost to construct the other facilities required by "disposition" of these nuclear materials to private, commercial ventures and (6) remediation/cleanup of nuclear waste disposal costs from the operation of commercial reuse or recycling/reprocessing facilities which DOE reasonably can foresee and predict to result from the proposed action.
Response: Items 1 and 2 were dealt with in the CERCLA ROD for FEMP. Transportation from the candidate site is the responsibility of another federal agency, such as the Department of Defense, should they acquire the materials. At present, commercial ventures cannot buy the material; another federal agency could acquire it via an interagency transfer. Thus sales revenues would not occur. Regarding impacts associated with use by another agency, any such impacts would have to be addressed by the respective agency when and if they acquire the materials. DOE cannot predict who would acquire what materials, where the materials would go, what specific uses they would be put or how decontamination might occur after transfer and use.

5. DOE is mandated to comply with Executive Order 12866, and all others.
Response: Comment noted.

6. DOE has failed to consider the direct and indirect foreseeable impacts of the proposed action, including the considerable long and short term costs, risks to the public and worker safety, and environmental consequences in draft EA.
Response: DOE disagrees with this statement. The EA evaluated pertinent direct and indirect effects and in particular focused on public and worker safety (see Appendix B).

7. Note that EA presents dose calculations based upon incomplete/missing data. Breathing rate of 3.3 E-4 m3/s based on_____.

This rate is based on recommendations from the International Commission on Radiological Protection. This source information has been added.

8. Transportation is an obvious requirement/result of the proposed action, as in the impacts associate with transfer. Communities along the transportation routes are not even mentioned in passing (by rail or truck) in DOE EA.
Response: Transportation impacts have already been considered in previous documentation. DOE decided to provide an addendum to the DEA in order to address any transportation-related concerns. This information has been incorporated into a new appendix and included as part of the FEA.

9. Conclusion of the Transportation Addendum provides no meaningful information whatsoever about what is being moved, where the material is being moved from (ORO may be a misprint) since all other transportation discussion is focused upon removal of nuclear materials from the FEMP site as part of remediation activities of the site), what standards of protection and regulation apply and how DOE proposes to comply.....
Response: In section 1.1 DOE indicated that 3800 metric tons of uranium material is to be moved from the FEMP to another ORO site. Paragraph 5 of the Addendum explained that "all material shipped from FEMP will be packaged in accordance with Title 49 Code of Federal Regulations. In paragraph 6, DOE declares it intention to move the materials "in DOE-approved packaging, subject to DOE radiation, contamination or fissile controls and other Federal or State requirements".

10. DOE is being disingenuous in multiple failures to address transportation in a manner compliant with agency policy and guidelines. DOE cannot avoid addressing transportation due to implementation of transportation **requirement** in DOE proposed action by an outside/independent contractor. DOE and other agencies should not attempt to avoid disclosure of the total plan by hiding "the plan" behind Fernald/FEMP cleanup which is precisely what has been attempted in draft EA.
Response: On the contrary, DOE has already evaluated transportation as part of the integrated CERCLA/NEPA process. This process had full public involvement. Transportation-related impacts were identified as minor. Therefore, DOE chose to focus on the receipt and storage of these uranium materials at other ORO sites since that analysis had not been previously performed.

11. Scope of EA is narrowly focused upon movement of nuclear materials from FEMP site as a part of the site's remediation while failing to address and disclose what disposition is proposed for these materials after they are shipped from FEMP to other DOE site(s). DOE actions and intentions require full explanation in final EA.
Response: DOE has properly focused on analyzing the potential environmental impacts of receipt and storage of uranium materials at one or more ORO sites. DOE has no specific agreements in place to transfer these materials to a third party. Until final use is determined, DOE cannot where or precisely how the materials would be used. As appropriate, DOE will determine the level of NEPA action required for subsequent actions.

12. "Commitments made to the state of Ohio" require full explanation. Both DOE and state of Ohio have failed to disclose the commitments which cause the actions proposed in the EA to occur, and would provide information as to the total scope and purpose of the proposed action(s).
Response: The statements referring to commitments made to the State of Ohio actually addresses both direct and indirect commitments made to both the U.S. EPA and Ohio EPA. In 1993 plans and budgets were developed and put into place to address the disposition issues associated with the Nuclear Materials. In this same time frame, Records of Decision for the various Operable Units were being drafted to address the cleanup efforts at the site. The Nuclear Material Disposition Project represented a significant impediment to the D&D and soil remediation schedules, therefore, as a result

commitments were made to the state and federal regulatory agencies concerning the removal of nuclear materials from the FEMP. In this period of time, from 1993 through 1998 more than 5 million pounds of nuclear materials were removed from the FEMP, however there still remains more than 10 million pounds (4700 MTU) of nuclear materials that need to be dispositioned. In late 1998 DOE-FEMP committed to both the U.S.EPA and OEPA that a firm date for removal of all of the nuclear material would be provided by April 1, 1999. Schedules and budgets are currently being developed to provide the firm date to the regulators by this date.

13. DOE is required to notify interested and adversely affected parties by legal notification process. How and when was this done? I can find no public notification of draft EA's availability for public comment in the federal register or in legal notice in subscription newspapers available within the Brown County, Ohio area which properly notified the public of any proposed agency transport of nuclear (fissile) materials through local communities.
Response: Public notices were published in late January (January 21 for most papers) in several local newspapers including the Oak Ridger, Knoxville News Sentinel, Portsmouth Daily Times, Paducah Sun, and Hamilton Journal News. In addition, at this same time DOE sent news releases to local TV and radio stations regarding availability of the EA. The news releases were also sent to the following news papers–the Jackson Times Journal, the Chillicothe Gazette, Pike County News Watchman, Portsmouth Daily Times Columbus Dispatch, Cincinnati Enquirer, and the Louisville Courier Journal.

14. DOE is requested to prepare program-wide EA/EIS which address the major federal actions being proposed for implementation in draft EA.
Response: Comment noted.

15. DOE is also required to comply with Executive Order 12898, February 16, 1994 which mandates federal agencies to avoid actions resulting in disproportionate adverse environmental and health impacts in low-income and minority communities.
Response: Socioeconomics and Environmental Justice were addressed for each of the DOE/ORO sites (see sections 3.1.6, 3.2.6, 3.3.6, 3.4.6, and 3.5.6) and corresponding impacts sections.

16. Given the arbitrary nature of the process used by DOE to date in declaring "excess property" in inventory, statement of DOE intent is required in final EA. DOE has considerable reason to predict that implementation of FEMP environmental management and restoration will likely result in the FEMP site (land) becoming excess real property. What are the agency's intentions after remediation is completed at FEMP?
Response: That decision is beyond the scope of this EA.

17. Current proposals for FEMP future uses include giving the FEMP site back to the Indians. Does DOE intend to use FEMP as a "pilot program" for giving other DOE/federally owned sites /land back to Native Americans, including the Hanford site in Washington state?
Response: Approximately 1050 acres of FEMP land is being evaluated for alternative uses. DOE is being assisted in this process by local groups and other agencies. A majority (884 acres) is proposed to undergo natural resource restoration. A 23-acre plot in the south-central portion of the site may be set-aside for potential commercial development. No final decisions on land reuse have been made at this time.

18. The agency has failed to include data necessary to justify a finding of no significant impact.
Response: DOE has analyzed the potential environmental impacts of receipt and storage of 3800 metric tons uranium at several ORO sites. Both normal operations and accident situations have been

examined. No significant environmental impacts have been identified. Some site locations pose more exposure risk than others.

19. DOE is capable of applying considerably higher standards of agency review and oversight and is herein requested to do so.
Response: Comment noted.

Gregory L. Simonton
SODI Executive Director
Southern Ohio Diversification Initiative
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RE: USDOE Fernald Material Relocation

The Southern Ohio Diversification Initiative (SODI) wishes to make comments regarding the destination of material from the USDOE Fernald Site, especially related to the USDOE Portsmouth Site.

1. The SODI is working cooperatively with the local communities and the Department of Energy to develop and implement programs that will lessen the impacts resulting from the reductions of employment at the local site. A central theme, and the key to our long -term transition success, is the reuse of buildings, lands, and equipment located on the Portsmouth Reservation.

We believe that relocating the material from Fernald to the Portsmouth Site negatively impacts our re-industrialization efforts. Public perception will play a vital role in our marketing program and reuse success, both of which are targeting a variety of companies to diversify our regional economy.

We recognize the Department of Energy has obligations with the regulatory agency(s) concerning removal of the Fernald material. With that in mind, we make the following recommendations:

Any material transferred to the Portsmouth Site should not be stored in facilities with a viable potential for reuse and alternate job creation. Specifically, any facility targeted for storage should be reviewed and approved by the SODI-DOE's designated Community Reuse Organization. This will ensure the negative impacts to our Re-industrialization Strategy will be minimized.

Buildings X-3002, 3001, 3346, 3000, 1000 (and other facilities) are initial priorities for our Re-industrialization Strategy and should not be considered for Fernald material storage.

If Portsmouth is to receive a portion of the Fernald material, new facilities should be constructed to house the same.
Response: Comments and recommendations are noted.

William M. Pardue, Chair
Oak Ridge Reservation Environmental Management
Site Specific Advisory Board
Oak Ridge, TN 37830

In analyzing the relative appropriateness of Oak Ridge Operations (ORO) for the receipt and storage of uranium materials from the Fernald Environmental Management Project Site:

1. The distance from Poplar Creek to prospective storage sites at East Tennessee Technology Park (ETTP) is discussed, but the elevation above creek level and flooding history were not mentioned.
Response: Information in section 3.5.3 indicates that most of the ETTP site is above the probable maximum flood. Text has been added to specifically state that all proposed storage locations at ETTP are above the 100-year flood level. According to the USGS topographic map for ETTP (DOE 1999), storage location K-131/K-631 elevation is approximately 780 ft, which is about 40 feet above the Poplar Creek level of 735-740 ft. The open area location elevation is about 760 ft, some 20 feet above the Poplar Creek level. Storage location K-1066 F elevation is also approximately 780 feet.

Water levels in Poplar Creek, which is a tributary of the Clinch River, are controlled to a large extent by Melton Hill Dam approximately 18 km (11 miles) upstream from the confluence of Poplar Creek and the Clinch River. All three locations are outside the 100-year flood plain boundary of Poplar Creek.

2. No information is given on the average isotopic composition of the depleted uranium (U) present. If the U has nearly natural composition, then the material could compete as feed for gaseous diffusion. If it has the 0.3 or 0.4% U-235 content usual for depleted uranium, the likelihood of sale in the near future may be small.
Response: For the purposes of the risk assessment, as stated on page B-9 of the Draft EA, for normal and depleted uranium is considered to be no more than 0.71% U235. This value is considered conservative. The uranium materials discussed in this EA or slated to be marketed or used.

3. How did this project become such an emergency that work must be completed this year, with the result that stakeholders are prevented from having the opportunity for meaningful input?
Response: The public has opportunity for meaningful input.

4. Why did DOE-ORO agree to accept the material before the EA was made available?
Response: DOE determined that the uranium material was a valuable product and its safe storage and eventual use was appropriate to DOE's mission.

5. It appears that the facility at Portsmouth is a more appropriate site for storage:

- An appropriate site at Portsmouth (X-3002) has been identified where the material can be accommodated.
- Storage of this material is consistent with the Portsmouth mission; it is inconsistent with the current mission at ETTP.
- At Portsmouth, the material will stay within the same regulatory framework as at present.
- The State of Tennessee (TDEC) has reached agreement with DOE to remove stores of depleted uranium hexafluoride from ETTP within the next ten years. There is little sense in shipping a supply of a different fluoride to Tennessee in the near future.

Response: Comment noted.

Earl C. Leming
Director/State of Tennessee
Department Of Environment and Conservation
DOE Oversight Division
761 Emory Valley Road
Oak Ridge, Tennessee 37830

The Tennessee Department of Environment and Conservation, DOE Oversight Division (TDEC/DOE-O) has reviewed the subject document in accordance with the requirements of the National Environmental Policy Act (NEPA) and associative regulations of 40 CR 1500-1508 and 10 CFR 1021 as implemented.

The State of Tennessee strongly supports the Defense and National Security missions on the Oak Ridge Reservation. The State has not supported use of the Oak Ridge Reservation for storage off offsite materials that have no identified future use or may be declared a waste at some future date.

The Draft EA appears to propose a Monitored Retrievable Storage Facility (MRS) at a site other than Fernald. The Draft EA has not demonstrated that such a facility meets present or future Defense Programs needs for the material or other national security interest, nor has it provided sufficient information to allow the State to consider the overall positive and negative impacts resulting from a transfer of the materials to Oak Ridge.

The Division appreciates the early interaction with the DOE on this issue. We believe cooperation and issue resolution is more likely when the State is involved early in the NEPA process. We would like to see this process continued.

Enclosed for your review and response are general and specific comments.
Response: Comments are addressed individually below.

Tennessee Department of Environment and Conservation/DOE-Oversight
Comments on the Draft Environmental Assessment
DOE/ORO-2078, February 1, 1999
The U.S. Department of Energy, Oak Ridge Operations
Receipt and Storage of Uranium
Material from the Fernald Environmental Management Project Site

General Comments:

1. In order to reasonably assess whether the Fernald material is an asset material required for Defense needs or other national security considerations the EA should provide information on existing complex wide inventories of similar material and how much has been transferred over the past five years to the Department of Defense or "other interests."
Response: As stated in the EA, FEMP has reduced its uranium inventory form 14,500 to approximatley 6,800 metric tons over the past 6 to 8 years. There have been expressions of interest in acquiring the 3,800 MTU product by both private concerns and other federal agencies. Currently there is a temporary moratorium on sales of uranium to private concerns; however, DOE can transfer the material to another agency as the need arises.

2. The EA does not describe a contingency plan for the storage and eventual disposition of this material in case no markets are developed. Although the EA states on page 1-1 there is an "interest" the material is "potentially marketable," and it is in the best interest of DOE to "eventually market or use" the material, DOE may require long-term management of the material. The draft EA risk analysis indicates that a container breach would occur primarily from long-term corrosion. Without proper storage and maintenance the material from Fernald could experience corrosion. The DOE should avoid this situation with the Fernald material by planning for adequate funding for storage and maintenance. The EA should address associated cost for transportation, long term storage, and disposition (including disposal). It should also address any plans for cost recovery through sales or other forms of revenue exchange. The EA should clearly identify the DOE program, which would be responsible for the material and that programs funding assurance or needs to properly store, maintain, and disposition the material. It should also address future decontamination and decommissioning cost of equipment and facilities.
Response: DOE-ORO carefully evaluated the FEMP materials and determined what materials were waste and what were product. DOE anticipates an economic or interagency use for the product analyzed in this EA.

3. The draft EA is inconsistent in many areas of consideration. A description of existing, contamination, fire suppression systems, and ventilation was provided for some candidate site buildings, while the buildings at Y-12 and ETTP did not receive the same consideration. Some proposed areas were evaluated as flood zones while areas at Y-12 and ETTP did not have the same evaluation. Other sites were evaluated for upgrades to facilities while there were no assessments done for the buildings at Y-12 and ETTP. In order to evaluate this document for issuance of an EIS or FONSI, complete and consistent information must be provided.
Response: While some buildings have fire suppression and other systems, DOE took no credit for these systems during a potential accident event. As noted on page B-6 of the Draft EA—"all facility structures are assumed to be destroyed and nothing but rubble remains. All utilities are lost." DOE believes this approach is conservative. It removes uncertainties from the analysis associated with the whether and/or how well a particular fire suppression system may operate during an emergency or the degree to which a particular building can withstand an earthquake or other natural disaster.

4. It has been indicated that material exists in the inventory that requires a Nuclear Category 2-storage facility. The category should be described and the site(s) under consideration evaluated to determine if they meet the same nuclear category or what will be required to upgrade the facilities to a Category 2. The amount of material requiring Nuclear Category 2 storage must also be identified.
Response: The term Nuclear Category 2 refers to the inventory of material and not to the building or storage facility capability.

5. The radioactive contamination levels of candidate buildings must be described. The presentation made to this Division clearly indicated that the material from Fernald would be in clean packages, i.e.: free from external contamination, and would be placed in "pristine" facilities.
Response: It is DOE's intent to place the FEMP materials in clean facilities. Buildings that do not or cannot be made to met this criterion in the time needed will not be used.

6. The transportation evaluations for moving the material were absent from the draft EA and provided only after request. If the containers are transported off site, they must be evaluated for transport suitability, as the document states there have been problems with long-term corrosion.
Response: This information is in Appendix A. All material proposed to be shipped from FEMP would be packaged in accordance with Title 49 CFR. Outbound shipments will move in DOE-approved packaging, subject to DOE radiation, contamination or fissile controls and other DOE Federal or state requirements.

7. The EA must address the inspection and maintenance programs that have allowed the long-term corrosion to occur. The final EA should include all incidents of container breaches and releases of material. The final EA should also describe the storage containers including type and thickness of metal.
Response: The FEMP materials will be repackaged or refurbished to meet DOT requirements for shipment. The materials will be under a surveillance program, which meets or exceeds DOE requirements.

8. Requested funding in FY 2000 to upgrade the existing facilities at Y-12 for storage of highly enriched uranium has been cut. Additional material stored in substandard facilities increases the risk of release to the environment and exposure to the public. It does not appear the risk analysis used substandard facilities in the evaluation.
Response: As noted above, DOE took no credit for building integrity in the event of a natural disaster.

9. At the request of Tennessee, DOE has imposed a limit for storage of LEU at 6 MTU for the Y-12 site. No inventory above that limit is allowed as specified in the Finding of No Significant Impact (FONSI) for the Environmental Assessment (EA) of the "Proposed Interim Storage of Enriched Uranium Above Maximum Historical Storage Level at Y-12 Plant, Oak Ridge, Tennessee."
Response: Comment noted.

Specific Comments:

10. **Page 1-1, Section 1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION**
"Of the remaining inventory there are approximately 3800 metric tons of potentially marketable material...."
This remaining 3000 metric tons of uranium material that is not potentially marketable should be considered waste.
Response: It is considered waste and is being dealt with accordingly.

11. **Page 2-1, Section 2.1 BACKGROUND**
"...an area where at least two tension-support structures..."
The EA should clearly indicate that these are temporary tent-like structures and not permanent buildings.
Response: The EA notes that the TSSs would have tarpaulin roofs and sides.

12. **Page 2-8, 2.5 Y-12 Plant**
The Nuclear Category level and contamination levels (if levels exist) of the buildings should be described.
Response: The Nuclear Category level refers to the inventory and not to the building/facility.

13. **Page 2-8, 2.6-1 K-1066F Area**
The draft EA should specifically state whether the K-1066F area is or is not within a flood zone.
Response: A sentence has been added to section 3.5.3, which states that all proposed storage locations at ETTP are above the 100-year flood level.

14. **Page 2-8, 2.6-2 K-131 and K-631 Buildings**
The *"Remedial Investigation Report for the East Tennessee Technology Park, Oak Ridge, Tennessee, Volume 5"* does not list K-131 as having a basement. Additionally, both buildings are listed as having contamination areas, failing a screen for the report, and requiring further evaluation in the feasibility study. These buildings are currently listed on a decontamination and decommissioning list. During the presentation made to the Division, it was stated by DOE that the storage of this material was to be "pristine" facilities. Storage in contaminated buildings would not meet that goal.
Response: Buildings would only be used if they were "clean". DOE would not use contaminated buildings. It is unlikely that these specific buildings could meet programmatic requirements for storage of this uranium.

15. *"These buildings are approximately 200 ft south of Poplar Creek at its closest point."*
Explain the significance of this statement in terms of flooding.
Response: See response to comment 13 above.

16. Provide information for the meaning of "nominal" in the statement
"The nominal basement size is 22,765 ft...."
Response: The usable, available space in a building can be slightly smaller than the actual/nominal square footage.

17. **Page 2-1, 2.8.1 Commercial Facilities**
The requirement to have all the uranium removed from the FEMP site by September 30, 1999, should be cited. Although the draft EA states there *"was not enough time to prepare and issue a competitive request for proposal..."* the DOE has known for some time this material needed to be removed from the FEMP site.
Response: Comment noted.

18. **Page 3-3 and 3-11, Table 3.1 and Table 3.4**
A comparison of Table 3.1 and 3.4 indicates that Cincinnati was included for the Fernald site analysis, but Knoxville was not included in the Oak Ridge site analysis. Knoxville is as close to Oak Ridge as Cincinnati is to Fernald, therefore, Knoxville should have been included in the analysis of the Oak Ridge sites.
Response: The Draft EA indicated that the socioeconomic region of influence for FEMP could either be Hamilton County, Ohio or the Cincinnati Metropolitan Statistical Area. DOE chose to include data form both areas. Given the small potential economic impact associated with the proposed action, inclusion of Knoxville data would make no difference to the analysis or conclusions.

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19. **Page 3-9, Section 3.4.2 Climate and Air Quality**
"For radiological pollutants, emissions are variable and emanate mostly from the TSCA incinerator." TSCA is not the primary source of radiological emissions. In the 1997 ASER, less than one Curie of radiation was reported as being emitted from the TSCA stack. Over 10,000 Curies were reported as being emitted from the HFIR stack. Only .013 Curies of uranium were released from Y-12 during 1997; however, Y-12 was still in "stand-down" mode. The most effected individual for the ORR was closest to the HFIR stack not the TSCA stack. Please revise this section to reflect the above statistics.
Response: Text corrected.

20. **Page 3-9, Section 3.4.1 Public and Worker Risk**
Y-12 should have the same considerations as Portsmouth and Paducah sites for "radiation dose from airborne radionuclides..." and "collective radiological dose from airborne emissions..." The document is inconsistent in its evaluations.
Response: Information added to text.

21. **Page 3-9, 3.4.3 Water Resources**
Floodplains are not addressed nor is groundwater. This section is inconsistent in evaluation with other sites' sections.
Response: Text added.

22. **Page 3-10, 3.4.5 Ecological Resources**
Lake Reality is not considered waters of the State and is a man-made, spill containment pond that has heavy mercury and PCB contamination. Its location is now adjacent to Upper East Fork Poplar Creek.
Response: Comment noted.

23. **Page 3-11, Section 3.5 EAST TENNESSEE TECHNOLOGY PARK (formerly K-25 Site)**
This section discusses the East Tennessee Technology Park (ETTP) as a possible site. The ETTP is being re-industrialized. The use of the site as a storage area for Uranium material does not appear to meet the current mission for the ETTP. The EA should address the D&D Trust Fund which is the main source of funding for ETTP operations and how ETTP funds would be used to store and disposition the Fernald material.
Response: Through 2001 monies to meet the proposed action would come form the FEMP budget. After 2001, funding will be presented as part of DOE-ORO budget request but separate from the D & D Trust Fund.

24. **Page 3-11, Table 3.4**
Please explain what the "Fernald Region of Influence" (in table title) means and how it impacts Anderson and Roane counties. The "Fernald Region of Influence" is also mentioned in Tables 3.2 and 3.3.
Response: Table titles have been corrected.

25. **Page 3-11, 3.5.1 Public and Worker Risk**
ETTP should have the same considerations as the Portsmouth and Paducah sites for "radiation dose from airborne radionuclides..." and "collective radiological dose from airborne emissions..." Again, the document is inconsistent in its evaluations.
Response: Text added.

26. **Page 3-12, 3.5.3 Water Resources, Surface Water**
"...most of ETTP is above maximum flood level" does not adequately describe the potential for flooding at proposed storage sites. Flood levels are measured in terms of "X" year floods, that is, a 25-year flood will reach a certain elevation above sea level in a certain location, while a 100-year flood will reach a higher

elevation in the same location. The proposed locations for this material are located near Poplar Creek. The paragraph should provide specific information whether or not a flood could inundate the area and the flood plain year (25, 100, etc.)
Response: Requested information added.

27. Page 3-12, 3.5.3 Water Resources, Groundwater
"...conduit-dominated flow has been confirmed only in portions underlain by Knox carbonate along Black Oak Ridge." One-third of all bedrock wells at ETTP intersects cavities, which are generally water-filled. At least one of the proposed locations had adjacent dolines shown on topographic and geologic maps of the area. Conduit flow should be and is the base assumption for unconfined carbonate aquifers such as those that underlie the ETTP proposed storage sites. The fact that conduit flow has only been delineated in one area at ETTP should not be used to imply that conduit flow does not exist in other carbonate units beneath the site.
Response: Comment noted. DOE considered all activities associated with the proposed action including both normal operations and accident conditions. Surface and ground water resources would not be adversely affected.

28. Page 4-1, 4.1 Public and Worker Risk, first paragraph
Provide information for the statement *"In addition, the initial assessment to determine..."* specifically outlining what is meant by *"a review of the fate of the uranium in the off-site environment..."* Also provide information as to where this assessment appears in the appendices.
Response: Accidental release of uranium has been evaluated for each site. Additional information on metal toxicity was added to the EA in section 4.0 and text revised.

29. Page 4-2, 4.1 Public and Worker Risk, first and second paragraph
"Uranium that is released from primary and secondary containment..." It appears that the modeling did not use the tension support structures proposed for storage of this material.
Response: As noted in the response to comment # 3 above, DOE took no credit for building integrity during a seismic-fire event. Thus releases during these accident conditions are assumed to be the same for a permanent brick-and-mortar building as for a TSS. This assumption is environmentally conservative and likely over estimates adverse effects in many situations.

30. Page 4-8, 4.6.1 Normal Operations, fifth paragraph
"...Workers could be exposed to direct radiation from surface contamination"
Storage containers should not have any surface contamination. The DOE's original presentation to this Division stressed the packages would be clean and kept in a clean environment. Although these packages may be stored on brown field areas, they are not scheduled to be in any type of secondary containment building. Containers should be free of contamination to prevent release of surface contamination to areas outside the designated storage.
Response: This is correct; storage containers should not have any surface contamination and the EA notes the precautions taken to prevent such an occurrence.

31. Page A-3, Appendix A
To prevent moving the material twice or more, the 193 MTU of normal uranium scheduled to be used for blend stock should be moved directly to the sites using the material. Furthermore, if other users for the inventory are identified, the material should be transported directly from Fernald to the user to avoid transporting twice. The total pounds and MTU amounts do not match the total s given on page A-4 and Table B.1
Response: Comment noted.

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32. Page A-5, Appendix A
The chart is describing "depleted" uranium but the total is stated for "all normal."
Response: Chart corrected.

33. Page B-4, Appendix B, Table B.1
The inventory amounts for the total normal uranium MTU do not match the amount listed in Appendix A, page A-3. The total low-enriched uranium pound amount does not match the amount listed in Appendix A, page A-7.
Response: Comment noted.

34. Page B-6, Table B.4
The tornado wind speed for Oak Ridge is less than Fernald and Paducah. How was the wind speed determined, and why was it less for Oak Ridge?
Response: The source document for these data were added to the appendix. The information is based on historical data. A variety of factors determine tornado wind speed; however, the hilly topography in the Oak Ridge area is a likely contributor to lower wind speeds other areas with flatter terrain.

35. Page B-6, Appendix B, page B-5, Table B.2, and Container Breach
It is listed that an accident involving a container breach due to corrosion or degradation of the storage containers could occur. The condition and age of the storage containers should be fully examined and included in the final EA. The material also needs to be fully evaluated for transportation in the final EA.
Response: Virtually all containers are new and in excellent condition. The T-hoppers are older but are very thick walled vessels. All containers will meet DOE transportation requirements. The containers are proposed to be stored in the dry in buildings or Tension Support Structures. The uranium is relatively inert, insoluble, and non-corrosive. Container breach would most likely under an accident scenario rather than from corrosion.

36. Page B-7, Appendix B, third paragraph
"...it is assumed that the uranium storage facility is a Hazard Category 2 facility..." The hazard analysis appears to assess storage in a Hazard Category 2 facility but not storage in the tension-support structures (TSS) or outside storage pads.
Response: see response to comment #12 above.

37. Page B-9, Appendix B
Please explain the blank line for the first bullet regarding breathing rate.
Response: This rate is based on recommendations from the International Commission on Radiological Protection. This source information has been added.

38. Page B-15, Appendix B, Table B.8
The calculations for public dose needs to be re-evaluated as the ETTP site is undergoing re-industrialization, members of the public are not restricted to outside the site fence boundaries.
Response: Industrial workers are treated in the assessment as workers or co-located workers.

Ms. Joelle Key
Health Physicist
Department of Environment and Conservation
Division of Radiological Health
3rd Floor, L & C Annex
401 Church Street
Nashville, TN 37243-1532

Thank you for the opportunity to review the Environmental Assessment for the Receipt and Storage of Uranium Materials from Fernald Environmental Management Project Site. The Division of Radiological Health has the following comments about this document:

1. There are a number of special security considerations for the movement and storage of the LEU material. Since the Y-12 site currently stores some HEU and LEU, that site appears to be the best location for the storage of the LEU material if it is to be stored in Oak Ridge.
Response: Comment noted.

2. This proposal treats the uranium in question as a "product" but the only mention of an actual customer for the product is for the LEU. The State of Tennessee already contains hundreds of cylinders of Depleted Uranium in the form of UF6 which the Department insists can be marketed as a product, but for which they have been unable to find a buyer. While the UF6 situation is different because of the need to convert the uranium to a usable form, the situation is similar.
Response: The Department of Defense uses depleted uranium in certain weapon systems.

3. In the proposal to store the material at K-25, the "co-located worker" is considered to be closer than the member of the public. This is not an accurate assessment of this site. Due to the re-industrialization of the ETTP site members of the public work at and visit this site regularly. The concept of a "co-located worker" for non-radiation workers is a DOE fabrication and is not recognized elsewhere.
Response: DOE believes the assessment of industrial workers at re-industrialized facilities as co-located workers is accurate and appropriate.

4. The EA states that the intent is to get approval for storage of the material at "one or more site." If the intent of this statement is to leave several options open then we have no objection to this intention. If on the other hand the intention is to scatter the material to different sites then this causes us concern. Storing the DU and HEU at different sites may be necessary but scattering the DU material to various locations appears inefficient. For example, using more than one site would require that personnel be hired and trained to monitor the material at each of the sites. This does not appear to be the most efficient use of resources. Some of the sites being considered, such as the Y-12 site, do not have enough storage space for all of the material. If a site cannot contain all of the DU material, then we do not think it should be considered for storage of this material.
Response: Comment noted.

5. The accident assessment for the ETTP site and specifically for the K-1066F site describes the worst credible accident dose to the public as a low dose. The dose calculated is 1.26 rem. This should not be considered a low dose. Evacuation of the public is recommended at a projected dose of greater than 1 rem.
Response: The methodology for risk and associated terminology used is presented in Appendix C.

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6. On page B-9, the first bullet at the bottom of the page is incomplete. It contains a blank underlined space, which was most likely intended to be filled in. The information is included on the page but should also be included in the bulleted line.
Response: This rate is based on recommendations from the International Commission on Radiological Protection. This source information has been added.

7. On page B-11, a chart lists the distances to the site boundary from each building considered. This distance was used in the accident assessment as the distance to the nearest member of the public. Given the development of private enterprise on this site ETTP is a public site. Given this, the site boundary is not a reasonable measurement for this calculation for those three buildings. The accident assessment for all three buildings should be reevaluated, this includes the K1066F site which already represents the highest accident dose of 1.26 rem.
Response: DOE believes the assessment of industrial workers at re-industrialized facilities as co-located workers is accurate and appropriate. The boundaries to the public are correct.

8. Page B-13 includes a table that lists radiological consequence levels to the public and to workers and associates these with a descriptive word. A public dose ranging from >=0.1 rem to <5 rem is described as having low consequences. This seems an unreasonably high range for a low consequence dose.
Response: The methodology for risk and associated terminology used is presented in Appendix C.

9. Many of the proposed storage locations are not in the form of already existing buildings, but are empty lots on which Tension Support Structures (TSS) would be built. These buildings do not appear to be as secure as a real building. How reasonable is it to store this type of material in this type of building?
Response: All the uranium product is packaged in containers suitable for transport and will be stored in this packaging. There is practically no risk during normal operations in any structures. During accident conditions, risks are minimal even taking into consideration that DOE takes no credit for containment by buildings during the seismic-fire event. Use of TSSs appears to be a viable method of storage. All buildings and TSSs are proposed in locations that are in DOE property protection areas and are thus secure.

2178 02-05-99

MR. DAVID R ALLEN
ORO NEPA COMPLIANCE OFFICER
DEPT OF ENERGY
OAK RIDGE OPERATIONS OFFICE
P.O. BOX 2001
OAK RIDGE, TENNESSEE 37831

DEAR MR. ALLEN:

THANK YOU VERY MUCH FOR THE DRAFT DOE/ORO-2078. I WANT TO MAKE THE COMMISSION AWARE THAT I HAVE 53 ACRES OF LAND 18 MILES EAST of SIERRA BLANCA, TEXAS WHICH is 88 MICES EAST OF EL PASO, TEXAS.

I KNOW THAT NUCLEAR WASTE IS BEING STORED HERE BY THE SIGNS ETC, AND A VISIT TO MY PROPERTY. I MAKE MY PROPERTY AVAILABLE AT A Good COST TO THE D.O.E, AND I KNOW A LOT of OTHER ACREAGE WOULD BE AVAILABLE.

THANK YOU + PLEASE REPLY.

Walter Frazier

Mr. Walter Frazier
[redacted]

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to
The U.S. Department of Energy

Dear Sir
I am opposed to the D.O.E.
plan to make Wes Kentucky a
nucular waste dump. The Federal
plant site is on a major Earthquake
falt and our Experts say the big one
could happend any time and be a
major dissaster. We don't need any
more nucular wast in fact the nucular
waste we now have should be sent
some place else.

Yours Truly
A B Puckett

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PADUCAH, KY R&DF 420 02/13/98 139 F

Mr. Alfred B. Puckett

[redacted]

ZIP CODE

USA H
First-Class Rate

David allen
N.E.P.A Compliance officer
oak Ridge operations
E.E.-32
Po Box 2001
Oak Ridge Tn 37831

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[redacted]

February 14, 1999

David R. Allen
ORO NEPA Compliance Officer
Dept. of Energy Oak Ridge Operations Office
PO Box 2001
Oak Ridge, TN 37831-2001

Dear Mr. Allen:

Subject: Comment on EA for USDOE/ORO Receipt and Storage of Uranium Materials from the Fernald EM Project Site.

The subject document has some notable deficiencies from the perspective of the attentive public concerned about decisions affecting the Oak Ridge environment:

- I found no information on the toxic effects of uranium other than the radioactivity.

- The reader is told of the distance from Poplar Creek of prospective storage locations at ETTP, but the elevation above creek level and flooding history were not mentioned.

- No information is given on the average isotopic composition of the depleted uranium present. If the U has nearly natural composition, then the material could compete as feed material for gaseous diffusion. If it has the 0.3 or 0.4 % U-235 content usual for depleted uranium, the likelihood of sale in the near future may be small.

- I could not readily determine the basis of the risk calculations. Statements about air concentrations near the ORR seem questionable. Pg. 3-1 suggests the normal background dose rate is 0.5 mrem/hr. Unusual!

- The description of hypothetical accidents was inconsistent or at least so obscure I could not follow it.

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Since willingness of the public to accept risks from any project must depend on potential benefits or at least whether the project makes any sense, other questions intruded which need consideration in the final alternative selection:

- How on earth did this project become such an emergency that work must be completed this fiscal year, so adequate comment time cannot be afforded?

- Why did DOE/ORO agree to accept the material before the EA was made available?

Regardless of the above points, it appears to this reader that the facility in Portsmouth is the logical choice for storage because:

- An appropriate building has been identified where the material can be accommodated,

- Storage of such material is aligned with the site mission more correctly at considered locations other than ETTP in Oak Ridge,

- At Portsmouth the material will stay within the same regulatory framework as at present, and

- Since the EA was issued, I read that that Tennessee (TDEC) has been promised that stores of depleted uranium hexafluoride will be removed from the state within ten years. If so, there would be little sense in shipping a supply of a different fluoride to Tennessee in the near future!

Sincerely,

Robert Peelle

Robert Peelle

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Mr. Robert W. Peelle

[redacted]

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Mr David R. Allen
ORO NEPA Compliance Officer
Dept. of Energy Oak Ridge Operations Office
PO Box 2001
Oak Ridge, TN 37831-2001

2178

John, These are Kristi and my comments on the Fernald EA on behalf of ourselves and RACE. Could you forward these to David Allen or send me his email address so I can submit them today? thanks a lot. If you have any questions, let me know. Mark D.
David Allen
U.S Dept. of Energy
Oak Ridge Region
March 4, 1999

Dear DOE,
These are the comments of the undersigned on the draft EA for the movement of uranium materials from Fernald.

1. The purpose of an EA is to determine the potential significance of a proposed action. Certain factors are required by the CEQ in their NEPA regs to be considered by the agency in making this determination. These factors are found at 40 CFR 1508.27. This is, in fact, a site-specific project, and therefore, requires a site-specific context in applying these factors in the significance determination. It is our opinion that a compliant application of these factors would not result in a finding of no significant impact. Factor # 7 is the requirement that the agency look at cumulative effects during the significance determination. Some courts (for example, the 5th circuit) have ruled that during the threshold determination of significance, the duty to look at cumulative effects is even more detailed that during the EIS process, for if a FONSI is issued, this will be the only look at cumulative effects of the proposal.
Response: Cumulative impacts were examined and documented in section 4.8. DOE used the definition of cumulative effects defined in the CEQ Regulations. The effects of the proposed action when combined with past, present, and reasonably foreseeable future actions do not result in significant adverse impacts.

2. On its face, this EA is deficient. The EA inappropriately segments the actions into transportation, storage, and final disposition for purposes of NEPA analysis. This is a clear violation of NEPA. In a convoluted "Addendum", the agency tries to fast talk its way out of its duties to consider the combined effects of the storage, transportation, and long-term disposal, but this fails miserably. This is a site specific proposal, and a 1994 EA done for another part of the project, which, while it should have included the entire process, could not have because the proposal to move the material had not been made, cannot be adequate to meet the public information and scrutiny aspects of NEPA. This is not fully informing the public.
Response: As shown in the Addendum, DOE fully considered transportation of the uranium materials in several documents beginning in 1994. NEPA and CERCLA were followed and public review and comment were solicited on these actions. Further, the outbound shipments

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from ORO will move in DOE-approved packaging, subject to DOE radiation, contamination or fissile controls and other DOE Federal or State requirements.

3. In addition, there are cumulative effects from other ongoing projects at Paducah. These are clearly documented in the site management plan, which has not undergone NEPA review. While the management at Paducah keeps repeating as it mantra that the CERCLA analysis meets all the requirements of NEPA, the transportation addendum flatly contradicts this, stating, (finally) that "...DOE excludes Removal actions from requiring detailed NEPA documentation..." There is no doubt that there needs to be a cumulative effects analysis done of ALL the action ongoing at the site, and segmenting each individual project into a discreet analysis unit is not in compliance with NEPA. If such an analysis were undertaken, there would be no doubt that the impact would be potentially significant and require an EIS. This would and should be the site-wide EIS we have been calling for years. At a bare minimum, this should require a supplement to the EIS process ongoing for the depleted uranium, but DOE isn't even doing this. This EIS process is fatally flawed unto itself for being segmented into a discreet unit, while there are considerable and significant other actions ongoing at the site with cumulative impacts.
Response: Comment noted; see responses to comments 1 and 2 above.

4. Two other factors which are potentially significant relevant to this process are the effects on public health and safety, and the scientific uncertainly surrounding the proposal. Clearly, if there is emissions and escape of radio nuclides or uranium element into the environment which gets distributed into the food chain or into an environmental media which could cause any kind of ecological or human exposure, there is clearly a public health and safety concern which is significant. While DOE, as typical, attempts to brush these concerns off with a broad brush of statements of no impact, these conclusory statements are supported on the record with nothing. They do not comply with NEPA, which requires that findings such as this be supported with valid, objective data, which can be obtained by the public, and which is clearly identified in the record. Conclusory statements of no impact impress us not, and are in violation of NEPA. What are the emission rates of the various materials, and what are the exposure routes. What are the ecological effects, and what is the time span these effects could continue. These questions are not adequately answered or supported in the EA.
Response: As indicated in the DEA, emissions under normal operating conditions are effectively zero. The outside of the containers in which this material is packaged can be safely handled and workers require no special protection when working near the containers. Under accident situations, the doses (facility worker, co-located worker, and the public) are computed and the risk of exposure determined (see Table B.8).

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5. The biggest scientific uncertainly associated with the Paducah site is the seismic hazard. It is common knowledge that the site is within a high risk seismic zone. Just recently, there has been renewed media stories about the Central Midwest Consortium's annual meeting and their call for earthquake preparedness in our region. Yet, DOE brushes this off inexplicably. This is clearly potentially significant, and needs a hard look site-wide.
Response: The radiological risk associated with these uranium materials was determined for several scenarios including seismic risk (Table B.8).

6. In addition, just the fact that DOE is calling this a temporary move because they don't know what to do with the materials long term is clear evidence that there is strong scientific uncertainly associated with these materials.
Response: The uranium materials are being moved from FEMP in order to comply with a regulatory commitment made to the state of Ohio. DOE expects to sell these materials as commercial product.

7. Another factor is the effects on federally listed species. While the EA lists the evening bat as federally listed, we don't believe that is correct. However, the Indiana Bat is clearly critically endangered. The conclusion that it does not occur on the plant site is not supported by the record. A clear look at the record on Indiana Bats shows that their foraging range could easily put them into the range of impact. They could easily consume insects which have become contaminated with emissions from this material. If this affects their reproductive capacity, which some evidence suggests, then this could be construed as "harm", which would be a take. It is the opinion of the commentors that an incidental take permit is necessary at this point to continue any cleanup or production activities at the plant, and failure to have completed formal Section 7 consultation to implement conservation guidelines to minimize the take is a violation of the Endangered Species Act, which would be potentially significant also under the CEQ guidelines.
Response: DOE is consulting with the U. S. Fish and Wildlife Service and state fish and game departments regarding any potential adverse impact to protected species.

8. Another potential regulatory requirement which is not mentioned in the EA is the possible requirement for a point source runoff permit for the storage area and the immediate adjacent lands. Where will this area drain, and what kind of contamination can we expect in these runoffs?
Finally, wouldn't this require a RCRA permit? How would the lands being proposed for storage be regulated? What capacities would be allowed? What storage requirements would be set? How would the public be involved in this process?
Response: DOE will comply with all regulatory requirements.

These are all questions which need to be answered.
Thank you for considering these comments, and please keep us on the mailing

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list to receive future mailings regarding this proposal.

Mark Donham
Kristi Hanson
RACE/Heartwood
[redacted]
502-443-3082(W)

OhioEPA
State of Ohio Environmental Protection Agency

Southwest District Office

401 East Fifth Street
Dayton, OH 45402-2911

TELE: (937) 285-6357 FAX: (937) 285-6249

George V. Voinovich, Governor
Nancy P. Hollister, Lt. Governor
Donald R. Schregardus, Director

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Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 2

To STEVEN WYATT	From GRAHAM MITCHELL
Co. DOE - ORO	Co. OHIO EPA
Dept.	Phone #
Fax # 423-576-1165	Fax #

March 3, 1999

Mr. David Allen
NEPA Compliance Officer
U.S. Department of Energy
Oak Ridge Operations Office
SE-32
P. O. Box 2001
Oak Ridge, TN 37831-2001

Dear Mr. Allen:

Listed below are Ohio EPA's comments on the Uranium Receipt and Storage EA:

General Comments

1. Ohio EPA concurs with the EA conclusion that the DOE Fernald site does need to remove 3800 metric tons of uranium from the site in order to complete cleanup activities at Fernald.

2. If the ultimate location for this material is to be at the DOE Oak Ridge facility in Tennessee, we would recommend that the material be sent there directly from Fernald to Oak Ridge. This will reduce overall shipping costs and reduce transportation risks by handling this material only once.

3. If any of this material is shipped to the Portsmouth Gaseous Diffusion Plant for interim or long term storage, funding should be provided to the Portsmouth site to cover the costs of managing this material. The Portsmouth cleanup budgets have been cut significantly in the past several years and this storage effort should not further impact the Portsmouth cleanup program.

Specific Comments

1. Page 3.1.8 Infrastructure
Fernald discharges treated effluent to the Great Miami River not the Little Miami River.

(rev. 2/96)

Please contact me if you have any questions about these comments.

Sincerely,

Graham E. Mitchell
Chief, Office of Federal Facilities Oversight

cc: Tom Schneider, OEPA
Donna Goodman, OEPA
Melody Stewart, OEPA
Diana Cahall
Jack Craig, DOE Fernald
Melda Raferty, DOE Portsmouth

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LOC INC
Oak Ridge Reservation
Local Oversight Committee

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OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL # of pages ▸ 12
To Wayne Tolbert From Melisa Hart
Dept./Agency SAIC Phone # 576-8985
Fax # 481-8797 Fax #
NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

March 2, 1999

Mr. David Allen
NEPA Compliance Officer
Oak Ridge Operations, SE-32
U. S. Department of Energy
P.O. Box 2001
Oak Ridge, TN 37831

Subject: Comments on the Draft Environmental Assessment (EA) for the U.S. Department of Energy, Oak Ridge Operations, Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project Site (DOE/ORO-2078)

Dear Mr. Allen:

The Oak Ridge Reservation (ORR) Local Oversight Committee, Inc. (LOC) submits the following comments on the subject draft EA. The LOC Board of Directors voted unanimously to comment that the LOC would have no objection to storage of uranium materials at Y-12 that are consistent with its mission. However, the LOC objects to storage of additional uranium materials at K-25, also known as East Tennessee Technology Park (ETTP), considering that the uranium hexafluoride (UF6) cylinders currently stored there are a disincentive to reindustrialization and a potential hazard to workers.

The LOC is a non-profit regional organization funded by the State of Tennessee and established to provide local government and citizen input into the environmental management and operation of the DOE ORR. The Board of Directors of the LOC is composed of the County Executives of Anderson, Knox, Loudon, Meigs, Morgan, Rhea, and Roane Counties; the Mayor of the City of Oak Ridge; and the Chairs of the Roane County Environmental Review Board, the City of Oak Ridge Environmental Quality Review Board, and the LOC Citizens' Advisory Panel (CAP). The CAP has up to 20 volunteer members with diverse backgrounds who represent the greater ORR region.

No preferred alternative is given in the EA. The CAP proposes that storage of the uranium materials at the Portsmouth Gaseous Diffusion Plant be the preferred alternative, for the following reasons:

1. The Portsmouth facility offers the most options and even has an empty building (X-3002) suitable for storing the uranium material. The proposed action is consistent with the current mission at Portsmouth. Storing the uranium material at Portsmouth also avoids transfer of materials across state lines.

Anderson • Meigs • Rhea • Roane • City of Oak Ridge • Knox • Loudon • Morgan

136 S. Illinois Ave., Suite 208 • Oak Ridge, TN 37830 • Phone (423) 483-1333 • Fax (423) 482-6572 • E-mail: loc@icx.net

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2. Receipt and storage of these materials is not consistent with the current ETTP mission. The Oak Ridge public and the Tennessee state regulators are increasingly unwilling to accept the continued storage of the depleted UF6 at ETTP, as there is no defined use for the material in the foreseeable future and the cylinders require ongoing surveillance and maintenance to ensure that they are not breached. DOE should not propose storage of additional depleted uranium when the existing stockpile is destined for removal and/or conversion to a stable oxide form.
3. Most of the uranium is depleted (2761 metric tons); locating it at Y-12 in its doubly secure area is not in keeping with the current Y-12 mission. However, locating the 799 metric tons of low-enriched uranium (LEU) at Y-12 until its sale is finalized appears commensurate with the plant's mission.
4. The Paducah site is limited in space and has increased earthquake and wind hazards. The action is otherwise consistent with its mission, although it is a less advantageous location than Portsmouth for these reasons and due to the transportation distance.

If you have any questions regarding these comments, please call me at 483-1333.

Sincerely,

Susan L. Gawarecki, Ph.D., P.G.
Executive Director

cc: LOC Citizens' Advisory Panel
LOC Board of Directors
Bill Pardue, Chair, ORREMSSAB
Earl Leming, Director, TDEC DOE-O
Steve Richardson, Acting Manager DOE ORO
Carol Borgstrom, Director, Office of NEPA Policy & Assistance, DOE-HQ
Charles E. Bradley, Jr., Office of Nuclear Energy, Science and Technology

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February 22, 1999

David Allen
NEPA Compliance Officer
Oak Ridge Operations
SE-32
P.O. Box 2001
Oak Ridge Tn. 37831

Dear Mr. Allen,

I wish to submit my comments on the Fernald EA. There are several reasons for not moving the uranium metal to Paducah. The first is Paducah is a small site and has more than our fair share of waste, such as 40,000 cylinders of our own and several tons of scrap metals. Paducah does not have a facility to store this metal and would have to build one. The second reason is that the Paducah plant is near the New Madrid earthquake zone. Geologists predict a severe quake to strike the region in the next few years. For this reason the Paducah Plant should move our waste out of the region. I feel certain that the Department of Energy would disagree since a lot of our waste lies in 14 ton cylinders, but these cylinders have small 2 inch fill valves with very little protection . I feel there will be numerous breaches of these fill valves during an earthquake. I believe we should be reducing the waste at Paducah instead of bringing more to this area for storage. I have included information of the fault from the earthquake consortium and a list of seismic data activity.

Thank You,

Ronald Lamb

Ronald Lamb
[redacted]

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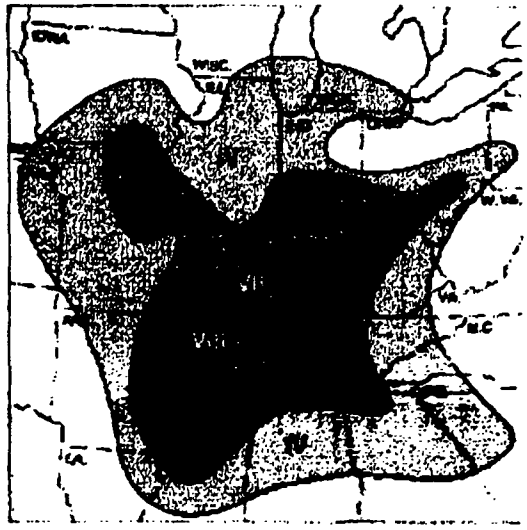
Central United States Earthquake Consortium

The Great New Madrid Earthquake

In the winter of 1811-1812, the central Mississippi Valley was struck by three of the most powerful earthquakes in U. S. history. Even today, this region has more earthquakes than any other part of the United States east of the Rocky Mountains. Government agencies, universities and private organizations are working to increase awareness of the earthquake threat and to reduce loss of life and property in future shocks.

The 400 terrified residents in the town of New Madrid (Missouri) were abruptly awakened by violent shaking and a tremendous roar. It was December 16, 1811, and a powerful earthquake had just struck. This was the first of three magnitude-8 earthquakes and thousands of aftershocks to rock the region that winter.



Survivors reported that the earthquakes caused cracks to open in the earth's surface, the ground to roll in visible waves, and large areas of land to sink or rise. The crew of the New Orleans (the first steamboat on the Mississippi, which was on her maiden voyage) reported mooring to an island only to awake in the morning and find that the island had disappeared below the waters of the Mississippi River. Damage was reported as far away as Charleston, South Carolina, and Washington, D.C.

These dramatic accounts clearly show that destructive earthquakes do not happen only in the western United States. In the past 20 years, scientists have learned that strong earthquakes

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in the central Mississippi Valley are not freak events but have occurred repeatedly in the geologic past. The area of major earthquake activity also has frequent minor shocks and is known as the New Madrid seismic zone.

Earthquakes in the central or eastern United States effect much larger areas than earthquakes of similar magnitude in the western United States. For example, the San Francisco, California, earthquake of 1906 (magnitude 7.8) was felt 350 miles away in the middle of Nevada, whereas the New Madrid earthquake of December 1811 (magnitude 8.0) rang church bells in Boston, Massachusetts, 1,000 miles away. Differences in geology east and west of the Rocky Mountains cause this strong contrast.

The loss of life and destruction in recent earthquakes of only moderate magnitude (for example, 33 lives and $20 billion in the 1994 magnitude-6.7 Northridge, California, earthquake and 5,500 lives and $100 billion in the 1995 magnitude-6.9 Kobe, Japan, earthquake) dramatically emphasize the need for residents of the Mississippi Valley to prepare further for an earthquake of such magnitude. Earthquakes of moderate magnitude occur much more frequently than powerful earthquakes of magnitude 8 to 9; the probability of a moderate earthquake occurring in the New Madrid seismic zone in the near future is high. Scientists estimate that the probability of a magnitude 6 to 7 earthquake occurring in this seismic zone within the next 50 years is higher than 90%. Such an earthquake could hit the Mississippi Valley at any time.

In 1811, the central Mississippi Valley was sparsely populated. Today, the region is home to millions of people, including those in the cities of St. Louis, Missouri, and Memphis, Tennessee. Adding to the danger, most structures in the region were not built to withstand earthquake shaking, as they have been in California and Japan. Moreover, earthquake preparations also have lagged far behind.

Recognizing these problems, the U.S. Geological Survey (USGS) and other organizations are joining in actions that will greatly reduce loss of life and property in future temblors:

- In 1983, the states of Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri, and Tennessee formed the Central United States Earthquake Consortium (CUSEC). CUSEC improves public earth-quake awareness and education; coordinates multi-state planning for earthquake preparedness, response, and recovery; and encourages research in earthquake hazard reduction.

- In 1990, the USGS, advised by private, academic, and government experts, issued a plan for intensified study of the New Madrid seismic zone. At the same time, the National Earthquake Hazards Reduction Program expanded efforts in the central United States.

- Earthquake education is now part of the curriculum in the schools of many CUSEC states. In Kentucky, the state legislature has mandated that earthquake education be taught in schools.

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- Earthquake Awareness Weeks have been held in Arkansas and Kentucky for several years, and in Tennessee starting in 1995.

- Volunteer earthquake advisory councils or similar organizations have been formed in most CUSEC states.

- In 1993, with USGS support and collaboration, the CUSEC state geologists began a significant effort to map earthquake hazards. In 1995 they completed a regional soils map that can be used to locate areas likely to experience intense shaking in earthquakes.

- Most CUSEC states have adopted building codes containing modern earth-quake design standards

- Efforts to ensure the seismic safety of critical structures, such as dams, bridges, and highways, have accelerated. For example, in 1990, transportation agencies in Illinois, Kentucky, and Tennessee initiated programs to strengthen highway bridges that do not meet earthquake design standards.

Strong earthquakes in the New Madrid seismic zone are certain to occur in the future. In contrast to the western United States the causes and effects of earthquakes in the central and eastern United States are just beginning to be understood. Through better understanding of earthquake hazards and through public education, earth scientists and engineers are helping to protect the citizens of all parts the United States from loss of life and property in future earthquakes.

For more information Contact:
The U.S. Geological Survey 901-678-2007
Center for Earthquake Research and Information
The University of Memphis. Memphis, Tennessee 38152

For more details Visit:
The Virtual Times, New Madrid Earthquake section.

U.S. Geological Survey Fact Sheet-168-95, 1995

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DISASTERS

WORLDWIDE DISASTER AID AND INFORMATION VIA THE INTERNET

New Madrid Fault Poses Potential Risk to Midwestern States

Posted on Fri, 24 Apr 1998 17:16:21 GMT

Written by Jennifer Brill, DisasterRelief.org Writer

Six million people living in midwestern states could be at risk if an earthquake occured along the New Madrid fault line which runs diagonally from Marked Tree, Arkansas to southeastern Missouri.

That's why the Central U.S. Earthquake Consortium headquartered its operation in Memphis, the southernmost largest city on the fault.

An earthquake in this midwest region would cause more damage than one on the west coast, says Elaine Clyburn, a response planner with Red Cross Disaster Services. Clyburn is assigned to the consortium to help educate the community on earthquake preparedness.

In addition to the fault line, the region's geology poses additional challenges.

Because the soil in the central U.S. is looser and sandier than on the west coast, Clyburn says, "the shockwaves from an earthquake would travel much farther and the same magnitude earthquake on the west coast would be about 10 times worse in the central U.S."

Experts say that an earthquake could occur anywhere along the fault line running from Memphis to its northern point in St. Louis.

Seven states especially at risk from the New Madrid fault line belong to the consortium: Arkansas, Illinois, Indiana, Kentucky, Missouri, Tennessee and Mississippi.

"In the central U.S., a major earthquake would affect the entire country," Clyburn says. "A lot of commerce depends on railroads and 18-wheelers. It would be like having a hole in the middle of the country."

The worst quake to hit this region occurred in 1811 when the earth moved enough to cause the Mississippi River to temporarily reverse its usual course of north to south. Whole lakes were created, such as the Reelfoot Lake in Kentucky.

In 1811 the population was a fraction of its current size. Today, many more people would be affected by a quake similar to that of 1811, which registered around 9.0 on the Richter scale. Clyburn says that would be "so scary that it's hard to talk about preparing for it."

The possibility of such a quake should offer residents a strong incentive to learn how to ready themselves for an earthquake during April's Earthquake Preparedness Month.

Clyburn says that enhanced preparation is especially necessary in the Memphis-St. Louis area where adhering to building codes is an issue.

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"Humanity has not paid much attention to where we put our buildings. We like the idea of building where we want to build," which may not be such a good idea when a fault line is involved.

Each of the seven states at risk from the New Madrid fault line promotes awareness, supported by the consortium. Building awareness takes on several forms, Clyburn says, such as sponsoring poster contests for children and posting displays at the public library.

"There's no way to predict when one could happen," Clyburn says, though she adds, "There's an excellent chance that we'll lave a major earthquake in the next 15 years."

The area has two earthquakes a week but they're generally not felt. Instruments placed underground, called "seismic networks," are sensitive enough to differentiate between a train and a tremor in the earth.

"It's easy to behave as if there is no threat, or to be unaware of it," Clyburn says. "That's why we try to educate people."

Since earthquakes can't be predicted, they're generally talked about in terms of probabilities and historical evidence.

"A fault is buried under the earth, so it's not like looking at the sky and seeing a dark cloud," Clyburn explains.

Related Stories

- Preparing for Earthquakes is a Lesson in Strength -- December 2, 1997

Related Links

Are you Ready for an Earthquake? English or Español

Central United States Earthquake Consortium

Los Angeles Red Cross Chapter

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The following catalog is for earthquakes in the New Madrid seismic zone, and is produced by the Cooperative New Madrid Seismograph Network (CNMSN), a member of the Council of the National Seismic System. CNMSN support comes from the United States Geological Survey and the State of Tennessee.

In the early 1800's, the New Madrid seismic zone was the site of what are considered to be the largest earthquakes to have occurred in the conterminous United States. During the winter of 1811-1812, a series of three earthquakes, estimated at magnitude 8 or larger, struck in a period of three months. There have been several magnitude 6-7 events since that time and there is a continuing activity of small earthquakes that defines the present day seismic zone. The principal seismic activity is found in western Tennessee, northeast Arkansas, and southeast Missouri.

Other catalogs for various regions of the United States can be obtained using the finger mechanism 'finger quake@machine'. The following list gives the machine names for different regions.

gldfs.cr.usgs.gov	(USGS NEIC/NEIS world-wide)
andreas.wr.usgs.gov	(Northern California)
scec.gps.caltech.edu	(Southern California)
fm.gi.alaska.edu	(Alaska)
seismo.unr.edu	(Nevada)
mbmgsun.mtech.edu	(Montana)
eqinfo.seis.utah.edu	(Utah)
sisyphus.idbsu.edu	(Idaho)
quake.eas.slu.edu	(Central United States)
tako.wr.usgs.gov	(Hawaii)

Additional catalogs and information are available on the World Wide Web at the URL 'http://www.geophys.washington.edu/seismobig.html'.

The Date/Time is given in Universal Time Coordinates (UTC), which is 6 hours ahead of Central Standard Time (5 hours ahead of CDT).

Magnitudes are reported as Md (local duration magnitude) unless otherwise noted.

Q denotes the location quality: A = good, D = poor.

Updated on August 3 1998.

DATE-(UTC)-TIME	LAT	LON	DEP	MAG	Q	COMMENTS
yy/mm/dd hh:mm:ss	deg.	deg.	km			
98/01/09 09:05:59	36.56N	89.52W	7.0	2.2	B	New Madrid, Missouri (C)
98/01/17 19:40:07	36.59N	89.62W	6.5	2.2	B	New Madrid, Missouri (C)
98/01/27 09:58.40	36.12N	89.57W	12.0	2.5	A	Dyersburg, Tennessee (C)
98/01/28 22:05:12	36.10N	89.76W	11.4	2.7Lg	B	Caruthersville, Missouri (C)
98/02/12 09:37:49	36.14N	89.71W	9.6	3.0	A	Caruthersville, Missouri; felt in Hayti and
98/02/13 23:08:12	36.10N	89.76W	6.5	1.9	A	6.96 km east of Steele Missouri (L,
98/02/19 14:05:27	36.54N	89.56W	8.9	2.7	A	New Madrid, Missouri (C)
98/02/19 22:22:49	36.48N	89.56W	8.2	1.9	A	New Madrid, Missouri (C)
98/02/26 02:10:25	36.49N	89.56W	5.2	2.5	B	New Madrid, Missouri (C)
98/03/11 08:09:43	36.63N	89.32W	5.0	1.5	C	13.63 km northwest of Hickman, Kentucky (p)
98/03/13 03:05:27	36.26N	89.61W	7.4	2.0	B	10.69 km north of Caruthersville, Missouri
98/03/15 06:56:46	36.43N	89.52W	5.3	2.5	B	6.63 km northwest of Tiptonville TENNESSEE
98/03/21 06:52:23	36.15N	89.47W	15.8	1.6	B	12.51 km south of Ridgely TN (C)
98/04/08 18:16:49	36.94N	89.02W	13.9	3.2Lg	B	15.77 km east of Cairo IL (N)
98/04/09 05:13:41	36.40N	89.50W	6.8	2.7Lg	B	3.48 km norwest of Tiptonville, TN, Felt n
98/04/27 10:22:43	36.24N	89.48W	6.6	2.0	A	2.61 km south of Ridgely TN (L)
98/04/29 01:44:56	36.17N	89.43W	9.2	2.0	B	11.33 km south of Ridgely TN (L)
98/05/11 08:07:15	36.88N	89.07W	4.3	2.6Lg	C	14.72 km north of Columbus, KY (N)
98/05/12 09:37:10	36.42N	89.51W	7.0	1.7	A	5.44 km northwest of Tiptonville, Tennessee
98/05/21 06:37:19	36.55N	89.61W	2.6	1.5	C	8.01 km west of New Madrid, Missouri (L)
98/05/21 14:53:29	36.20N	89.43W	6.0	1.7	A	8.24 km southeast of Ridgely, TN (L)
98/05/27 06:04:52	36.11N	89.01W	4.5	2.4	D	23.63 km east of Newbern Tennessee (L)
98/06/11 07:44:12	36.17N	89.45W	9.6	1.8	A	10.36 km south of Ridgely Tennessee (L)
98/06/27 05:19:16	37.08N	89.80W	6.0	2.1	A	3.14 km east of Steele, MO (L)
98/07/05 07:48:10	36.29N	89.53W	9.3	1.4	B	7.6 km northwest of Ridgely Tennessee (C)
98/07/15 04:24:51	36.69N	89.52W	13.2	3.1Lg	B	7.5 km north of New Madrid, MO (L,N)
98/07/22 22:11:57	37.65N	90.20W	17.5	2.7	C	WOMACK, MO mbLg = 2.65 (SLU)

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98/08/01 02:21:10	35.64N	90.40W	4.1	2.0	A	11.8 km north of Marked Tree, AR. (C)
98/08/16 04:23:03	36.23N	89.45W	6.5	1.9	A	5.1 km southeast of Ridgely, TN (L)
98/09/05 00:35:02	35.77N	90.20W	9.9	2.2	A	21.6 km west of Osceola, AR. (M)
98/09/06 18:35:30	36.26N	89.29W	6.2	2.3	A	15.7 km north of Newbern, TN. (L)
98/09/14 23:24:19	36.60N	89.59W	16.2	1.8	A	5.89 km west of New Madrid, MO (N)
98/09/17 08:46:41	36.85N	89.45W	1.7	2.1	B	14.02 km east of Sikeston MO (N)
98/10/05 22:50:45	36.44N	89.54W	7.5	1.8	A	8.91 km northwest of Tiptonville TN
98/10/15 09:47:22	35.62N	90.45W	12.1	2.9Lg	A	10.0 km north of Marked Tree, AR (C)
98/10/26 00:29:52	37.00N	90.88W	5.0	2.6	D	GARWOOD, MO (SLU)
98/10/26 08:46:57	35.80N	90.03W	2.0	2.0	D	12.77 km north of Osceola AR (L)
98/11/03 15:47:53	36.43N	89.52W	8.4	2.2	A	7.24 km northwest of Tiptonville TN (L)
98/11/09 18:36:47	36.50N	89.53W	5.9	2.2	A	9.06 km south of New Madrid MO (N)
98/12/16 10:45:34	35.86N	89.95W	8.6	2.4Lg	B	8.98 km south of Blytheville AR (C)
99/01/06 09:26:23	35.66N	88.33W	10.9	2.4	B	25.75 km east of Jackson, TN (C)
99/02/03 16:59:20	35.32N	90.84W	3.9	2.3	D	45.39 km southwest of Marked Tree AR (L)

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PADUCAH GASEOUS DIFFUSION PLANT SITE SPECIFIC ADVISORY BOARD

2178

Chartered under the Federal Advisory Committee Act

MEMORANDUM

DATE: March 4 1999

TO: David Allen, Oak Ridge Operations
NEPA Compliance Officer

FROM: Paducah Site Specific Advisory Board

SUBJECT: Comments on the Fernald Environmental Assessment

At a regular meeting of the Site Specific Advisory Board (SSAB) held February 18, 1999, the board identified comments on the draft *Environmental Assessment for the U.S. Department of Energy, Oak Ridge Operations Receipt and Storage or Uranium Materials from the Fernald Environmental Management Project Site.*

General Comments:

The Paducah SSAB recommends that Fernald pursue amendments to the appropriate regulatory documents allowing the uranium materials to be retained at the Fernald site pending resolution of the long-term disposition strategy. Nothwithstanding this recommendation, if the DOE decides to move the uranium materials, the Paducah SSAB recommends that the uranium materials should be moved the least distance possible to reduce the environmental impact of transportation hazards.

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Specific Comments:

1. Page 2-7: Drawing is out of date even though it says rev. 1/20/99. There are buildings and pads in the general area designated for the storage area.
2. Page 2-11, Paragraph 1: What is the benefit of using a combination of sites?
3. Page 2-11, Paragraph 2: The first sentence appears to be poor planning, not a justification for not considering commercial facilities.
4. Page 2-11, Paragraph 4: "to support compliance with regulatory requirement" seems to use this as an excuse for poor planning and as a hammer to make something happen.
5. Page 3-6, Paragraph 4: Change "PGDP" to "DOE reservation."
6. Page 3-6, Paragraph 5: Where did these numbers come from? Is this 1992 data?
7. Page 3-6, Paragraph 6: Using 1992 data seems outdated.
8. Page 3-6, Paragraph 7: Why not look at 1998 or even 1997 radionuclides sources rather than 1992? If you bother checking, we believe you will find the vapor degreasers in C-400 are no longer operating. Didn't anyone visit the site or talk to the people at the Paducah Site?
9. Page 3-7, Paragraph 2: Check on numbers of plumes — believe there are 3 now (major or minor?).
10. Page 3-7, Paragraph 5: List source of the identification of the federally listed species. A 1994 Corp Study did not list the evening bat in this area and identified the pearly mussel as endangered. Also, none of these species were identified on the DOE Reservation. I think a list of the Kentucky E&T species should be included.
11. Page 3-8, Paragraph 4: Sewage is treated "onsite" not "offsite."
12. Page 3-8, Paragraph 5: The Corp has performed a cultural resources survey. I believe it was completed in 1994.
13. Page 4-5, Paragraph 4: What about waste from the construction/site preparation. I believe soil in that area is PCB contaminated. There are buildings and pads that are not depicted on your map, will their existence change preferred location?
14. Page 4-9, Paragraph 3: I believe USEC might disagree that cleanup is the major priority at the site. I would like the source of the baseline identified and a list of "future changes."
15. Page 5-1: Why wasn't up-to-date information about Paducah used?
16. Page 6-1: Appears "walk-downs" were performed at Portsmouth and Fernald, why not Paducah and Oak Ridge?
17. Page B-9, Paragraph 6: What goes in the blank?

The information used was significantly out of date, and in some cases, totally incorrect. The general impression of this project is that Fernald has a regulatory driver and it will be met. How long has this project been going on? It appears this part of the project is being rushed.

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Yggdrasil Institute

PO Box 131, Georgetown, KY 40324, USA
502-868-9074 (phone and fax)

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March 3, 1999

Mr. David Allen
NEPA Compliance Officer
DOE Oak Ridge Operations, SE-32
PO Box 2001
Oak Ridge, TN 37831

RE: Environmental Assessment for the US Department of Energy, Oak Ridge Operations, Receipt and Storage of Uranium Material from the Fernald Environmental Manatement Project Site (DO/ORO 2078)

Dear Mr. Allen:

I believe that the 3800 metric tons of depleted uranium now at Fernald should stay where they are until they are sold, rather than be moved to any of the alternative sites. Surely the agreement between the Department of Energy and the State of Ohio can be amended to make this commonsense step possible. If the material is valuable, can it not be sold within a short time period?

The storage at the alternative sites may not itself involve risks, but there is always risk in transportation. The tonnage involved would mean a major shipping initiative. Furthermore, transportation would mean a waste of resources: the consumption of fossil fuels and the consequent increase air pollution.

Sincerely,

Mary B. Davis

Mary Byrd Davis

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FAX TRANSMITTAL # of pages ▸ 13

To Wayne Tolbert	From Melisa Hart
Dept./Agency SAIC	Phone # 576-8983
Fax # 481-8797	Fax #

NSN 7540-01 317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

David Allen
NEPA Compliance Officer
DOE Oakridge Operations
SE-32
P.O. Box 2001
Oak Ridge, Tennessee 37831

Facsimile: (423) 576-0411

Re: Public Comment on Draft Environmental Assessment for Proposed Receipt and Storage of Uranium Materials From the Fernald Environmental Management Project Site.

Dear Mr. Allen

Please include this correspondence and attachments as part of the agency's official record of proceedings on the above-referenced proposed agency action.

The following comments to the agency will contain considerable objection and criticism of the agency's public participation process, implementation of NEPA, and offer challenge to the finding of fact, Finding of No Significant Impact, proposed in draft Environmental Assessment.

Therefore, in fairness to the U.S. Department of Energy as the lead agency, I would like to begin by thanking the Department of Energy Oakridge Operations, NEPA Office for extending the public comment period originally scheduled to begin on February 1, 1999 and end on February 10, 1999 until March 4, 1999. Although, I definitely feel that 30 day comment period fails to provide sufficient time for public review and comment by all parties who have interest in the proposed action, extension of the public comment period does provide opportunity for limited review and participation by a few members of the public other than those representing the interests of the Fernald Environmental Management Project Site (FEMP).

DOE proposes to transfer some 3,800 metric tons of uranium metal in various forms to candidate sites (Portsmouth Gaseous Diffusion Plant, Piketon, Ohio, Paducah Gaseous Diffusion Plant, Paducah, Ky., and Y 12 Plant and East Tennessee Technology Park, Oakridge Tn.) for interim storage until the material can be sold at market value "rather than disposing the material as waste." Ref.: DOE/ORO-2078, 1.1 Purpose and Need for the Proposed Action.

Agency statement of "Purpose and Need" pre-determines decision/disposition by the agency to potentially offer for sale 800 Metric Tons of LEU and/or 3,000 metric tons of uranium metal in other forms from the Fernald Site. DOE proposed action has significant, i.e., programmatic impact: 1) DOE has short-circuited the process of declaring any of this material to be "Excess Property," and 2) failed to implement criteria/guidance policy in disposing of property that is declared to be "Excess Property" by such determination as stated in EA. Ref.: GAO/RCED-99-3. By implication in EA statement of purpose and need:

> This effort (material transfers and sales) is part of the U.S. Department of Energy's (DOE's) decision to change the mission of the FEMP site; it is currently shut down and the site is being remediated.

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This remaining nuclear material inventory must be removed from the site by the end of fiscal year (FY) 1999 (July 1, 1999) to support commitments made to the state of Ohio. Interest in the material has been by the U.S. Department of Defense and other commercial ventures.

According to FEMP Record of Decision (ROD), Operable Unit-3, August 1996, FEMP Site History:

> Production operations began in 1952 and continued until July 1989, at which time operations were placed on standby to focus on environmental compliance and waste management initiatives. Following appropriate congressional authorizations, the facility was formally closed in June 1991. TO REFLECT A NEW MISSION FOCUSED ON ENVIRONMENTAL RESTORATION,(emphasis added) the name of the facility was changed to the FEMP in August 1991.

By considerable omission and implication in statement of purpose and need for the proposed action, DOE has flown under the radar screen of accountability to the public by agency failure to address the proposed action as a programmatic decision with considerable consequences to the public. By deciphering statement of purpose and need, DOE must be referring 1991 DOE change in mission of FEMP or DOE decision yet-to-be-made-public of FEMP's new mission. In either circumstance, DOE has failed to address the proposed action as significant in EA. "Commitments made to the state of Ohio" to remediate the FEMP site should not be co-mingled and confused with commitments to share the revenue with the state of Ohio from the sale of "Excess Property" managed by DOE for all taxpayers nationally.

Procedure for the sale of 800 metric tons of LEU by the Ohio Field Office requires full disclosure in final draft of EA. Apparently, considerable lack of accountability to the public has been allowed to occur in the procedure to sell property which DOE has yet to declare as "Excess" though any recognizable process. What is the value of this "property" in which the U.S. Department of Defense and other commercial ventures have expressed "interest." It would certainly seem apparent that the Ohio Field Office and site management contractor have implemented disposition of public property as "excess" with little review or accountability to the public in the process. Has the Office of Defense Programs declared the 800 metric tons of LEU "excess" to missions' needs? When was this done and by what mechanism? When was the 3,000 metric tons of uranium metal in various forms declared "Excess Property" and by what DOE office? Is decontamination some or all of the 3,000 metric tons required before DOE releases the property for "reuse" or sale? What is the market value/sale value of this material and what agencies/entities share the revenue from the sale to "commercial" ventures?

> After the property has been determined to be excess, the regulations state that the property must first be screened for reuse or transfer to others before offering it for sale to the public. Personal property is first screened for reuse within DOE, then for

transfers to the Math and Science Education Gift Program (under Executive Order 12821) and to the Community Reuse/Economic Development Program (under P.L. 103-160). Subsequent steps include making property available to educational institutions such as colleges and universities under the Used Energy Related Laboratory Equipment Grant Program (P.L. 101-510) and to other federal agencies and state donation programs. Personal property that remains after the screening process can be sold to the public or discarded. Ref.: GAO/RCED-99-3, page 5.

It would seem disingenuous, at the very least, to 'share' the revenue generated by the sale of 600 metric tons of LEU to commercial buyers/vendors with ventures under the process described as anticipated agency procedure for disposal of excess personal property (not real property, lands, etc.). It would seem as disingenuous for colleges and universities to solicit radioactive materials including the residuals and residues owned by DOE currently on site at FEMP for medical and research purposes. Interested parties in the Fernald Uranium transfer should not be parties interested in getting a share from the proceeds of sale of these materials. DOE mission statement does not include sale of hazardous and toxic materials to the highest bidder for distribution among parties claiming an interest/
share of the profits.

Obviously, DOE has pre-determined to offer nuclear materials and by-products of uranium processing for transfer and/or sale rather than dispose of those materials as 'waste' which is hazardous and toxic to humans and the natural environment. When did any such decision-making provide program-wide public participation and opportunities for comment? Again, the action proposed in draft EA fails to address connected actions with significant program-wide impacts in DOE disposition of materials.

DOE cannot reasonably assert that materials with hazardous and toxic characteristics can be safely isolated from the human and natural environment simply by calling them 'nuclear materials' with economic value rather than waste. Materials, whether classified as waste, by-product, assets, feed materials, metals, or nuclear inventory, pose the same risks to human health and the natural environment which should reasonably cause DOE to require the same standards of protection to prevent contamination. DOE actions should not seek to circumvent intent of CERCLA, SRA, and TSCA.

Draft EA defines the economic impact of the proposed action much too narrowly. A structure to temporarily store the 3,800 metric tons of nuclear materials at other DOE sites until sale or transfer does not address the total, foreseeable economic impacts of DOE action (as stated in EA purpose and intent). Five million dollars and three new worker jobs to monitor the materials in the interim fails to include: 1) packaging costs for transport from FEMP, 2) transportation costs to one or more of DOE's candidate receiving sites, 3) transportation from the candidate/host site(s), 4) revenue from the sale of materials, 5) cost to construct the other facilities required by 'disposition' of these nuclear materials to private, commercial ventures, and 6) remediation/clean up and nuclear waste disposal costs from

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the operations of commercial reuse or recycling/reprocess facilities which DOE can reasonably foresee and predict to result from the proposed action.

DOE is mandated to comply with Executive Order 12866, and all others. A significant regulatory action is defined as a rule which may result in:
1) $100 million or more adverse effect upon the economy, a sector of the economy, productivity, competition, jobs, the environment, public health, safety of state, local, or Tribal governments;
2) create a serious inconsistency or interfere with an action planned or taken by another agency;
3) materially alter the budgetary impact of entitlement, grants, user fees, loan programs or the rights and obligations of loan recipients; and
4) raise novel legal or policy issues arising out of legal mandates.

As set forth in Executive Order 12866, DOE proposed action is significant and subject to review by the Office of Management and Budget (OMB) and requirements of E.O.12866. Note that "cost" savings must be included in determination of $100 Million dollars economic impact. DOE has failed to consider the direct and indirect foreseeable impacts of the proposed action, including the considerable long and short term costs, risks to the public and worker safety, and environmental consequences in draft EA. The finding of no significant impact proposed by the agency is not supported by the data. DOE has failed to include the costs of transportation in proposed action.

Recent transportation contract awarded to International Technologies Inc. (IT) for transport of materials/waste from the FEMP totalled $122,000, see Attachment 1. Obviously, agency experience would result in DOE conclusion that transport of 3,800 metric tons of uranium from the production and processing facilities at the former uranium processing facility would result in considerable dollar amount cost which should reasonably be added to the $5,000,000. cost estimated by DOE for construction of Tension-Support Structure(s) (TSSs) at proposed interim storage sites. Failure to address the physical processes required for transport/transfer of the nuclear materials from FEMP to receiving sites represents considerable omission.

Note that EA presents dose calculations based upon incomplete/missing data. "Breathing rate of 3.3 E-4 m 3/s based on _____." Lack of supporting data in calculation of public and worker risk from inhalation of uranium does inspire confidence in finding of no significant impact.

"Commitments" made to the state of Ohio referenced in purpose and need for the proposed action require explanation in EA. What "commitments" have already been made and precisely what is required to fulfill those commitments has been omitted from draft proposal. Transportation is an obvious requirement/result of the proposed action, as in the impacts associated with the transfer. Communities along the transportation routes are not even mentioned in passing (by rail or truck) in DOE EA. DOE has added Transportation Addendum to draft EA which addresses the obvious transportation requirement inherent in the proposed action. However, no discussion of mode(s) (rail, truck, air carrier) is included. Cost of feasible means of transport with DOE consideration of radiation dose exposures to the general public, workers, and freight employees is included. Bluntly stated, DOE is focused upon the impacts to the FEMP remediation ONLY, and has excluded worker exposure, risks to communities along the

transportation routes resulting from incident/accident radiation dose release in EA. DOE is required by CEQ regulations to avoid improper segmentation (by elimination) of original draft. Addendum fails to address transportation as an impact of the proposed action. Rather, DOE has listed (with no explanation) regulations that apply during transport of the nuclear materials. No discussion of cost, safety, or risk to the public is provided. DOE is required to address "worst case scenerio" as a potential adverse impact from incident/accident during transport which has not been done in EA or Addendum of 1/12/99. Final paragraph in Addendum concludes:

> The outbound shipments from ORO will move in DOE approved packaging, subject to DOE radiation, contamination or fissile controls and other DOE and federal requirements.

Conclusion of the Transportation Addendum provides no meaningful information whatsoever about what is being moved, where the material is being moved from (ORO may be a missprint since all other transportation discussion is focused upon removal of nuclear materials from the FEMP site as part of remediation activities of the site), what standards of protection and regulations apply and how DOE proposes to comply, whether the materials proposed to be moved require decontamination before transport from the site(s), what "fissile controls" are required, what "other DOE and federal requirements" apply and how the agency proposes to comply with these undisclosed requirements! The omission is considerable and fails to inspire trust and confidence that the total plan with considerable potential adverse impacts is being addressed in EA and its FONSI conclusion. DOE has failed to follow its own agency policy and guidance documents, as well as other federal regulations which direct the agency to avoid all actions likely to lead to loss of public trust and confidence. Transportation Addendum reference to "fissile controls" logically leads to conclusion that DOE has failed to address considerable "worst case scenerio" impacts, and all others, likely to result from the proposed action.

> . . .when transportation is in any respect a major factor. . . the environmental impacts of such transport should be analyzed, even when DOE is not responsible for the transportation. Transportation impacts include those from transport to a site, on-site, and from a site, when such activities are reasonably construed as part of the proposed action or analyzed alternative. If not otherwise analyzed, include any necessary loading or unloading activities in the transportation impact analysis.

Ref.: RECOMMENDATIONS FOR THE PREPARATION OF ENVIRONMENTAL ASSESSMENTS AND ENVIRONMENTAL IMPACT STATEMENTS, U.S. DEPARTMENT OF ENERGY OFFICE OF NEPA OVERSIGHT, May 1993.

Citing own guidance document (previously referenced) Recommendations for analysis of TRANSPORTATION IMPACTS are directed to:

1) Analyze of all links that are reasonably foreseeable parts of the proposed action (which has been omitted entirely from EA and Addendum

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2) Avoid (do not) rely exclusively on general statements that transportation will be conducted in accordance with applicable regulations and requirements of U.S. DOT, U.S. EPA, NRC, state authorities, DOE (which is precisely how EA has added Addendum "addressing" transportation to draft EA)

3) Evaluate both routine (incident free) transport and accidents. Give special emphasis to public or worker health impacts from exposure to radiation or chemicals (which is completely omitted from EA and Addendum)

4) Be sure to use defensible estimation methods for assessing the radiological impacts of transportation (such as the most current version of RADTRAN) (no methods of estimation radiological impacts have been included, the omission is indefensible due to "fissile" materials referenced in conclusion of Addendum)

5) Estimate the annual and total impact of all DOE and non-DOE transportation associated with the use of specific routes (if known) over the term of the proposed action. . .including the impact on a maximally exposed individual. The impacts related to transportation must be totalled over the duration of the project (e.g. 48 trips per year for 5 years). (No modes of transport or routes have been addressed, radiation dose to a maximally exposed individual has not been considered, duration of the project and number of train or truck loads required has been omitted from EA and Addendum)

6) In determining the cumulative impact from transportation activities, use available data to estimate, for example, the number of radioactive materials packages that were shipped over a given transport routing system over a given period of time (no cumulative impacts from rail route and truck route transportation has been included in EA shipments among the DOE sites discussed in EA and Addendum although cumulative impacts from 40 years should be considered significant in cumulative impact).

DOE is being disingenuous in multiple failures to address transportation in a manner compliant with agency policy and guidelines. DOE cannot avoid addressing transportation due to implementation of transportation *requirement* in DOE proposed action by an outside/independent contractor. DOE and other agencies should not attempt to avoid disclosure of the total plan by hiding "the plan" behind Fernald/FEMP clean up which is precisely what has been attempted in draft EA.

Furthermore, Addendum which addresses transportation only by stating transportation is required for FEMP remediation with conclusion referencing "outbound" shipments of "fissile" materials (indirectly by implication that fissile controls are required) provided only two of three documents referenced in Addendum. Document #1: Letter (no date) Kim Hayes (no agency affiliation or title) to Thomas Rowland (no affiliation or title), April 12, 1993; subject: Safe Shutdown Environmental Assessment cannot be located by DOE ORO or DOE Fernald! DOE has used this letter (document) in Addendum as justification for the proposed action and finding of no significant impact and is unable to produce/provide a copy of the letter. I requested a copy of this letter (FOIA) in order to include it in research for public comment period on EA and was informed by the ORO and Fernald Public Information Centers that the letter could not be located. From the lack of information provided in reference to what DOE has indicated is a crucial document in this

proposed action, this missing letter could, in fact, have absolutely nothing to do with FEMP remediation and/or the subject of EA proposed action. DOE should reasonably be able to locate and provide a letter of crucial importance in issuing a FONSI on its proposed action, but has failed to do so.

Draft EA fails to address radiological and chemical dose exposures to workers and the general public required by transport of these nuclear materials and during "interim" storage at the receiving site(s). Note that DOE has indicated a willingness to use a "hybrid alternative," i.e., shipments to more than one site for "storage" prior to ultimate/final disposition. EA implies decision to ship to more than one site is being considered, though discussion of that alternative is not addressed.
1.2 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT, 1-1 defines scope of the proposed action as:

> The Ohio Field Office will assume responsibility for environmental analyses and documentation for packaging and transport of the material as part of the remediation of the site (FEMP), and ORO is preparing this EA for receipt and storage at one or more sites.

Scope of EA is narrowly focused upon movement of nuclear materials from the FEMP site as part of that site's remediation while failing to address and disclose what disposition is proposed for these materials after they are shipped from FEMP to some other DOE site(s). DOE actions and intentions require full explanation in final EA. Unnecessary segmentation of actions result in findings which are inappropriate. DOE states intention in Transportation Addendum to move the materials (from ORO?), but fails to include where the materials are to be ultimately transported and for what purposes. It would appear that "recycling" metals, metal fabrication, and other potential uses would be anticipated to cause other major polluting facilities to be constructed or converted and should be addressed in EA. DOE cannot appropriately avoid disclosure/public participation by storing, then handing off such materials to private, commercial facilities licensed by NRC rather than DOE based upon a finding of no significant impact.

"Commitments made to the state of Ohio" require full explanation. Both DOE and the state of Ohio have failed to disclose the commitments which cause the actions proposed in EA to occur, and would provide information as to the total scope and purpose of the proposed action(s). Both U.S. EPA and NRC have regulatory statutues which require DOE compliance at FEMP. DOE appears to be proposing compliance with U.S. EPA mandates at the FEMP site as an isolated action which does not require the same level of compliance with other federal and state regulations once the material leaves the Fernald Site. The finding (FONSI) and public participation process described as "public involvement" addresses the proposed action(s) from the perspective of the FEMP site ONLY. DOE is mandated to fully address the adverse impacts and consequences caused by proposed actions to "stakeholders" likely to be adversely affected as this process is implemented in final version of EA.

Public (and media) interest exist by potentially adversely effected parties, but "participation" can occur only when DOE provides information necessary for informed participation as the process is occurring, i.e., when decisions are being made by the agency. See Attachment II.

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DOE is required to notify interested and adversely affected parties by legal notification process. How and when was this done? I can find no public notification of draft EA's availability for public comment in the federal register, or in legal notice in subscription newspapers available within the Brown County, Ohio area which properly notified the public of any proposed agency transport of nuclear (fissile) materials through local communities. DOE press release was available on Internet, but does not provide legal notice to the directly-effected public. Editorial and newspaper reports do not provide proper, legal public notification of opportunity for participation and comment. As stated previously, extension of the public comment period from original 10 day time period is helpful, but does not meet NEPA requirements of involving the public early in the process. DOE is well-aware that participation from the FEMP/Fernald public only fails to include adversely effected parties from comment/objection/decision-making process.

DOE is requested to prepare program-wide EA/EIS which address the major federal actions being proposed for implementation in draft EA. DOE's disposition of "excess" inventory property has considerable potential impacts and should be decided in a public forum rather than tagged-on to FEMP remediation. Program-wide decision-making implications contained in EA include: 1) depleted uranium management (dispose as waste/use as restricted construction material, feed materials in nuclear fuel production), 2) recycling/recovery of uranium and uranium milling residues, including Thorium and Radium, 3) recycling of uranium metals in various forms, and 4) recycling or disposal of steel/metals when Decontamination and Decommissioning (D&D) of DOE production facilities occurs. June 1994 ROD and August 1996 ROD requires D&D of FEMP production facilities (Operable Unit 3). DOE and its contractors cannot implement D&D at FEMP in the absence of program-wide decisions without setting precident at other DOE facilities nationally. Bluntly stated, FEMP stakeholders are certainly not the only stakeholders/effected parties by DOE decision-making regardless of commitments made to the state of Ohio! DOE cannot proceed to set precident without providing access to decision-making process based on a narrowly focused FONSI. See previous comment on compliance required by DOE with Executive Order 12866.

DOE is also required to comply with Executive Order 12898, February 16, 1994 which mandates federal agencies to avoid actions resulting in disproportionate adverse environmental and health impacts in low-income and minority communities. DOE facilities named as potential candidate sites in EA are all located in economically depressed regions. August 1996 ROD provides for complete demolition and removal of process buildings, including contaminated concrete from the FEMP site. Movement of 3,800 metric tons of uranium materials is specifically required in order to accomplish demolition of the FEMP production buildings and processing facilities. DOE is required to include disposition of the considerable waste stream from that process in a public participation and implementation process involving more than FEMP site input. DOE is apparently using FEMP as the "pilot project" in site restoration. The agency is required to address implications from such decision-making in context of its potential to set precedent in DOE policy and future actions at other sites. (Executive Order 12866.) DOE is required to consider ultimate disposal/disposition of materials to be generated by FEMP site remediation and DOE's ultimate goal for the federally owned lands when FEMP remediation projects are completed at the site.

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Given the arbitrary nature of the process used by DOE to date in declaring "excess property" in inventory, statement of DOE intent is required in final EA. DOE has considerable reason to predict that implementation of FEMP environmental management and restoration will likely result in the FEMP site (land) becoming excess real property. What are the agency's intentions after remediation is completed at FEMP? As remediation progresses, wastes are to be characterized and disposed, according to DOE decisions with U.S. EPA regulations of hazardous and toxic materials, and under NRC regulations of radioactive materials.

Current proposals for FEMP future uses include giving the FEMP site back to the Indians. Does DOE intend to use FEMP as a "pilot program" for giving other DOE/federally owned sites/land back to the Native Americans, including the Hanford site in Washington state? Bluntly stated, DOE's site contractor at FEMP also manages Hanford. In 1996 U.S. District Court Decision, Backcounty Against Dumps v. EPA, the court ruled that U.S. EPA did not have authority under RCRA to approve (or disapprove) tribal solid waste permit programs. Disposition of excess federal lands from DOE back to "the Indians" would seem to remove U.S. EPA from the permitting process required at FEMP and at other sites declared by DOE to be excess real property, as well. DOE is required to consider the proposed action in EA in context of the total remediation currently being implemented at FEMP and in context of programmatic implications.

Does DOE envision disposition of federal lands presently under DOE management becoming excess real property in DOE inventory which could be given back to the Indians? Any such potential decision-making process must be addressed by the agency in program-wide decision making process with full participation by effected and interested parties. Removal of U.S. EPA from authority under RCRA would certainly appear to create "unique" regulatory issues, or more accurately, a void thereof.

Draft EA attempts to focus upon the immediate need and requirement to transfer 3,800 metric tons of uranium from FEMP. The agency has failed to include data necessary to justify its proposed finding of no significant impact. Final draft should comply with DOE policy and guidance in implementation of NEPA and address the total impacts of the proposed agency action. The agency is requested to respond to my questions and the issues of concern raised in this correspondence. Program-wide policy decisions should be determined by program-wide decision-making documents. The agency has authority to require accountability from its contractors, including Fior Daniel at FEMP. Ref.: Price-Anderson Act. Legal and other maneuvering to exclude/remove U.S. EPA from authority at FEMP or any other DOE site should not be tolerated, and most certainly not condoned by the agency. The legacy from the nation's nuclear weapons program is considerable. Some 5,000 of the DOE's 20,000 facilities were declared "surplus" in 1996. Characterization of these 5,000 facilities has not yet been completed, but "a large number" are known to be contaminated with hazardous, toxic, and/or radioactive substances." Both the Hanford, Washington and FEMP site are known to be contaminated. Hanford (250) and Fernald (180) have the most facilities in the decommissioning process at this time and the same contractor. Procedure proposed to be implemented in the "disposition" of excess property at FEMP is disingenuous and self-serving by the parties involved at the long term expense to the public in dollars, public health and safety, and natural environment. DOE is respectfully requested to prepare a final draft of EA which includes the required data for credible finding, including policy to be

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set, for the proposed agency action.

In conclusion, to avoid any misinterpretation that I am suggesting an other federal, state, local agency, or planning commission could or would be preferred to manage the considerable legacy created by former nuclear weapons production within the past 50 years, DOE can and should use the policies and procedures presently in place within the agency and its considerable resources in all agency actions, particularly the action proposed in draft EA. Final EA should address errors and omissions. DOE does provide volumes of information to the public which is not available from any other agency. The information available from DOE allows me to offer these comments on the proposed action. DOE is capable of applying considerably higher standards of agency review and oversight and is herein requested to do.

Respectfully submitted,

Diana I. Cahall

[redacted]

Attachments

VIA THE U.S. POSTAL SERVICE, CERTIFIED MAIL, RETURN RECEIPT REQUESTED, ARTICLE NUMBER _____, ON MARCH ____, 1999.

cc:
By The U.S. Postal Service, regular mail, postage prepaid, on 3/4/99 to:

Ohio Field Office/Ohio EPA
U.S. Department of Energy, Fernald Office
U.S. Department of Energy, Washington, D.C.
U.S. EPA, Region 5

Steven L Wyatt, Director
U.S. Department of Energy
Oak Ridge Operations
Public Affairs Office
Fax: (423) 576-1665

February 12, 1999

Dear Director Wyatt:

Thank you for your prompt response to my request for a copy of the "Transportation Addendum" to the Environmental Assessment/ Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project Site.

My initial reading of the Transportation Addendum indicates that DOE has previously addressed Transportation as an issue included in environmental process by reference back to past DOE documents. In isolation, the Addendum doesn't provide the information I require for informed comment. Could you please provide me with a copy of each of the following documents referenced by DOE Field Office as having previously adequately addressed Transportation?

1) No title provided, document(s) referenced in INTRODUCTION. ENVIRONMENTAL ASSESSMENT FOR THE U.S. DEPARTMENT OF ENERGY. OAKRIDGE OPERATIONS. RECEIPT AND STORAGE OF URANIUM MATERIALS FROM THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT SITE. DOE/ORO-2078. page 1-1, paragraph 1 in statement as follows: "This remaining material inventory must be removed from the site by the end of fiscal year (July 1, 1999 translation added) FY 1999 to support commitments made to the State of Ohio." Documents required which specify in detail the commitments made by DOE to the State of Ohio.

2) Document referenced in Addendum as: REMOVAL ACTIONS #12. SAFE shutdown of the former production facilities at the FEMP. paragraph 2. which continues "DOE determined that the implementation of the SAFE SHUTDOWN REMOVAL ACTION (including material disposition) was excluded from requiring a detailed NEPA evaluation (e.g. an Environmental Assessment)."

3) Letter: Kim Hayes to Thomas Rowland. April 12. 1993: subject: Safe Shutdown Environmental Assessment.

4) June 1994: Operable Unit 3 RECORD OF DECISION for Interim Remedial Action: Fernald Environmental Management Project. (FEMP) Fernald. Ohio.

5) August 1996: Operable Unit 3 RECORD OF DECISION for Final Remedial Action. FEMP. Fernald. Ohio.

Please provide the information requested herein within 10 working days so that I will have opportunity to include the information contained therein as part

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of timely public comment to the agency on the proposed action in the E.A. referenced previously in this correspondence.

Thank you for your timely assistance.

Diana Cahall

Diana Cahall

[redacted]

Transmitted at approx. 2:50 P.M. on 2/12/99.

2/13/99

Ms. Wyatt:
Paper Copy for your Records -
Got somewhat unreadable at times.
Thanks.
Diana

SOUTHERN
OHIO
DIVERSIFICATION
INITIATIVE

1864 Shyville Road
Piketon, Ohio 45661
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reindustrializing south central ohio

March 4, 1999

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL | # of pages ▶ 1

To Wayne Tolbert	From Melisa Hart
Dept./Agency SAIC	Phone # 576-8983
Fax # 481-8797	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Dave Allen
USDOE Oak Ridge Operations
PO Box 2001
Oak Ridge, TN 37831

Dear Mr. Allen,

re: USDOE Fernald material relocation

The Southern Ohio Diversification Initiative (SODI) wishes to make comments regarding the destination of material from the USDOE Fernald Site, especially related to the USDOE Portsmouth Site.

The SODI is working cooperatively with the local communities and the Department of Energy to develop and implement programs that will lessen the impacts resulting from the reductions of employment at the local site. A central theme, and the key to our long term transition success, is the reuse of buildings, lands, and equipment located on the Portsmouth Reservation.

We believe that relocating the material from Fernald to the Portsmouth Site negatively impacts our reindustrialization efforts. Public perception will play a vital role in our marketing program and reuse success, both of which are targeting a variety of companies to diversify our regional economy.

We recognize the Department of Energy has obligations with the regulatory agency(s) concerning removal of the Fernald material. With that in mind, we make the following recommendations:

1. Any material transferred to the Portsmouth Site should not be stored in facilities with a viable potential for reuse and alternate job creation. Specifically, any facility targeted for storage should be reviewed and approved by the SODI-DOE's designated Community Reuse Organization. This will ensure the negative impacts to our Reindustrialization Strategy will be minimized.
2. Buildings X-3002, 3001, 3346, 3000, 1000 (and other facilities) are initial priorities for our Reindustrialization Strategy and should not be considered for Fernald material storage.
3. If Portsmouth is to receive a portion of the Fernald material, new facilities should be constructed to house same.

If you have questions or comments concerning any of the above feel free to contact me.

Sincerely,

Gregory L. Simonton
SODI Executive Director

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STATE OF TENNESSEE

DON SUNDQUIST
GOVERNOR

March 11, 1999

Mr. David R. Allen, ORO NEPA Compliance Officer
U.S. Department of Energy
PO Box 2001, SE-32
Oak Ridge Operations Office
Oak Ridge, TN 37831-8739

Dear Mr. Allen:

As the Governor's Lead Contact for State of Tennessee National Environmental Policy Act (NEPA) reviews, I am providing comments in response to the **Draft Environmental Assessment for the Oak Ridge Operations Receipt and Storage of Uranium Material from the Fernald Environmental Management Project Site DOE/ORO-0278.** The attached comments from state agencies represent the complete and official response of the State of Tennessee. These comments are limited to the scope of study appropriate for the aforementioned document. Please give these comments your full consideration.

The State of Tennessee firmly and unequivocally supports the defense and national security mission and role of the Oak Ridge Reservation. The Draft EA does not, however, clearly demonstrate that the proposed Monitored Retrievable Storage Facility at Oak Ridge would further present or future defense and national security needs. It has not provided sufficient information for the State to consider the overall impacts resulting from the transfer of materials to Oak Ridge and does not show a contingency plan for future disposal.

The State has not supported the use of the Reservation for storage of off-site materials that have no identified use. Past studies have established that Oak Ridge is a poor location for long-term storage of wastes.

The State specifically appreciates the early communications and interaction with DOE on this issue and would like to see this process continued. We believe successful resolution is much more likely when the State is involved early in the process.

State Capitol, Nashville, Tennessee 37243-0001
Telephone No. (615) 741-2001

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We appreciate the opportunity to comment. If you have any questions, please contact Earl Leming or Dale Rector at (423) 481-0995, our staff policy analyst at 615/532-4968, or me.

Sincerely,

Justin P. Wilson
Deputy Governor for Policy

JPW/emw

cc: Mr. Milton H. Hamilton, Jr., Commissioner
NEPA coordination file/Mr. Dodd Galbreath
State NEPA Contacts

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

March 5, 1999

David R. Allen, ORO NEPA Compliance Officer
PO Box 2001, SE-32
DOE Oak Ridge Operations
Oak Ridge, Tennessee 37831-8739

Dear Mr. Allen

Document NEPA Review: Draft Environmental Assessment for the U.S. Department of Energy, Oak Ridge Operations Receipt and Storage of Uranium Material from the Fernald Environmental Management Project Site, DOE/ORO-2078, February 1, 1999

The Tennessee Department of Environment and Conservation, DOE Oversight Division (TDEC/DOE-O) has reviewed the subject document in accordance with the requirements of the National Environmental Policy Act (NEPA) and associative regulations of 40 CR 1500-1508 and 10 CFR 1021 as implemented.

The State of Tennessee strongly supports the Defense and National Security missions on the Oak Ridge Reservation. The State has not supported use of the Oak Ridge Reservation for storage of off-site materials that have no identified future use or may be declared a waste at some future date.

The Draft EA appears to propose a Monitored Retrievable Storage Facility (MRS) at a site other than Fernald. The Draft EA has not demonstrated that such a facility meets present or future Defense Programs needs for the material or other national security interest, nor has it provided sufficient information to allow the State to consider the overall positive and negative impacts resulting from a transfer of the materials to Oak Ridge.

The Division appreciates the early interaction with the DOE on this issue. We believe cooperation and issue resolution is more likely when the State is involved early in the NEPA process. We would like to see this process continued.

Enclosed for your review and response are general and specific comments. If you have questions, please contact Dale Rector or me at (423) 481-0995.

Sincerely

Earl C. Leming
Director

xc Steve Richardson - DOE
Dale Jackson - DOE
Justin Wilson - Governor's Policy Office
Dodd Galbreath – TDEC, Environmental Policy Office

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Tennessee Department of Environment and Conservation/DOE-Oversight
Comments on the Draft Environmental Assessment
DOE/ORO-2078, February 1, 1999
The U.S. Department of Energy, Oak Ridge Operations Receipt and Storage of Uranium Material from the Fernald Environmental Management Project Site

General Comments:

In order to reasonably assess whether the Fernald material is an asset material required for Defense needs or other national security considerations the EA should provide information on existing complex wide inventories of similar material and how much has been transferred over the past five years to the Department of Defense or "other interests."

The EA does not describe a contingency plan for the storage and eventual disposition of this material in case no markets are developed. Although the EA states on page 1-1 there is an "interest," the material is "potentially marketable," and it is in the best interest of DOE to "eventually market or use" the material, DOE may require long-term management of the material. The draft EA risk analysis indicates that a container breach would occur primarily from long-term corrosion. Without proper storage and maintenance the material from Fernald could experience corrosion. The DOE should avoid this situation with the Fernald material by planning for adequate funding for storage and maintenance. The EA should address associated cost for transportation, long term storage, and disposition (including disposal). It should also address any plans for cost recovery through sales or other forms of revenue exchange. The EA should clearly identify the DOE program, which would be responsible for the material and that programs funding assurance or needs to properly store, maintain, and disposition the material. It should also address future decontamination and decommissioning cost of equipment and facilities.

The draft EA is inconsistent in many areas of consideration. A description of existing contamination, fire suppression systems, and ventilation was provided for some candidate site buildings, while the buildings at Y-12 and ETTP did not receive the same consideration. Some proposed areas were evaluated as flood zones while areas at Y-12 and ETTP did not have the same evaluation. Other sites were evaluated for upgrades to facilities while there were no assessments done for the buildings at Y-12 and ETTP. In order to evaluate this document for issuance of an EIS or FONSI, complete and consistent information must be provided.

It has been indicated that material exists in the inventory that requires a Nuclear Category 2 storage facility. The category should be described and the site(s) under consideration evaluated to determine if they meet the same nuclear category or what will be required to upgrade the facilities to a Category 2. The amount of material requiring Nuclear Category 2 storage must also be identified.

The radioactive contamination levels of candidate buildings must be described. The presentation made to this Division clearly indicated that the material from Fernald would be in clean packages, i.e.: free from external contamination, and would be placed in "pristine" facilities.

The transportation evaluations for moving the material was absent from the draft EA and provided only after request. If the containers are transported off site, they must be evaluated for transport suitability, as the document states there have been problems with long-term corrosion.

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The EA must address the inspection and maintenance programs that have allowed the long-term corrosion to occur. The final EA should include all incidents of container breaches and releases of material. The final EA should also describe the storage containers including type and thickness of metal.

Requested funding in FY 2000 to upgrade the existing facilities at Y-12 for storage of highly enriched uranium has been cut. Additional material stored in substandard facilities increases the risk of release to the environment and exposure to the public. It does not appear the risk analysis used substandard facilities in the evaluation.

At the request of Tennessee, DOE has imposed a limit for storage of LEU at 6 MTU for the Y-12 site. No inventory above that limit is allowed as specified in the Finding of No Significant Impact (FONSI) for the Environmental Assessment (EA) of the "Proposed Interim Storage of Enriched Uranium Above Maximum Historical Storage Level at Y-12 Plant, Oak Ridge, Tennessee."

Specific Comments:

Page 1-1, Section 1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION
"Of the remaining inventory there are approximately3800 metric tons of potentially marketable material...." This remaining 3000 metric tons of uranium material that is not potentially marketable should be considered waste.

Page 2-1, Section 2.1 BACKGROUND
"... an area where at least two tension-support structures..."
The EA should clearly indicate that these are temporary tent-like structures and not permanent buildings.

Page 2-8, 2.5 Y-12 Plant
The Nuclear Category level and contamination levels (if levels exist) of the buildings should be described.

Page 2-8, 2.6.1 K-1066F Area
The draft EA should specifically state whether the K-1066F area is or is not within a flood zone.

Page 2-8, 2.6.2 K-131 and K-631 Buildings
The *"Remedial Investigation Report for the East Tennessee Technology Park, Oak Ridge, Tennessee, Volume 5"* does not list K-131 as having a basement. Additionally, both buildings are listed as having contamination areas, failing a screen for the report, and requiring further evaluation in the feasibility study. These buildings are currently listed on a decontamination and decommissioning list. During the presentation made to the Division, it was stated by DOE that the storage of this material was to be "pristine" facilities. Storage in contaminated buildings would not meet that goal.

"These buildings are approximately 200 ft south of Poplar Creek at its closest point." Explain the significance of this statement in terms of flooding.

Provide information for the meaning of "nominal" in the statement *"The nominal basement size is 22,765 ft²..."*

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Page 2-1, 12.8.1 Commercial Facilities
The requirement to have all the uranium removed from the FEMP site by September 30, 1999, should be cited. Although the draft EA states there *"was not enough time to prepare and issue a competitive request for proposal..."* the DOE has known for some time this material needed to be removed from the FEMP site.

Page 3-3 and 3-11, Table 3.1 and Table3.4
A comparison of Table 3.1 and 3.4 indicates that Cincinnati was included for the Fernald site analysis, but Knoxville was not included in the Oak Ridge site analysis. Knoxville is as close to Oak Ridge as Cincinnati is to Fernald; therefore, Knoxville should have been included in the analysis of the Oak Ridge sites.

Page 3-9, Section 3.4.2 Climate and Air Quality
"For radiological pollutants, emissions are variable and emanate mostly from the TSCA incinerator."
TSCA is not the primary source of radiological emissions. In the 1997 ASER, less than one Curie of radiation was reported as being emitted from the TSCA stack. Over 10,000 Curies were reported as being emitted from the HFIR stack. Only .013 Curies of uranium were released from Y-12 during 1997; however, Y-12 was still in "stand-down" mode. The most effected individual for the ORR was closest to the HFIR stack not the TSCA stack. Please revise this section to reflect the above statistics.

Page 3-9, Section 3.4.1 Public and Worker Risk
Y-12 should have the same considerations as the Portsmouth and Paducah sites for "radiation dose from airborne radionuclides..." and "collective radiological dose from airborne emissions..." The document is inconsistent in its evaluations.

Page 3-9, 3.4.3 Water Resources
Floodplains are not addressed nor is groundwater. This section is inconsistent in evaluation with other sites' sections.

Page 3-10, 3.4.5 Ecological Resources
Lake Reality is not considered waters of the State and is a man-made, spill containment pond that has heavy mercury and PCB contamination. Its location is now adjacent to Upper East Fork Poplar Creek.

Page 3-11, Section 3.5 EAST TENNESSEE TECHNOLOGY PARK (formerly K-25 Site)
This section discusses the East Tennessee Technology Park (ETTP) as a possible site. The ETTP is being reindustrialized. The use of the site as a storage area for Uranium material does not appear to meet the current mission for the ETTP. The EA should address the D&D Trust Fund which is the main source of funding for ETTP operations and how ETTP funds would be used to store and disposition the Fernald material.

Page 3-11, Table 3.4
Please explain what the "Fernald Region of Influence" (in table title) means and how it impacts Anderson and Roane counties. The "Fernald Region of Influence" is also mentioned in Tables 3.2 and 3.3.

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Page 3-11, 3.5.1 Public and Worker Risk
ETTP should have the same considerations as the Portsmouth and Paducah sites for "radiation dose from airborne radionuclides..." and "collective radiological dose from airborne emissions..." Again, the document is inconsistent in its evaluations.

Page 3-12, 3.5.3 Water Resources, Surface Water
"...most of ETTP is above maximum flood level" does not adequately describe the potential for flooding at proposed storage sites. Flood levels are measured in terms of "X" year floods, that is, a 25-year flood will reach a certain elevation above sea level in a certain location, while a 100-year flood will reach a higher elevation in the same location. The proposed locations for this material are located near Poplar Creek. The paragraph should provide specific information whether or not a flood could inundate the area and the flood plain year (25, 100, etc.).

Page 3-12, 3.5.3 Water Resources, Groundwater
"...conduit-dominated flow has been confirmed only in portions underlain by Knox carbonate along Black Oak Ridge." One-third of all bedrock wells at ETTP intersects cavities, which are generally water-filled. At least one of the proposed locations had adjacent dolines shown on topographic and geologic maps of the area. Conduit flow should be and is the base assumption for unconfined carbonate aquifers such as those that underlie the ETTP proposed storage sites. The fact that conduit flow has only been delineated in one area at ETTP should not be used to imply that conduit flow does not exist in other carbonate units beneath the site.

Page 4-1, 4.1 Public and Worker Risk, first paragraph
Provide information for the statement *"In addition, the initial assessment to determine...."* specifically outlining what is meant by *"a review of the fate of the uranium in the off-site environment...."* Also provide information as to where this assessment appears in the appendices.

Page 4-2, 4.1 Public and Worker Risk, first and second paragraph
"Uranium that is released from primary and secondary containment...." It appears that the modeling did not use the tension support structures proposed for storage of this material.

Page 4-8, 4.6.1 Normal Operations, fifth paragraph
"...workers could be exposed to direct radiation from surface contamination"
Storage containers should not have any surface contamination. The DOE's original presentation to this Division stressed the packages would be clean and kept in a clean environment. Although these packages may be stored on brown field areas, they are not scheduled to be in any type of secondary containment building. Containers should be free of contamination to prevent release of surface contamination to areas outside the designated storage.

Page A-3, Appendix A
To prevent moving the material twice or more, the 193 MTU of normal uranium scheduled to be used for blend stock should be moved directly to the sites using the material. Furthermore, if other users for the inventory are identified, the material should be transported directly from Fernald to the user to avoid transporting twice.

The total pounds and MTU amounts do not match the totals given on page A-4 and Table B.1.

Page A-5, Appendix A
The chart is describing "depleted" uranium but the total is stated for "all normal."

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Page B-4, Appendix B, Table B.1
The inventory amounts for the total normal uranium MTU do not match the amount listed in Appendix A, page A-3. The total low-enriched uranium pound amount does not match the amount listed in Appendix A, page A-7.

Page B-6, Table B.4
The tornado windspeed for Oak Ridge is less than Fernald and Paducah. How was the wind speed determined, and why was it less for Oak Ridge?

Page B-6, Appendix B, page B-5, Table B.2, and Container Breach
It is listed that an accident involving a container breach due to corrosion or degradation of the storage containers could occur. The condition and age of the storage containers should be fully examined and included in the final EA. The material also needs to be fully evaluated for transportation in the final EA.

Page B-7, Appendix B, third paragraph
"...it is assumed that the uranium storage facility is a Hazard Category 2 facility...." The hazard analysis appears to assess storage in a Hazard Category 2 facility but not storage in the tension-support structures (TSS) or outside storage pads.

Page B-9, Appendix B
Please explain the blank line for the first bullet regarding breathing rate.

Page B-15, Appendix B, Table B.8
The calculations for public dose needs to be re-evaluated as the ETTP site is undergoing reindustrialization, members of the public are not restricted to outside the site fence boundaries.

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STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Radiological Health
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March 11, 1999

Mr. David R. Allen, ORO NEPA Compliance Officer
U.S. Department of Energy
PO Box 2001, SE-32
Oak Ridge Operations Office
Oak Ridge, TN 37831-8739

Dear Mr. Allen:

Thank you for the opportunity to review the Environmental Assessment for the Receipt and Storage of Uranium Materials from the Fernald Environmental Management Project Site. The Division of Radiological Health has the following comments about this document.

1. There are a number of special security considerations for the movement and storage of the LEU material. Since the Y-12 site currently stores some HEU and LEU, that site appears to be the best location for the storage of the LEU material if it is to be stored in Oak Ridge.

2. This proposal treats the uranium in question as a "product" but the only mention of an actual customer for the product is for the LEU. The State of Tennessee already contains hundreds of cylinders of Depleted Uranium in the form of UF6 which the Department insists can be marketed as a product, but for which they have been unable to find a buyer. While the UF6 situation is different because of the need to convert the Uranium to a usable form, the situation is similar.

3. In the proposal to store the material at K-25, the "co-located worker" is considered to be closer than the member of the public. This is not an accurate assessment of this site. Due to the reindustrialization of the ETTP site members of the public work at and visit this site regularly. The concept of a "co-located worker" for non-radiation workers is a DOE fabrication and is not recognized elsewhere.

4. The EA states that the intent is to get approval for storage of the material at "one or more site." If the intent of this statement is to leave several options open then we have no objection to this intention. If on the other hand the intention is to scatter the material to different sites then this causes us concern. Storing the DU and the HEU

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at different sites may be necessary but scattering the DU material to various locations appears inefficient. For example, using more than one site would require that personnel be hired and trained to monitor the material at each of the sites. This does not appear to be the most efficient use of resources. Some of the sites being considered, such as the Y-12 site, do not have enough storage space for all of the material. If a site cannot contain all of the DU material, then we do not think it should be considered for storage of this material.

5. The accident assessment for the ETTP site and specifically for the K-1066F site describes the worst credible accident dose to the public as a low dose. The dose calculated is 1.26 rem. This should not be considered a low dose. Evacuation of the public is recommended at a projected dose of greater than 1 rem.

6. On page B-9, the first bullet at the bottom of the page is incomplete. It contains a blank underlined space, which was most likely intended to be filled in. The information is included on the page but should also be included in the bulleted line.

7. On page B-11, a chart lists the distances to the site boundary from each building considered. This distance was used in the accident assessment as the distance to the nearest member of the public. Given the development of private enterprise on this site ETTP is a public site. Given this, the site boundary is not a reasonable measurement for this calculation for those three buildings. The accident assessment for all three buildings should be reevaluated, this includes the K1066F site which already represents the highest accident dose of 1.26 rem.

8. Page B-13 includes a table which lists radiological consequence level to the public and to workers and associates these with a descriptive word. A public dose ranging from >= 0.1 rem to <5 rem is described as having low consequences. This seems an unreasonably high range for a low consequence dose.

9. Many of the proposed storage locations are not in the form of already existing buildings, but are empty lots on which Tension Support Structures (TSS) would be built. These buildings do not appear to be as secure as a real building. How reasonable is it to store this type of material in this type of building?

Sincerely,

Joelle Key
Health Physicist

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