

**FINDING OF NO SIGNIFICANT IMPACT  
WASTE DISPOSITION ACTIVITIES AT THE  
PADUCAH SITE  
PADUCAH, KENTUCKY**

**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-1339), which is incorporated herein by reference, for proposed disposition of polychlorinated biphenyl (PCB) wastes, low-level radioactive waste (LLW), mixed low-level radioactive waste (MLLW), and transuranic (TRU) waste from the Paducah Gaseous Diffusion Plant Site (Paducah Site) in Paducah, Kentucky. All of the wastes would be transported for disposal at various locations in the United States. Based on the results of the impact analysis reported in the EA, DOE has determined that the proposed action is not a major federal action that would significantly affect the quality of the human environment with in the context of the National Environmental Policy Act of 1969 (NEPA). Therefore, preparation of an environmental impact statement is not necessary, and DOE is issuing this Finding of No Significant Impact (FONSI).

**PUBLIC AVAILABILITY OF EA AND FONSI:** The EA and FONSI may be reviewed at and copies of the document obtained from:

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U.S. Department of Energy  
5600 Hobbs Road  
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(270) 441-6831

Paducah Public Library  
555 Washington Street  
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**FURTHER INFORMATION ON THE NEPA PROCESS:** For further information on the NEPA process, contact

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**BACKGROUND:** DOE must continue to manage (i.e., treat, store, and dispose) and control its wastes safely, efficiently, and cost effectively in compliance with applicable federal and state laws while protecting public health and the environment. The wastes considered in the assessment are limited to DOE's ongoing and legacy non-CERCLA waste management operations at the Paducah Site. These wastes include LLW, MLLW, and TRU waste, as well as materials stored in DOE Material Storage Area (DMSAs). Also included is storage of USEC program wastes, which are characterized as one or more of these waste types. Wastes not covered in this EA are those associated with the Comprehensive

Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) activities, including decontamination and decommissioning activities, and disposition of wastes associated with United States Enrichment Corporation (USEC) operational activities. The cumulative impacts section of the EA does take these wastes into consideration.

The assessment is intended to supplement and update the previous NEPA evaluation of waste disposition activities conducted as part of the final Waste Management Programmatic Environmental Impact Statement (WM-PEIS) for radioactive and hazardous waste. This assessment expands the scope of previous analyses to include possible transportation to commercial facilities.

DOE's proposed action includes waste disposition activities such as storage, on-site treatment, waste transport to off-site treatment and disposal facilities, waste management supporting activities, and DMSA waste characterization. The following table summarizes the proposed action:

Activity	Proposed Action
Storage	Storage at the Paducah Site until scheduled for treatment, disposal, or transport from the Paducah Site. Existing facilities would be used for waste storage. Applies to all wastes evaluated.
On-Site Treatment	On-site treatment would be conducted in existing facilities and treatment technologies are neutralization, solidification, carbon adsorption, and photocatalytic conversion. Applies to approximately 200 m <sup>3</sup> (7060 ft <sup>3</sup> ) of the 11,000 m <sup>3</sup> (390,000 ft <sup>3</sup> ) volume of wastes.
Waste Transport	Transport to off-site treatment and disposal facilities by truck, rail or intermodal carrier. Representative receiving locations include: Andrews, Texas; Deer Park, Texas; Hanford, Washington; Clive, Utah; Mercury, Nevada; Oak Ridge, Tennessee; Atomic City, Idaho, and Calsbad New Mexico.
Waste Management Supporting Activities	Supporting activities include waste staging, on-site waste movement, packaging, repackaging, sorting, volume reduction, waste container decontamination, inspection, labeling, characterization, facility modifications and/or upgrades, and others as necessary for waste management and maintenance.
DMSA Waste Characterization	Nuclear Criticality Safety (NCS) characterization in addition to standard waste management operations. Based upon the completion of the NCS characterization, standard waste management supporting activities would commence.

The impact analysis in the EA addressed the potential effects of storing all legacy and newly generated wastes on site, on site treatment of a subset of wastes (approximately 200m<sup>3</sup>), waste handling, and transporting accumulated legacy and ongoing operations wastes from Paducah to destinations representative of other DOE sites and licensed commercial treatment/disposal facilities. The potential effects of transport over both highway and rail routes were evaluated. Evaluations of waste generation were estimated based on volumes anticipated over a 10 year life cycle. On-site treatment technologies are limited by the Paducah Site RCRA Part B permit. RCRA-permitted on-site treatment technologies include sedimentation, precipitation, oxidation, reduction, neutralization, and cementation/solidification. Of these treatment processes only neutralization, stabilization, carbon adsorption, and photocatalytic conversion are applicable to waste types included in the analysis. Building C-752-A is evaluated as the on-site treatment facility.

**ALTERNATIVES:** In addition to the proposed action, impacts were also evaluated for two alternatives 1) no action alternative and 2) enhanced storage.

*No Action Alternative* - In the No Action alternative (i.e., long-term storage), DOE would not perform disposition activities except for those needed for waste management and maintenance. No disposal of the existing and projected quantities of various wastes discussed under the proposed action would occur. Because existing storage space would be rapidly exhausted, new facilities would have to be constructed on-site to store newly generated wastes and some legacy wastes that cannot remain in outside storage. On-site treatment would be performed on wastes that require some type of stabilization prior to storage. Any on-site waste treatment requiring indoor processing would occur in Bldg. C-752-A or another suitable location. Relatively small volumes of waste would continue to be shipped to DOE or commercial facilities under existing categorical exclusions (CXs). As these CXs expire, no new ones would be placed, and the waste would then be stored on-site.

*Enhanced Storage Alternative* - The Enhanced Storage alternative (i.e., fortified, long-term storage) was added to the analysis as a result of public comments on the EA. This alternative is identical to the No Action alternative with the exception that storage facilities would be constructed for resistance to disasters (such as earthquakes and fires). No disposal of the existing and projected quantities of various wastes discussed under the proposed action would occur. Because existing storage space does not meet enhanced storage definitions, new facilities would have to be constructed on-site to store wastes.

## ENVIRONMENTAL IMPACTS

### PROPOSED ACTION

#### Radiological Risks

*Radiological consequences for on-site treatment of waste* - Detailed analysis of radiological impacts to the public and to workers resulting from on-site treatment of waste was performed in the EA. The analysis indicated that impacts are not notable for the entire treatment process or for individual waste stream groups.

*Radiological Impacts from normal Truck Transportation* - The potential effects of transporting waste by highway from Paducah to each of the potential final destination sites were evaluated on an annual basis during the major shipment year groupings and on a total 10-year shipping campaign basis. Truck shipments to receiving facilities were evaluated for the probability of a latent cancer fatality (LCF) to the truck crew, the general population, and the maximally exposed individual (MEI). It turns out that the worst-case results for the truck crew, general population, and MEI all occur during the shipment to Mercury, Nevada. However, all values were calculated to be less than 1 (largest value being  $2.4 \times 10^{-2}$  for the crew), so risks to these receptors are considered negligible.

*Radiological Impacts from normal Rail Transportation* - The potential radiological effects of routinely transporting LLW, MLLW, and TRU waste by rail from Paducah to each of the potential final destination sites were estimated for all waste subgroups on an annual basis during the major shipment year groupings and on a total 10-year shipping campaign basis. Rail shipments were evaluated for the probability of an LCF to the train crew, the general population, and the MEI. It turns out that the worst-case results for truck crew, general population, and MEI all occur during the shipment to Mercury, Nevada. However, all values were calculated to be less than 1 (largest value being  $4.1 \times 10^{-2}$  for the population), so risks to these receptors are considered negligible.

**Nonradiological Risks.** During the normal operations of the proposed action, it is estimated that the wastes are stored and monitored, transported to waste treatment locations on-site, and prepared for transportation off-site. It is estimated that these activities require 60 full-time equivalents or 120,000

person-h/year over the 10-year duration. Based on the  $3.4 \times 10^{-3}/200,000$  person-h industrial fatality rate,  $2.0 \times 10^{-3}$  fatalities/year or  $2.0 \times 10^{-2}$  fatalities/ 10 years are expected as a result of industrial accidents.

#### Accident Analysis.

*Handling Mishap* - The computations for analyzing the vehicle mishap/mishandling accident evaluated the risks (expected fatalities) resulting from rupturing the ThF<sub>4</sub> drum or any of the 24 drums containing TRU waste. This analysis took into account the estimated accident frequency and the probability that the damaged drum would be either the ThF<sub>4</sub> drum or 1 of the 24 TRU waste drums out of a total of 56,000 drums. The results of the computations showed that the risk of the vehicle mishap/mishandling accident is negligible but slightly greater than for the EBE.

In addition to releases of radionuclides during a vehicle impact/mishandling accident, it is also possible that a PCB-containing transformer could be ruptured with ensuing combustion of the PCB oil. Concentrations of hydrochloric acid (HCl) and PCB soot arising from a PCB fire were calculated and compared to benchmarks. Neither the calculated HCl nor PCB soot occurs in concentrations that would create adverse health effects to the maximally exposed uninvolved worker (MUW) or MEL.

*Evaluation Basis earthquake (EBE)* - In the event of a major earthquake, the horizontal ground acceleration is estimated to be capable of creating differential movement between the top and bottom box layers, resulting in drums being toppled into the aisles. Two source terms were considered during the risk computations: the airborne source term (AST) in which radioactivity is released to, and dispersed by, the air; and the liquid source term (LST) in which radiologically contaminated liquids are released to, and dispersed by, surface water. In summary, the computed risks (expected fatalities) from radiological dose resulting from an EBE accident are negligible. Effects of exposure to toxic metals were also considered. No toxic metals are known to be in the liquid waste streams being considered in the EA. Therefore, only the AST was considered. The results of the computations demonstrate that the concentration of toxic metals in the AST resulting from an EBE would be negligible compared to the most conservative benchmark for human exposure.

*Vehicle-Related Impacts* - Potential vehicle-related impacts, including expected accidents, expected fatalities from accidents, and impacts from vehicle emissions were evaluated. Impacts from vehicle-related accidents and emissions were highest for the Mercury (Nevada Test Site), Nevada, and Clive (Envirocare), Utah, destinations because of the larger number of shipments and the total miles traveled to and from these destinations. However, vehicle-related impacts for these locations are calculated to be minimal. In addition, the radiological dose resulting from these accidents was calculated and the risk of LCFs to the general public were also calculated. The worst-case calculated number is far less than 1 LCF ( $1.5 \times 10^{-3}$ ) for shipment to Mercury, Nevada. For the entire waste transportation campaign, the calculated value is still less than 1 latent cancer fatality ( $2.5 \times 10^{-3}$ ).

*Rail-Related Impacts* - Potential rail-related impacts, including expected accidents, expected fatalities from accidents, and impacts from vehicle emissions were evaluated. Impacts from rail-related accidents and emissions are highest for the Mercury (Nevada Test Site), Nevada, and Clive (Envirocare), Utah, destinations because of the larger number of shipments and the total miles traveled to and from these destinations. However, all calculated values are much less than 1, indicating negligible impacts from rail-related accidents. In addition, the radiological dose resulting from these accidents was calculated and the risks of LCFs to the general public were also calculated. The worst-case calculated number is far less than 1 latent cancer fatality ( $1.6 \times 10^{-3}$ ) for shipment to Mercury, Nevada. For the entire waste transportation campaign, the calculated value is still less than 1 LCF ( $2.8 \times 10^{-3}$ ). Calculated population risk for rail transportation is equivalent to that for transportation by truck.

#### Ecological resources.

*Aquatic Biota* – Under normal operations, impacts to aquatic biota from the proposed action should be negligible. Long-term impacts to aquatic biota would be beneficial after implementation of the proposed action, because much of the on-site waste would be removed reducing the amount stored on-site. The reasonable worst-case accident (earthquake) scenario involving radionuclides is unlikely to cause harm to aquatic biota in the Ohio River as a result of exposure to radionuclides. However, aquatic receptors in Bayou and Little Bayou creeks and other water conveyances by which the waste would reach the Ohio River would suffer minor impacts resulting from the caustic nature of the waste. Accident impacts analysis to aquatic biota from the reasonable worst-case accident scenario (earthquake) involving nonradionuclides indicated that PCBs are the only constituents whose ratio of concentration to toxicity benchmark (2.08) exceeds 1, indicating that PCBs could pose minor, short-term adverse impacts to aquatic biota in Bayou and Little Bayou creeks.

*Terrestrial Biota* - Short-term impacts to terrestrial biota from normal operations of the proposed activity should be negligible because the repackaging and on-site maintenance of wastes should not result in the release of constituents at concentrations that would be harmful to the biota. The accident scenario for chronic radionuclide exposure indicates that in this worst-case accident scenario (earthquake), long-term radiation effects to soil biota would be negligible. Two organics (PCBs and 1,2,4-trichlorobenzene) and two inorganics (cadmium and chromium) have modeled concentrations that would likely pose minor adverse impacts to soil biota if the worst-case spill accident occurred. However, these impacts would be reduced by the use of mitigative controls such as dikes, spill control measures, and expeditious cleanup.

*Threatened and Endangered Species* – Mussels including the orange-footed pimpleback (*Plethobasus cooperianus*), pink mucket pearly mussel (*Lampsilis arbrupta*), ring pink (*Obovaria retusa*), fat pocketbook (*Potamilis capax*), as well as the Indiana bat (*Myotis sodalis*) are federally listed endangered species that may be found in or near McCracken County. No proposed operations or hypothesized accidents have been identified that would affect potential Indiana bat roosting or foraging habitat. Under normal operating conditions, any small quantities of PCBs released would not adversely affect the creeks or be expected to reach the Ohio River. However, if a highly unlikely or incredible accident were to occur, wastes might reach the Ohio River. During a flooding rainfall (which occurred less than once in 25 years), Bayou Creek, Little Bayou Creek, and the Ohio River would be flooded and sediments would move downstream. This would be a negligible addition to the concentration of contaminants already present in Ohio River sediments. This additional quantity of contaminants would be well within the measured variability of concentrations in river sediments. The addition of contaminants in the Ohio River would quickly (in minutes) pass mussel beds during flood conditions as sediments were moved rapidly downstream. An accidental release of contaminants would be extremely small and too brief to increase concentrations in the mussel species.

**Noise.** The normal operations of the proposed action within the Paducah Site boundaries would have no impact on the noise level at the site. Operation of trucks and drum-handling machinery, such as forklifts, and physical volume reduction machines, such as chippers and crushers, would occur. However, these activities currently take place at the site; therefore, no increase in the current noise level is anticipated.

**Air quality.** Emissions of criteria pollutants are the primary concern from area (nonpoint) sources such as waste packaging/sorting and storage areas. No notable emissions of criteria air pollutants are expected from the routine packaging, handling, and storage activities of existing or future generated waste at the Paducah Site.

All treatment activities would be conducted at existing facilities, so there would be no impacts from construction or site disturbance. The wastes proposed for on-site treatment would be processed by technologies, such as solidification, that historically have not produced notable air emissions and result in no anticipated ambient air impacts at the Paducah Site.

The Paducah Site anticipates making 762 waste shipments per year (up to 3 per day). During transportation, nonattainment areas are of most concern for potential air quality impacts. Nonattainment areas associated with each transportation route are associated with large metropolitan areas. Three shipments per day would not discernibly increase the daily rate of truck traffic for these metropolitan areas. In the *Environmental Assessment for Transportation of Low-Level Radioactive Mixed Waste from the Oak Ridge Reservation to Off-Site Treatment and Disposal Facilities* (DOE/EA-1317) analysis was undertaken to determine the impact of the proposed shipments relative to the threshold emission levels in nonattainment areas described by EPA in its air conformity regulations [40 CFR 93.153(b)(1)]. The receiving facilities for Paducah Site wastes are the same as in this analysis. The results determined that air emissions within all nonattainment areas along shipment routes are well below the EPA threshold emission levels, and thus require no formal conformity analysis. The deduction is made that the Paducah Site's proposed action of similar shipments per year along the same routes would also be de minimus.

**Socioeconomics and environmental justice.** The processing and repackaging of affected wastes for shipment are expected to result in an increase of 30 full-time-equivalent jobs per year. Transportation employment would similarly create 15 or fewer full-time-equivalent jobs. An increase of 45 total jobs would represent less than a 1% change from 1997 employment in McCracken County, which does not constitute a notable impact. Because the actual employment impact is likely to be smaller and would be spread over additional counties, there would be no notable economic impact from the proposed action. For the treatments considered in this EA, populations considered under environmental justice guidance are those that live within 80 km (50 miles) of the Paducah Site. However, these groups would be subject to the same negligible impacts as the general population.

**Irreversible and Irretrievable Commitment of Resources.** The proposed action would result in the decrease of the irreversible and irretrievable use of necessary fuel, power, and materials for maintaining the wastes and the storage facilities. No new storage facilities would be constructed. Funding could eventually be decreased for the management of wastes and facilities since the waste volume would decrease.

**Cumulative Effects.** Implementation of the proposed action would decrease the current risks for exposure of workers, the public and ecological resources to radiological emissions and nonradiological contaminants because it would decrease the amount of wastes present at the site.

## **NO ACTION ALTERNATIVE**

**Radiological Risks.** Worker doses under the No Action alternative would result in less than 1 Latent Cancer Fatality per waste type based on a worker population of 30 full-time employees. The estimated radiological doses are highly conservative because the calculations assumed that workers would spend the entire workday in the waste storage areas, which is not likely.

The potential for public exposure to radiological emissions resulting from LLW and TRU waste management activities under the No Action alternative is limited at the Paducah Site. It is unlikely that routine waste management activities would result in measurable quantities of radiation at the Paducah Site boundaries. A perimeter-monitoring program and warning system are in place around the Paducah Site boundaries and elsewhere to evaluate impacts from routine operations as well as emergency conditions. There are off-site regulatory limits that are adhered to by the Paducah Site as well. Environmental monitoring activities are conducted routinely and reported in the Annual Environmental Monitoring Report. This report has not indicated any adverse impact from the Paducah Site operations that include waste management activities. Therefore, it is unlikely that the No Action alternative would impact the public above current levels in terms of radiological impacts from continued storage of LLW and TRU waste.

**Nonradiological Risks.** Continued storage of LLW and TRU waste at the Paducah Site under the No Action alternative would increase safety risks to workers by requiring additional handling of the waste as maintenance and repackaging activities are needed. In addition, there would be routine monitoring activities in the storage locations that can present typical safety risks. These risks have been evaluated based on the average industrial accident rates for operations at similar industries. The estimated number of total recordable cases for the 30 workers associated with the No Action alternative would be 0.78 cases per year. The estimated lost workdays (LWDs) due to occupational illness or injury would be approximately 11 per year. In addition, as waste inventories grow over time, additional storage facilities or expansion of current capacity would be needed. This would require the use of heavy equipment and would introduce accident risks during facility construction.

**Accident Analysis.** The EBE and vehicle impact/mishandling accidents were evaluated for the No Action alternative. Because the waste characteristics and the accident scenarios are the same as those evaluated for the proposed action, the accident consequences are identical to the proposed action. However, while the frequency of the earthquake accident is the same for both alternatives, the frequency of vehicle impact/mishandling accidents is much lower due to the lower activity level. Based on the revised accident frequencies under the No Action alternative, expected fatalities are less than for the proposed action. However, because the institutional control period is assumed to be 100 years under the No Action alternative and is only 10 years under the proposed action, fatalities from the EBE increase by a factor of 10 under the No Action alternative. However, in both cases, the calculated number of expected fatalities remains negligible under the No Action alternative.

#### **Ecological resources.**

*Aquatic Biota* – Short- and long-term impacts to aquatic resources resulting from normal operations of the No Action alternative would be similar to those currently occurring from the Paducah Site activities. Accident impacts to resources from the worst-case accident scenario (i.e., earthquake) involving radionuclides should be no different from impacts associated with the proposed action. The earthquake scenario is highly unlikely to cause harm to aquatic biota in the Ohio River as a result of exposure to radionuclides. However, just as with the proposed action, aquatic receptors in Bayou and Little Bayou creeks and other water conveyances by which the waste would reach the Ohio River would likely be affected by the caustic nature of the waste. Accident impacts to resources from the worst-case accident scenario (i.e., earthquake) involving nonradionuclides are the same as for the proposed action. PCBs could pose minor, short term adverse impacts to aquatic biota in the Ohio River, as well as in Bayou and Little Bayou creeks. None of the other nonradionuclide contaminants would reach concentrations in the Ohio River to pose adverse impacts to aquatic biota.

*Terrestrial Biota* – Short- and long-term impacts to terrestrial biota from normal operations of the No Action alternative should be similar to those currently occurring from the Paducah Site activities. Impacts to terrestrial biota from the modeled worst-case spill accident scenario (i.e., earthquake) are the same as for the proposed action. Just as for the proposed action, long-term radiation effects to soil biota as the result of an earthquake would be negligible. Accident impacts to terrestrial biota from the worst-case accident scenario (i.e., earthquake) involving nonradionuclides would likely pose adverse impacts to soil biota under the No Action alternative.

**Noise.** Noise levels would be similar to those currently at the site since the activities included under the No Action Alternative are already being conducted on the site. If construction of new storage facilities is required, noise levels in the vicinity of the construction would increase during the construction period.

**Air quality.** The No Action alternative would not alter air quality at the Paducah Site or in the surrounding region since the activities included in this alternative are already being conducted at the site.

**Socioeconomics and environmental justice.** The No Action alternative would result in no net change in employment and therefore would have no notable socioeconomic impact on the ROI. Impacts from noise, air emissions, radiological emissions, and accidents would be low for both the residents closest to the site and the low-income communities. Exposures for the general public and the relevant workers would continue at historical levels for the Paducah Site.

**Irreversible and Irretrievable Commitment of Resources.** The no action alternative would result in the irreversible and irretrievable use of necessary fuel, power, and materials for maintaining the wastes and the storage facilities. If new storage facilities are constructed, additional building materials and energy would be used. Additional funding would be required for managing the increasing volumes of wastes and new facilities.

**Cumulative Effects.** Implementation of the no action alternative would add incrementally to current risks for exposure of workers, the public and ecological resources to radiological emissions and nonradiological contaminants because it would increase the amount of wastes present at the site.

#### **ENHANCED STORAGE ALTERNATIVE**

**Radiological Risks.** Worker doses under the No Action alternative would result in less than 1 LCF per waste type based on a worker population of 30 full-time employees. These doses would remain the same under the Enhanced Storage alternative because the work force required for storage facility workers would remain the same. The potential for public exposure to radiological emissions resulting from LLW and TRU waste management activities under the No Action alternative is limited at the Paducah Site. This potential would be further reduced under the Enhanced Storage alternative because the new/upgraded facilities would provide additional confinement to reduce the potential for radiological materials releases. Therefore, it is unlikely that the Enhanced Storage alternative would impact the public above current levels in terms of radiological impacts from continued storage of LLW and TRU waste.

**Nonradiological Risks.** Continued storage of LLW and TRU waste at the Paducah Site under the No Action alternative would increase safety risks to workers by requiring additional handling of the waste as maintenance and repackaging activities are needed. In addition, there would be routine monitoring activities in the storage locations that can present typical safety risks. These risks have been evaluated based on the average industrial accident rates for operations at similar industries. The estimated number of total recordable cases for the 30 workers associated with the No Action alternative would be 0.78 cases per year. The estimated lost workdays (LWDs) due to occupational illness or injury would be approximately 11 per year under the No Action alternative. These risks would remain the same under the Enhanced Storage alternative.

**Accident Analysis.** Under the Enhanced Storage alternative, the packaged waste containers would be transported to an on-site location and stored. The containers would be inspected periodically to verify that the containers are intact and repaired if required. These containers would be subject to the same conditions as the stored containers in the proposed action. They would, however, be at risk for a longer period of time. The EBE and vehicle impact/mishandling accidents were evaluated. The waste characteristics and the accident scenarios are the same for the Enhanced Storage alternative as those evaluated for the No Action alternative; however, the accident consequences would be expected to be less for the EBE because the enhanced storage facilities would provide additional confinement, thus reducing the amount of material released outside the building. The frequencies for both accidents remain the same as the No Action alternative.



**Comparison of Accident Risks.** Risks were computed for both process accidents and industrial accidents for the proposed action and the No Action alternatives. The highest radiological accident risk was  $1.5 \times 10^{-7}$  expected fatalities for the maximally exposed involved worker (MIW) and MUW at the edge of the waste storage area during and following an earthquake. This risk would be expected to be at least a factor of ten lower for the Enhanced Storage alternative because the buildings would provide additional confinement to reduce releases outside the facility. This risk would be computed for the 100-year no-action and enhanced storage institutional period. The second highest risk,  $7.9 \times 10^{-8}$  expected fatalities, was computed for the vehicle impact/mishandling accident impacting the ThF<sub>4</sub> container during the 10-year proposed action operating period. The risks are the same for all three alternatives, but the proposed action has a shorter duration.

The calculated industrial accident risks, while higher than the radiological accident risks, were small. The computed risk for the proposed action was 0.02 expected fatalities over the 10-year operating period. The corresponding industrial accident risk for the No Action alternative was 0.1 expected fatalities over the 100-year institutional control period and would be the same for the Enhanced Storage alternative. Neither the risks nor the differences between them are considered notable.

#### **Ecological resources.**

The Enhanced Storage alternative would not adversely affect any threatened or endangered species.

*Aquatic Biota* - Short- and long-term impacts to aquatic biota from the Enhanced Storage alternative would be no greater than those currently occurring from the Paducah Site activities. Accident impacts to aquatic biota from the worst-case accident scenario (i.e., earthquake) involving radionuclides were described for the proposed action, and the impacts should be no greater for the Enhanced Storage alternative. Because of this, the earthquake scenario is highly unlikely to cause harm to aquatic biota in the Ohio River as a result of exposure to radionuclides. However, just as with the proposed action, aquatic receptors in Bayou and Little Bayou creeks and other water conveyances by which the waste would reach the Ohio River would likely be less affected under the Enhanced Storage alternative because less radioactive materials would escape from the storage facilities.

Nonradionuclide accident impacts to aquatic biota from the worst-case accident scenario (i.e., earthquake) were also described for the proposed action. Again, the impacts should be no greater for the Enhanced Storage alternative. PCBs could pose adverse impacts to aquatic biota in the Ohio River, as well as in Bayou and Little Bayou creeks. None of the other nonradionuclide contaminants would reach high enough concentrations in the Ohio River to pose adverse impacts to aquatic biota.

*Terrestrial Biota* - Short- and long-term impacts to terrestrial biota from the Enhanced Storage alternative should be no greater than those currently occurring from the Paducah Site activities. Impacts to terrestrial biota from the modeled worst-case spill accident scenario (i.e., earthquake) are no greater than for the proposed action. Just as for the proposed action, long-term radiation effects to soil biota as the result of an earthquake would be negligible under the Enhanced Storage alternative. Accident impacts to terrestrial biota from the worst-case accident scenario (i.e., earthquake) involving nonradionuclides under the proposed action were described. The impacts to terrestrial biota under the Enhanced Storage alternative should be less. Nonradionuclides would likely pose less impact to biota if the worst-case spill accident occurred under the Enhanced Storage alternative because less material would escape from the storage facilities.

**Air quality.** Under the Enhanced Storage alternative, potential impacts resulting from on-site treatment, transport, and disposal would not apply. Other potential impacts would be no greater than those identified for the proposed action.

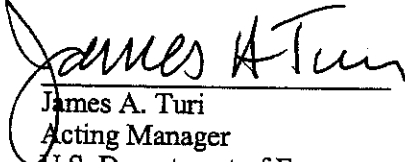
**Socioeconomics and environmental justice.** The Enhanced Storage alternative may result in a slight increase in employment due to construction and/or upgrades required for storage facilities. In addition, long-term surveillance and maintenance of facilities designed to withstand increased EBE loads might result in additional staff. Impacts from noise, air emissions, radiological emissions, and accidents would be low for both the residents closest to the site and the low-income communities. Exposures for the general public and the relevant workers would be no greater than those at historical levels for the Paducah Site

**Irreversible and Irrecoverable Commitment of Resources.** The Enhanced Storage alternative would result in the irreversible and irretrievable use of necessary fuel, power, and materials for maintaining the wastes and building the enhanced storage facilities. New storage facilities would be constructed and additional building materials and energy would be used. Additional funding would be required for building facilities and managing the increasing volumes of wastes and new facilities.

**Cumulative Effects.** Implementation of the Enhanced Storage alternative would add incrementally to current risks for exposure of workers, the public and ecological resources to radiological emissions and nonradiological contaminants because it would increase the amount of wastes present at the site.

**DETERMINATION:** Based on the findings of this EA, DOE has determined that the proposed action does not constitute a major federal action that would significantly affect the quality of the human environment within the context of the National Environmental Policy Act. Therefore, preparation of an environmental impact statement is not required.

Issued at Oak Ridge, Tennessee, this 5<sup>th</sup> day of November 2002.

  
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