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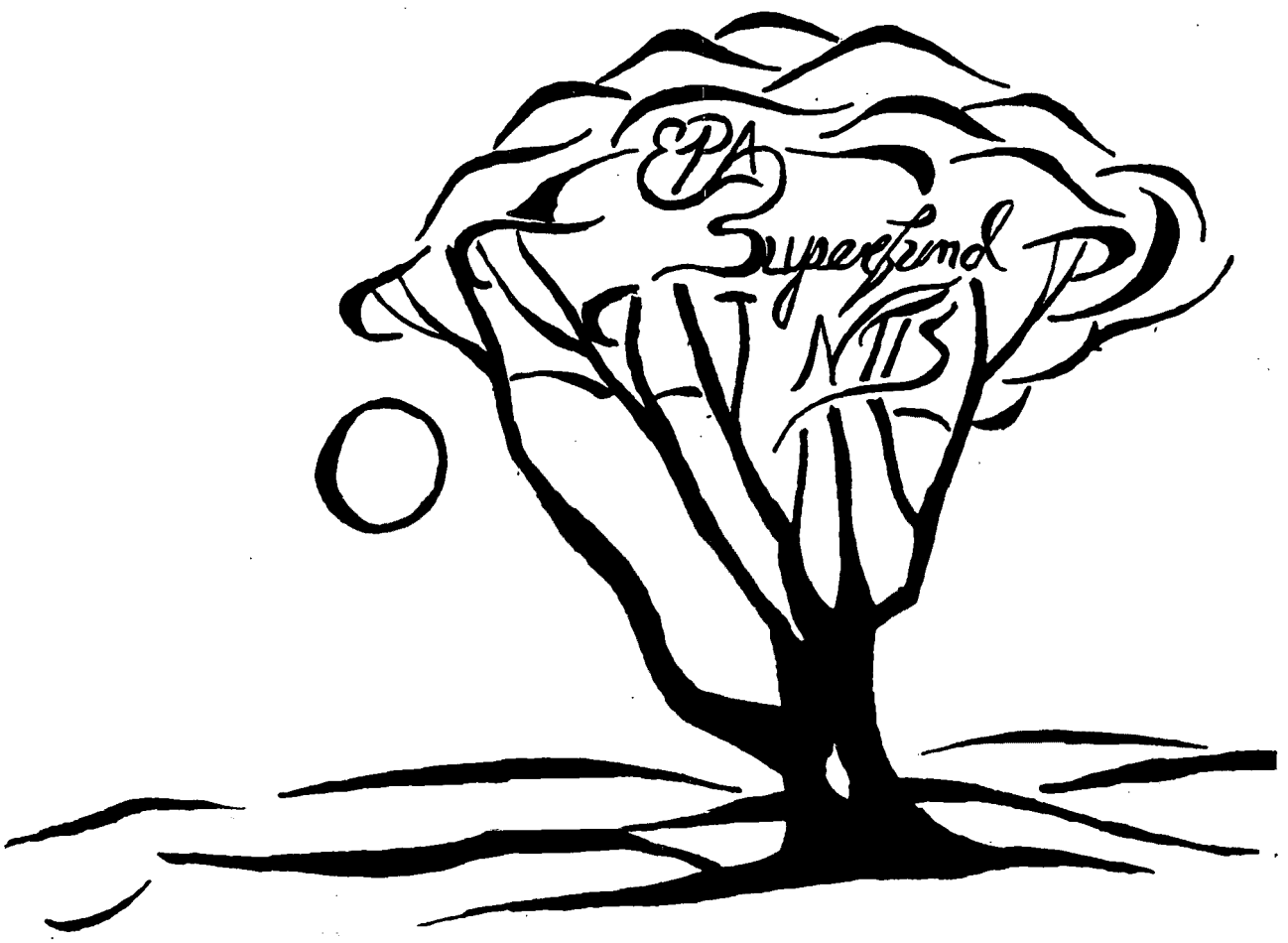
EPA Superfund Record of Decision:

Upper East Fork Poplar Creek (O.U. 2), Oak Ridge, TN 9/12/1994



DOE/OR/02-1265&D2

Record of Decision for the Upper East Fork Poplar Creek Operable Unit 2 (Abandoned Nitric Acid Pipeline) at the Oak Ridge Y-12 Plant Oak Ridge, Tennessee

Date Issued—July 1994

Prepared by
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Prepared for
U.S. Department of Energy
Office of Environmental Restoration and Waste Management

ACKNOWLEDGEMENTS

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PAI Corporation
Solutions to Environmental Problems
United Science Industries
University of Tennessee

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CONTENTS

ACRONYMS

ORR	Oak Ridge Reservation
OU	operable unit
RI	Remedial Investigation
U	uranium

PART 1. DECLARATION

SITE NAME AND LOCATION

U.S. Department of Energy
Upper East Fork Poplar Creek, Operable Unit 2
Abandoned Nitric Acid Pipeline
Oak Ridge Y-12 Plant
Oak Ridge, Anderson County, Tennessee

STATEMENT OF BASIS AND PURPOSE

This document presents the decision for no further action for the Abandoned Nitric Acid Pipeline at the Oak Ridge Y-12 Plant in Oak Ridge, Tennessee. This alternative is chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the administrative record file for this site. This Record of Decision provides the public a consolidated source of information about the Abandoned Nitric Acid Pipeline, and certifies that the Comprehensive Environmental Response, Compensation, and Liability Act requirements are met.

The state of Tennessee and the U.S. Environmental Protection Agency concur with the U.S. Department of Energy in this decision for no further action at Upper East Fork Poplar Creek Operable Unit (OU) 2.

ASSESSMENT OF THE OPERABLE UNIT

The baseline risk assessment, conducted as part of the Remedial Investigation (RI) for the site, indicates that conditions related to the Abandoned Nitric Acid Pipeline do not pose an unacceptable threat to human health or the environment. The total carcinogenic risks to either workers or future homesteaders at the Abandoned Nitric Acid Pipeline from all pathways are below 10^{-4}, the U.S. Environmental Protection Agency's thresholds of concern for remedial action. Noncarcinogenic hazard indices are below the action level of 1.0 established by the U.S. Environmental Protection Agency.

DECLARATION STATEMENT

No further remedial action on the soils is necessary to achieve protection of human health and the environment at the Abandoned Nitric Acid Pipeline. The no further action remedy protects human health and the environment, complies with federal and state applicable or relevant and appropriate requirements, and is cost-effective. The baseline risk assessment indicates that previous cleanup and maintenance activities reduced radiological and hazardous constituents on the site and in the soils to below levels for unacceptable carcinogenic and noncarcinogenic risk to human health. The groundwater is not addressed as part of this investigation because it will be addressed as part of the Upper East Fork Poplar Creek OU 1 surface water and groundwater

investigation. In addition, no significant releases were detected from the pipeline, therefore, it is not considered to be a source of groundwater contamination. A five-year review does not apply to this action because the remedy will not leave hazardous substances above action levels on site and, OU 1 will continue to explore and address groundwater in future investigations. There will be no future remedial cost associated with implementing this Record of Decision.

Joe LaGrone, Manager
Oak Ridge Operations Office
U.S. Department of Energy

8/8/94
Date

Earl C. Leming, Director
DOE Oversight Division
Tennessee Department of Environment and Conservation

8/11/94
Date

Patrick M Tobin for
John Hankinson, Regional Administrator
Region IV
U.S. Environmental Protection Agency

9-12-94
Date

PART 2. DECISION SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION

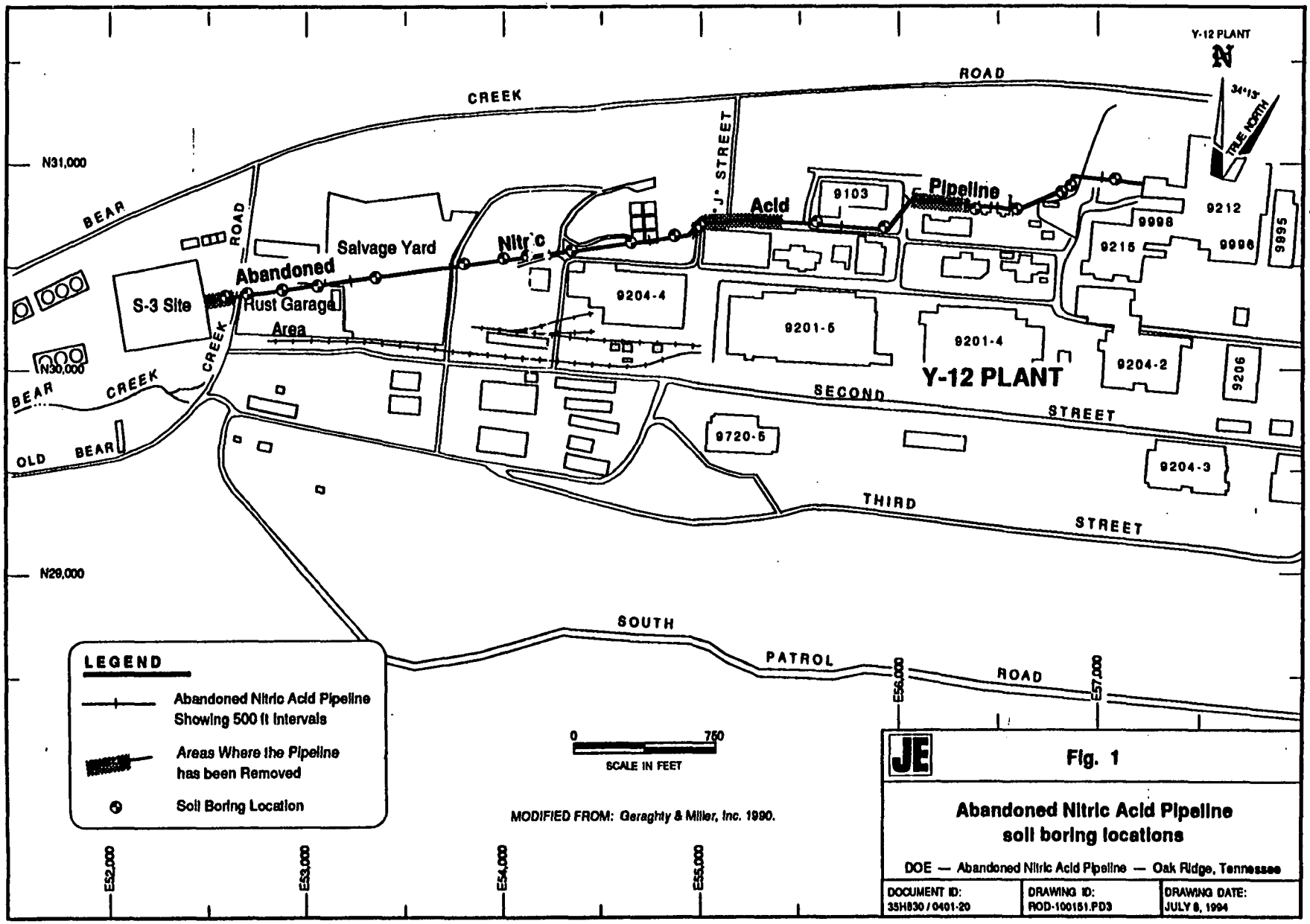
The Y-12 Plant is part of the Oak Ridge Reservation (ORR) and is located adjacent to the city of Oak Ridge in Anderson County, Tennessee. Y-12 occupies the upper reaches of East Fork Poplar Creek and Bear Creek, which lie in the valley between Pine Ridge to the north and Chestnut Ridge to the south. The Upper East Fork Poplar Creek, OU 2 Abandoned Nitric Acid Pipeline is a 1½- to 3-inch-diameter underground stainless steel pipe line that runs 4,800 feet east to west from the H-1 Foundry (Building 9215) to the S-3 Ponds (now known as S-3 Site, see Fig. 1). Elevation of the pipe ranges from 1,013.5 feet above mean sea level near the discharge point to a low of 986 feet above mean sea level near the midpoint.

The Abandoned Nitric Acid Pipeline was used to carry waste effluent from a uranium recovery process that produced nitric acid and depleted uranium in solution. Materials known to have been discharged through the pipeline include nitric acid, depleted and enriched uranium, various metal nitrates, salts, and lead skimmings. The pipeline had many turns, bends, joints, and low points along its length where waste effluent might have collected or leaked.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Y-12 Plant was built by the U.S. Army Corps of Engineers in 1943 as part of the Manhattan Project. The original mission of the plant was to separate ^{235}U, the fissionable isotope of uranium, using an electromagnetic separation process. The process stopped after World War II; the Y-12 Plant was converted to nuclear weapons component fabrication and defense research missions. Construction of the nitric acid pipeline was completed in October 1951. The pipeline carried effluent from the H-1 Foundry (Building 9215) to the S-3 Ponds. An estimated 5,500 gallons per day of effluent were discharged to the S-3 Ponds. The pipeline was originally buried 0.5 to 14 feet below ground surface, with an average depth of 5 feet. In 1983, the pipeline was taken out of service by flushing the lines and plugging portions of the pipeline with grout or concrete. Since then, some sections of the Abandoned Nitric Acid Pipeline have been removed. No soil samples were apparently taken, but the removed sections were scanned by health physics personnel, found to meet the acceptance criteria for the Y-12 Burial Grounds, and were disposed in the uncontaminated landfill.

The Abandoned Nitric Acid Pipeline was originally part of the Group 4 Resource Conservation and Recovery Act Facility Investigation Plan developed between 1988 and 1990. On December 21, 1989, ORR was added to the National Priorities List, and the four areas being investigated were separated at the U.S. Environmental Protection Agency's request to be dealt with as individual OUs under the Comprehensive Environmental Response, Compensation, and Liability Act. An RI Work Plan for the Abandoned Nitric Acid Pipeline was prepared in 1992, and phase I of the sampling took place in January and February of 1993. Nineteen points along the pipeline were selected where leaks had the highest probability of having occurred, and soil samples were taken from below the pipeline and analyzed for metals, nitrate/nitrite, and isotopic uranium. Samples were also monitored for organic vapors during excavation; samples with detectable vapors were analyzed for volatile organic compounds. Since no significant contamination was found in the phase I sampling, the project was streamlined and the RI Report was generated without conducting further sampling episodes.


Y-12 PLANT
N
34°15'
TRUE NORTH
ROAD
CREEK
N31,000
BEAR
ROAD
J STREET
Acid
Pipeline
9103
9212
9998
9215
9998
5986
Salvage Yard
Nitric
Abandoned
Rust Garage
Area
S-3 Site
9204-4
9201-5
9201-4
Y-12 PLANT
9204-2
9206
N30,000
BEAR CREEK
CREEK
SECOND STREET
OLD BEAR
9720-5
9204-3
THIRD STREET
N29,000
SOUTH PATROL ROAD
E56,000
E57,000
LEGEND
Abandoned Nitric Acid Pipeline Showing 500 ft Intervals
Areas Where the Pipeline has been Removed
Soil Boring Location
0
750
SCALE IN FEET
MODIFIED FROM: Geraghty & Miller, Inc. 1990.
E52,000
E53,000
E54,000
E55,000
JE
Fig. 1
Abandoned Nitric Acid Pipeline
soil boring locations
DOE — Abandoned Nitric Acid Pipeline — Oak Ridge, Tennessee
DOCUMENT ID: 35H830 / 0401-20
DRAWING ID: ROD-100151.PD3
DRAWING DATE: JULY 8, 1994

The Remedial Investigation Report on Abandoned Nitric Acid Pipeline at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee was issued in February 1994, and is available at the U.S. Department of Energy Information Resource Center located at 105 Broadway in Oak Ridge. After reviewing the data gathered in the RI and the accompanying risk assessment, and consultation with regulatory authorities, it was decided that no further action was needed for the site. Therefore, a feasibility study was deemed unnecessary.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Plan for Upper East Fork Poplar Creek OU 2 Abandoned Nitric Acid Pipeline, was released to the public March 21, 1994. This document is available in the administrative record file maintained at the U.S. Department of Energy Information Resource Center. The notice of availability was published in the *Roane County News* on March 18–21, 1994, the *Oak Ridger* on March 18, 1994, the *Clinton Courier* on March 24, 1994, and the *Knoxville News Sentinel* on March 18–24, 1994. The notice included a statement that a public meeting concerning the Proposed Plan would be arranged if requested by April 4, 1994. A public comment period was held from March 21 through April 20, 1994; no public meeting was requested. No public comments were received as indicated in the Responsiveness Summary, Part 3 of this No Further Action Record of Decision.

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

Under the Comprehensive Environmental Response, Compensation, and Liability Act an OU is defined as a discrete action that is part of a larger area or response action. The strategy of breaking large areas into OUs is designed to address all the problems at a site in a more logical and manageable fashion. Upper East Fork Poplar Creek OU 2 addresses only the soils along the Abandoned Nitric Acid Pipeline. Groundwater and surface water are addressed within this OU only to identify potential sources of contamination. Evaluation of any contamination found in the groundwater or surface water and consideration of remedial alternatives for the water will be conducted at a later date as part of Upper East Fork Poplar Creek OU 1 RI/Feasibility Study process. The OU concept enables the U.S. Department of Energy to address potential and actual sources of contamination early in the remedial process and then investigate and remediate OUs that collect or integrate the contamination migrating from the sources. The Abandoned Nitric Acid Pipeline does not appear to be an active contributor to water contamination at the Y-12 Plant Site. Any cumulative human or ecological risk associated with exposure to contaminated surface water or groundwater will be addressed in the integrated OUs for Bear Creek Valley OU 4 and Upper East Fork Poplar Creek OU 1.

SITE CHARACTERISTICS

Topography across the site is undulating with relief as much as 28 feet. Bedrock depth conforms to the topography and is between 13 and 26 feet below ground surface. The water table

tends to be situated just above bedrock, and was found to be below the pipeline at all sampling locations during January and February, 1993.

The unconsolidated material in which the pipeline was placed consists of man-made fill and weathered bedrock. The soils encountered in drilling were very tight clays and saprolite which inhibit fluid and contaminant migration. No gravel base was found in any of the drilling locations, suggesting that the pipeline was laid directly on the ground within the trench. Historically, leaks and pipeline breakage have occurred, but releases from each spill including any contaminated soil were cleaned up to protect the pipeline workers and others in the area.

The pipeline ran the full length of the historically restricted area, and passed through both developed and undeveloped areas of the plant. Exposure of the public and most ecological receptors are very unlikely since the pipeline is buried underground and within the fenced operational area of Y-12. Pathways of exposure for workers excavating in the area near the buried pipeline may include incidental ingestion, inhalation, dermal contact, and external exposure.

Data collected at 19 soil sampling points beside and beneath the buried pipeline during the RI indicate that:

- the Abandoned Nitric Acid Pipeline has not released effluent that has resulted in contamination of the environment;
- contaminants of potential concern for the Abandoned Nitric Acid Pipeline include nitrate, nitrite, ^{234}U, ^{235}U, ^{238}U, beryllium, hexavalent chromium, molybdenum, nickel, and nickel salts; and
- most of the contaminants were at or below background levels for the ORR. ^{238}U, ^{235}U, and beryllium were the main contributors to carcinogenic risk in the Abandoned Nitric Acid Pipeline soils, although ^{238}U was below background, and ^{235}U and beryllium were only slightly above background concentrations. All contaminants were below action levels established by the U.S. Department of Energy, the Nuclear Regulatory Commission, or established and agreed to in the RI Report.

SUMMARY OF SITE RISKS

Two conservative exposure scenarios were evaluated to determine the potential risk to human health posed by exposure to the contaminated soils surrounding the Abandoned Nitric Acid Pipeline. The risk assessment for these scenarios was based on current industrial and future hypothetical residential land uses. The risk assessment based on these scenarios included both radiological and hazardous chemical constituents, and pathways involving direct soil contact, soil ingestion, and inhalation of resuspended soil particulates.

Under conservative conditions, the total excess cancer risk through all exposure pathways to on-site construction workers was calculated to be approximately 1.9×10^{-6}. This means that out of 1 million workers exposed to the Abandoned Nitric Acid Pipeline soils over a 25-year

period, approximately two (1.9) would have a chance of developing cancer as a result of their exposure to the radiological contaminants in the soil. The risk to construction workers is only slightly greater than 1×10^{-6} (one in a million), the U.S. Environmental Protection Agency-established risk of no concern. The hypothetical future resident exposure scenario with people living on the site for 30 years or more estimated the potential excess cancer risk to be about 1.5×10^{-5}. This means that out of 100,000 hypothetical future residents living in the area of Abandoned Nitric Acid Pipeline, one or two (1.5) people might develop cancer because of exposure to the radiologically contaminated soil. The risk calculated for the future hypothetical resident is greater than the construction worker risk because the exposure frequency and duration are assumed to be greater for a resident. However, both of these risk values are below the U.S. Environmental Protection Agency-established unacceptable risk level of 1.0×10^{-4} and are within the U.S. Environmental Protection Agency-established acceptable risk range of 1.0×10^{-6} (one in a million) and 1.0×10^{-4} (one in 10,000).

The carcinogenic risk estimates represent 95 percent upper confidence limit on the arithmetic mean, meaning there is only a 5 percent probability that the actual risk will be greater than that estimated. However, due to the conservative risk assessment assumptions, the actual risk will most likely be lower than the estimates.

The hazard index is used to indicate the risk associated with exposure to noncarcinogenic toxic substances. This index is calculated from the ratio of the hypothetical daily intake of a substance divided by the estimated daily intake that is unlikely to cause health problems during a lifetime. The size of the hazard indicates the magnitude of the hazard; the larger the number the greater the risk. The U.S. Environmental Protection Agency established the threshold of concern for the hazard index as 1.0 for noncarcinogenic toxicity. The total cumulative pathway exposure hazard indices for noncarcinogenic risk to construction workers and hypothetical future residents at the Abandoned Nitric Acid Pipeline site are 0.0047 and 0.052, respectively.

Although both construction worker and residential scenarios were considered, the industrial nature of the site suggests that the construction worker scenario is more likely to occur. Therefore, the carcinogenic and noncarcinogenic risks associated with this scenario would be considered representative of future conditions.

There are no completed exposure pathways for ecological receptors. The Abandoned Nitric Acid Pipeline is located in a secured, highly industrialized area of Y-12, and the area is void of ecological receptors and habitat that would support such receptors. Any cumulative human or ecological risk associated with exposure to contaminated surface or groundwater will be addressed in the integrated OUs for Bear Creek Valley OU 4 and Upper East Fork Poplar Creek OU 1.

More information regarding the baseline risk assessment is found in Chapter 5 of the RI.

STATUTORY DETERMINATIONS

The sampling data and the baseline risk assessment indicate soils at the Abandoned Nitric Acid Pipeline do not pose an unacceptable risk to human health or the environment based on U.S.

Environmental Protection Agency conservative exposure scenarios. Contamination from past events at the Abandoned Nitric Acid Pipeline is effectively mitigated in previous cleanup and maintenance actions. No further remedial actions are necessary to ensure adequate protection of human health and the environment under Sections 104 and 106 of the Comprehensive Environmental Response, Compensation, and Liability Act.

EXPLANATION OF SIGNIFICANT CHANGES

No significant changes have been made to the no further action decision selected in the Proposed Plan through the regulatory and public comment periods.

REFERENCES

Martin Marietta Energy Systems, Inc. 1994. *Remedial Investigation Report on the Abandoned Nitric Acid Pipeline at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee, U.S. Department of Energy*, Oak Ridge, Tennessee, DOE/OR/01-1214&D2.

Jacobs ER Team, 1994. *Proposed Plan for the Upper East Fork Poplar Creek Operable Unit 2 (Abandoned Nitric Acid Pipeline)*, Oak Ridge, Tennessee, DOE/OR/02-1215&D2.

PART 3. RESPONSIVENESS SUMMARY

OVERVIEW

The U.S. Department of Energy established a public comment period from March 21 through April 20, 1994, for interested parties to comment on the U.S. Department of Energy's Proposed Plan for Upper East Fork Poplar Creek OU 2, Abandoned Nitric Acid Pipeline, at the Oak Ridge Y-12 Plant in Oak Ridge, Tennessee. The Proposed Plan states that no further remedial action is necessary to protect human health and the environment at the Abandoned Nitric Acid Pipeline. Also, the baseline risk assessment indicates that previous cleanup and maintenance activities reduced radiological and hazardous constituents on the site and in the soil below levels for unacceptable carcinogenic and noncarcinogenic risk to human health and the environment.

The 30-day public comment period ended on April 20, 1994. No comments on the Abandoned Nitric Acid Pipeline Proposed Plan were available by that date and no comments were received by April 25, 1994, the last day to accept mailed comments. In addition, no public meeting was requested, and none was held.