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ACTION MEMORANDUM FOR THE NON-TIME CRITICAL REMOVAL ACTION OF CONTAMINATED SOIL AT SITE 1 THORIUM SPILL NSWC INDIAN HEAD MD

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Action Memorandum

for the

NON-TIME CRITICAL REMOVAL ACTION OF THE CONTAMINATED SOIL AT SITE 1 – THORIUM SPILL

Naval Support Facility Indian Head

Indian Head, Maryland

Naval Facilities Engineering Command Washington

Contract Number N62470-08-D-1001

Contract Task Order JU11

JANUARY 2011

A. PURPOSE

This action memorandum describes a non-time-critical removal action to be conducted under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 40 Code of Federal Regulations (CFR) 300.415 at Installation Restoration (IR) Site 1 (Thorium Spill) at the Naval Support Facility (NSF) Indian Head, Maryland.

The non-time-critical removal action objective (RAO) for Site 1 addresses contaminated soil that is present and serves to reduce or eliminate potential unacceptable human health risk associated with hypothetical residential exposure to thorium-232 in soil to allow for unrestricted site use and unlimited exposure.

B. NSF INDIAN HEAD BACKGROUND

NSF Indian Head is located in northwestern Charles County, Maryland approximately 25 miles southwest of Washington, D.C. NSF Indian Head is a military facility consisting of the Main Area on the Cornwallis Neck Peninsula and the Annex on Stump Neck. The Main Area is bounded by the Potomac River on the northwest, west, and south, Mattawoman Creek to the south and east, and the Town of Indian Head to the northeast. Stump Neck Annex is located across Mattawoman Creek and is not contiguous with the Main Area.

In 1951, the Navy was assigned the joint-service explosive ordnance disposal (EOD) responsibilities for basic training and research and development. In 1953, the research and development tasks were established as a separate organization, and designated the Naval EOD Technical Center. The training function was renamed the Naval School, EOD (NAVSCOLEOD). From 1955 on, all joint service EOD training was provided at NSF-IH until the school moved to Eglin Air Force Base (AFB). In 1958, the NAVSCOLEOD moved from its Jackson Road location to Strauss Avenue. The NAVSCOLEOD command moved to Eglin AFB in 1993, and the NAVSCOLEOD at NSF Indian Head was designated as a detachment. The Commanding Officer and the NAVSCOLEOD Headquarters returned to NSF Indian Head in 1994 while a construction project was being completed at Elgin AFB. In January 1999, the NAVSCOLEOD was consolidated at Elgin AFB. A detachment of EOD personnel remains at NSF Indian Head.

C. SITE DESCRIPTION

a. Description. Site 1 is an area of approximately 60 by 135 feet located between Building 1662 and Strauss Avenue (Figure 1). The area is currently covered by a parking lot and maintained lawn. Building 1662 is used for electrical and satellite communications. Thorium was first placed on the ground at Site 1 in 1962 in connection with radiation training exercises conducted by the NAVSCOLEOD. Thorium ore from approximately five drums of 30- to 50-gallon capacity was spread over the site. No U.S. Atomic Energy Commission (USAEC) license was issued at the time the ore was purchased.

b. Current Use. Site 1 is currently covered by a parking lot and maintained lawn. Building 1662 is used for electrical and satellite communications. Future land use is expected to be any military, industrial, or commercial use needed to support the NSF Indian Head mission. It is unlikely that the site area would be developed for residential use while under government control.

c. Current Status and Previous Investigations. The Site Screening Process Investigation at Site 1 began in 2005 to determine whether historical practices resulted in the release of thorium at concentrations of potential environmental concern. During the investigation, soil samples were collected from the Navy Radiological Affairs Support Office (RASO)-approved *Reference Area* and from the onsite study area. Samples were collected from variable depth intervals [18 to 24, 24 to 30, or 30 to 36 inches below ground surface (bgs)] from a 3-inch

diameter borehole and sent to a laboratory for thorium-232 analysis using alpha spectroscopy. The appropriate depth interval for laboratory sample selection was based on the highest gross gamma radiation reading in the field from a gamma probe scintillator lowered down each borehole. The presence or absence of residual contamination at Site 1 was determined by evaluating analytical results between the site and the Reference Area (uncontaminated background conditions).

The results of the 2005 effort, along with additional research on historical activities, indicated an expanded study area was required. Subsequently, a larger study area was established and additional soil samples were collected in 2007 and analyzed for thorium-232. After evaluating both the 2005 and the expanded 2007 data sets, it was determined that nine sample locations exhibited elevated activity.

d. Release Description. Thorite ore was first placed on Site 1 in 1962. Early in 1967, some of the thorite ore was removed from the site, placed into barrels, and transferred offsite. The residual soil on the site was then disked and harrowed several times to uniformly incorporate any residual thorite ore into the soil. It was reported that the soil was affected to a depth of 8 to 12 inches.

In 1971, a sample of the thorite ore was assayed for thorium content by the Engineering Division, U.S. Army Engineer Power Group, Fort Belvoir, Virginia. The results were reported as, "Thorium content 2.5 w/o thorium with a specific activity of 100 disintegrations per second (dps) per gram." A radiological survey conducted at Site 1 on March 28, 1972, determined that the affected areas included seven locations covering a total of approximately 600 square feet. The depths of the affected soil ranged from 12 to 18 inches bgs.

In July 1972, the radioactive soil was excavated, placed into fifty 55-gallon drums, and staged at the facility's radiation training area. The drums were shipped in October for disposal at the Nuclear Engineering Company, Inc., in Morehead, Kentucky. Two subsequent radiological surveys, each followed by the removal of radioactive material, occurred on November 1972. The excavated area was backfilled with 18 to 24 inches of clean soil to reestablish original grade.

A final radiological survey of the area was performed by RASO personnel in February 1976. In a March 1976 memorandum, RASO indicated that based on the survey, "the subject area has been returned to background and may be released for unrestricted use." However, in 1983, two buried drums containing thorium material, dirt, and gravel were discovered near the site during construction of Building 1662. The drums were shipped off-site for disposal as low-level radioactive waste.

Prior to constructing an addition to Building 900, a radiological survey was performed in October 2001 along the southeastern side of the building where the site was initially thought to be located. Ten subsurface soil (0.5 to 2 feet bgs) samples were collected. The associated survey report concluded that "based on the laboratory results, no further actions regarding thorium are required at this time. Soil remediation will not be required as part of Building #900 Joint Interoperability Project."

In November 2004, RASO indicated that it considered all known drums of thorium ore to have been accounted for and properly disposed. However, RASO indicated in the same communication that "radiation measurements made in 1972 are not definitive as to the thorium concentrations remaining after the cleanup. Characterization surveys are still necessary." Following a search of historical files, RASO provided a description of the location of Site 1: *Clean soil covers the 60-feet by 90-feet area to a depth of 12 to 18 inches as a result of the 1972 removal of contaminated soil and its replacement with clean soil. No drums currently exist at the site. If contamination exists at the site, it will be found below the*

12 to 18 inches of clean soil and within the next 12 inches of depth (i.e., the bottom of the interval in question is 24 to 30 inches bgs).

e. Other Actions to Date

There have been no other actions taken to date.

f. Role of State and Local Authorities

The Maryland Department of the Environment actively reviews project work plans and reports and is expected to participate in the development of the decision documents for this site.

D. THREATS TO PUBLIC HEALTH OR THE ENVIRONMENT

A site-specific derived concentration guidance level (DCGL) was developed for a residential gardener exposure scenario (on-site resident tending to a vegetable garden) to relate thorium concentration to the acceptable United States Environmental Protection Agency (EPA) cancer risk level. This scenario is judged as the most likely potential exposure scenario for the site in the event the Navy relinquishes the site for public use. Using the Residual Radioactivity (RESRAD) computer model with inputs appropriate to a resident gardener, a thorium-232 concentration of 3 picocuries per gram (pCi/g) corresponds to a cancer risk of approximately 1×10^{-5}. This is within the EPA acceptable risk range of 1×10^{-6} to 1×10^{-4}.

Analytical results were evaluated following guidance contained in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). There were several sampling locations that exhibited elevated activity. Further evaluation of the sampling results identified two areas where thorium-232 concentrations were greater than the site-specific DCGL of 3 pCi/g. Based on exceedances of this DCGL, there are nine sampling locations within two areas that are candidates for excavation and removal to depths ranging from 24 to 36 inches bgs.

E. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

F. PROPOSED ACTION AND COST

a. Proposed Action. The action will include the removal of approximately 120 cubic yards of soil over two removal areas of 1,075 square feet to a depth of 3 feet bgs (Figure 2). The proposed excavation limits are mostly defined by soil with thorium-232 activity concentrations at individual sample locations that exceed the DCGL of 3 piC/g. The removal action will include post-excavation verification samples on the side-walls and bottom of each excavation area to confirm removal of the contaminated soil.

Site preparation activities would include mobilization and setup of facilities, installation of erosion and sediment controls, clearing of work areas (including demolition of any asphalt or concrete covering the excavation areas), installation of appropriate drainage controls to the degree necessary to support construction, preparation of radiological decontamination equipment and materials, and preparation for airborne radioactivity dust suppression.

Materials that have radioactivity above release criteria will be disposed at a Nuclear Regulatory Commission-licensed facility. Due to the relatively low levels of activity expected during excavation activities, minimal decontamination of heavy equipment will be required to provide for unconditional release. It is not expected that significant amounts of liquid

decontamination waste would be generated. Any waste associated with excavation or decontamination activities will be processed and disposed of with the excavated soils.

Excavated areas will be backfilled with clean fill to grade and then restored with asphalt or concrete paving or seeded with native grasses.

b. Contribution to remedial performance. The non-time-critical removal action will eliminate potential risks to human health from direct exposure to contaminated soil.

c. Alternative Actions Considered. The no action alternative, evaluated as a point-of-comparison with the proposed alternative, would not provide an effective solution for the contaminated soil present at Site 1. It does not achieve the RAO and does not comply with Applicable Relevant and Appropriate Requirements (ARARs).

d. Applicable, Relevant and Appropriate Requirements. The removal action complies with the following federal and state ARARs.

- 10 CFR Part 20.1101 and 20.1301- Applicable NRC guidance to implement as low as reasonably achievable constraints on air emissions of radioactive material to the environment.
- 10 CFR Part 20.1402- Radiological criteria for unrestricted use at closing NRC licensed facilities (relevant and appropriate).
- 10 CFR Part 20.1801 - Licensee shall secure from unauthorized removal or access licensed materials stored in controlled or unrestricted Areas (relevant and appropriate).
- 10 CFR Part 20.1802 - Licensee shall control and maintain constant surveillance of licensed material in a controlled or unrestricted area and not in storage (relevant and appropriate).
- COMAR 26.12.01.01 - Provides for protection of public health and safety from exposure to radiological sources (applicable).
- COMAR 26.17.01 - Requires measures to control stormwater runoff during removal alternatives or development of land (applicable).
- COMAR 26.02.03.02 –Limits set on the levels of noise must be met; these limits are protective of the health welfare, and property of the people in Maryland (applicable).

ARARs were used to develop clean-up criteria for the removal action and to identify removal action technologies.

e. Proposed Project Schedule: The removal action contract has been awarded and project completion is expected in March 2011. The removal action is anticipated to take approximately 1 month to complete.

f. Estimated Cost: The cost estimate presented in the Engineering Evaluation/Cost Analysis (EE/CA) was developed for comparison purposes with other alternatives. Actual construction costs may vary from this estimate due to market conditions, actual material costs, variations in estimated quantities, and other factors existing at the time of construction. The cost estimate developed for the EE/CA for the proposed removal action is approximately $340,000. The cost estimation assumes full excavation from 0 to 3 feet bgs in the target removal areas. However cost savings may be realized by not disposing the top 18 inches of soil at the site (which are not impacted by thorium-232). These soils could be used as backfill, which will decrease the need for importing clean fill.

There are no long-term operations, maintenance, or monitoring costs associated with this action as no waste will be left in place following implementation of the action.

G. EXPECTED CHANGE IN SITUATION SHOULD ACTION BE DELAYED

No changes to current situation are expected if the action should be delayed.

H. OUTSTANDING POLICY ISSUES

None.

I. RECOMMENDATION

This decision document presents the selected non-time critical removal action for the soil at Site 1, the Thorium Spill at NSF Indian Head, Maryland. Conditions at the site meet the criteria for non-time-critical removal actions as defined in the National Oil and Hazardous Substance Pollution Contingency Plan, 40 CFR 300.415(b)(2). The removal action is being conducted per all requirements in 40 CFR 300 and all Navy guidance. As such, the removal action is submitted for approval.

This decision document represents the selected removal action for Site 1 at NSF-IH, developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based on work that was completed by the Navy and on the administrative record for the site. The total project capital cost is estimated at $340,000. Actual costs are expected to be lower than the estimate. There are no operation and maintenance costs. The Navy is funding this project.

The implementation of the excavation and off-site disposal of the soil from the site is consistent with the recommendations of the EE/CA for Site 1. The NSF Indian Head IR Program Team, including representatives from the Department of the Navy, EPA, and Maryland Department of the Environment are in agreement with this determination.

Catherine T. Hanft
Captain, U. S. Navy
Commanding Officer
NSA South Potomac

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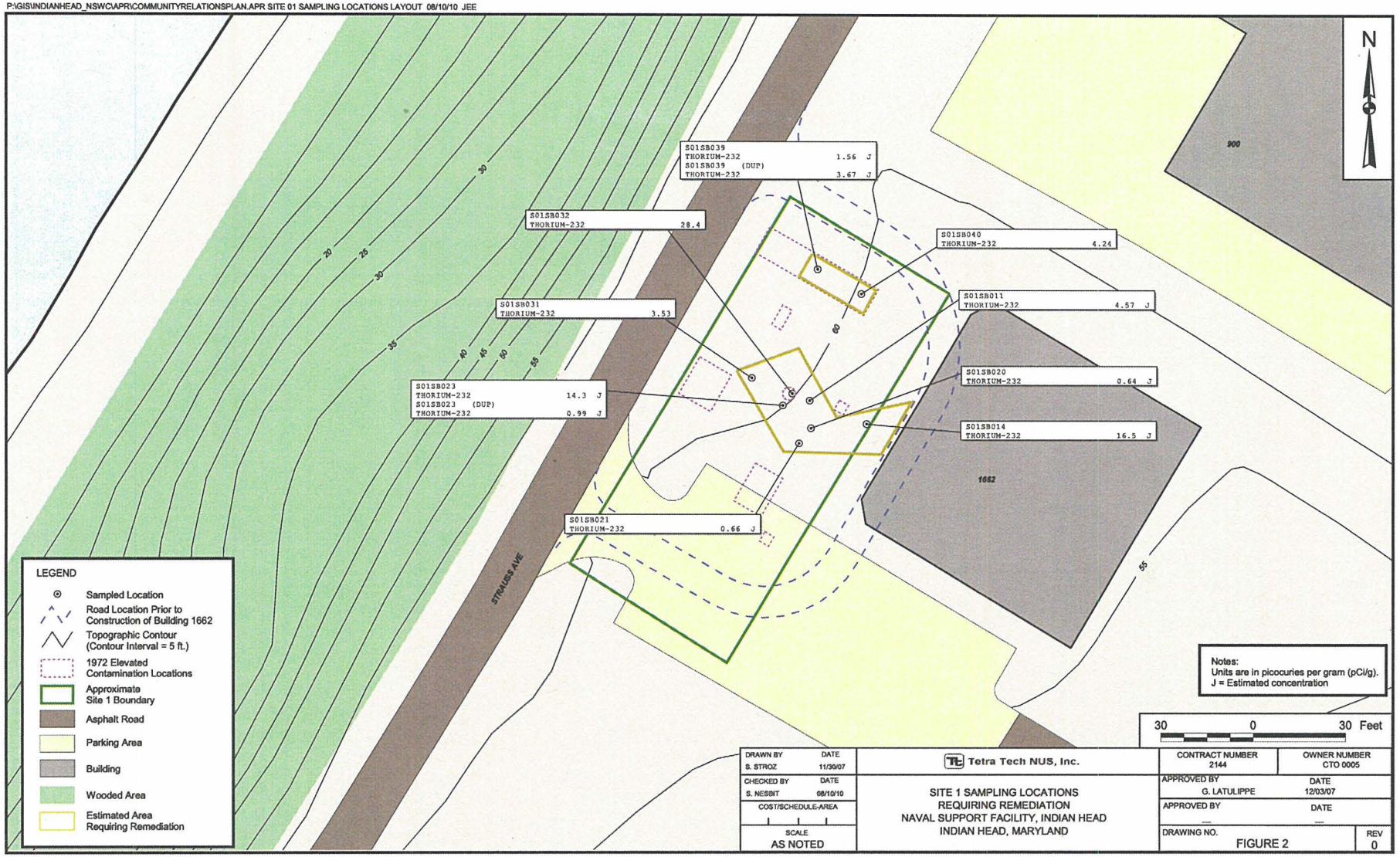
DRAWN BY K. PEILA DATE 6/8/04	Tetra Tech NUS, Inc.	CONTRACT NUMBER 2144	OWNER NUMBER 005
CHECKED BY G. LATULIPPE DATE 12/11/07	SITE LOCATION MAP SITE 1 - THORIUM SPILL NAVAL SUPPORT FACILITY, INDIAN HEAD INDIAN HEAD, MARYLAND	APPROVED BY G. LATULIPPE DATE 11/30/07	
COST/SCHEDULE-AREA		APPROVED BY — DATE —	
SCALE AS NOTED		DRAWING NO. FIGURE 1	REV 0

P:\GIS\INDIANHEAD_NSWC\APR\COMMUNITYRELATIONSPLAN.APR SITE 01 SAMPLING LOCATIONS LAYOUT 08/10/10 JEE



DRAWN BY S. STROZ	DATE 11/30/07	Tetra Tech NUS, Inc.	CONTRACT NUMBER 2144 / OWNER NUMBER CTO 0005
CHECKED BY S. NESBIT	DATE 08/10/10	SITE 1 SAMPLING LOCATIONS REQUIRING REMEDIATION NAVAL SUPPORT FACILITY, INDIAN HEAD INDIAN HEAD, MARYLAND	APPROVED BY G. LATULIPPE / DATE 12/03/07
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 2 / REV 0