INTERIM LETTER REPORT
VERIFICATION SURVEY OF
PARTIAL GRIDS H19, J21, J22, X20, AND X21 AT THE
DAVID WITHERSPOON, INC. 1630 SITE
KNOXVILLE, TENNESSEE

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DOE CONTRACT NO. DE-AC05-06OR23100

Prepared for the
U.S. Department of Energy

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MARCH 2008

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INTRODUCTION

The U.S. Department of Energy (DOE) has requested that the Oak Ridge Institute for Science and Education (ORISE) conduct verification surveys of available grids at the David Witherspoon Incorporated 1630 Site (DWI 1630) in Knoxville, Tennessee. On March 6, 2008, an independent verification team (IVT) from ORISE conducted verification activities of the excavated areas in partial grids H19, J21, J22, X20, and X21 (Figure 1).

The DWI 1630 Site received, processed, stored, and shipped scrap metal, including metal contaminated with radiological and chemical contaminants. Past site characterization activities identified numerous radiological and chemical contaminants, including uranium, thorium, heavy metals, polychlorinated biphenyls (PCBs), asbestos, and organic compounds. The contaminants have been noted in various media on the site, including debris, soil, sediment, groundwater, and surface water. There were no buildings located in the subject areas during site operations. The DOE's decommissioning contractor, Bechtel Jacobs Company, LLC. (BJC), has performed characterization surveys, subsequent remediation, and verification surveys and sampling within the subject area. The areas have not been backfilled pending results from the Independent Verification (IV) survey.

PROCEDURES

Site verification activities were performed on March 6, 2008 in accordance with a Project-Specific Plan (PSP) submitted to and approved by DOE (ORISE 2007) and the ORISE Survey Procedures and the ORAU Quality Program Manuals (ORISE 2008a and ORAU 2007). Grid boundaries for the specified survey area were obtained from maps or coordinates provided by the contractor and uploaded to a global positioning system (GPS). GPS was used to collect measurement information during walkover scans and identify soil sample locations such that each data point could be referenced to a map position. ORISE performed surface gamma scans and collected five soil samples. Scans and measurements were performed using sodium iodide (NaI) scintillation detector coupled to a ratemeter with audible output.

SAMPLE ANALYSIS AND DATA INTERPRETATION

Soil samples were returned to the ORISE laboratory in Oak Ridge, TN for analysis and interpretation. Sample analyses were performed in accordance with the ORISE Laboratory Procedures Manual (ORISE 2008b). Soil samples were analyzed by gamma spectroscopy and spectra were reviewed for U-238, Ra-226, Th-232, and other gamma-emitting contaminants. The results were reported in units of picocuries per gram (pCi/g).

FINDINGS AND RESULTS

The ORISE scan density was approximately 90% of accessible surfaces in the excavated areas of the subject grids (Figure 2). The ambient background radiation levels typically ranged from 3,000 to 6,000 counts per minute (cpm) with the exception of an area in Grid J21 along the railroad track. Gamma radiation levels in that grid ranged from 4,000 to 9,800 cpm.

Five judgmental surface soil sample (0 to 0.15 cm) locations were collected from areas exhibiting elevated radiation levels (Figure 3). Analytical results for S031 to S035 are provided in Table 1. U-238 concentrations in the samples ranged from 2.42 to 215 pCi/g and total Uranium concentrations ranged from 5.0 to 440 pCi/g. The highest U-238 concentration was detected in sample S034 (collected from Grid J21). A review of the BJC data package and ORISE verification sample data indicated that the BJC results for U-238 are comparable to the ORISE result for Grid J21 (BJC 2008). The spectra were also reviewed for other identifiable radionuclide photopeaks which have been included in Table 1.

All sample data were compared to the "hot-spot" criterion of 500 pCi/g for U-238, as specified in the PSP (ORISE 2007). The results for all ORISE samples were less than 500 pCi/g for U-238. It is important to note that the *a priori* scan MDC is approximately 115 pCi/g for natural uranium as estimated from Table 6.4 of NUREG-1507 (NRC 1998).

CONCLUSIONS

ORISE has verified that the U-238 concentrations in partial grids H19, J21, J22, X20, and X21 exceed the average surface remediation level (RL) of 3 pCi/g; however, U-238 concentrations are below the "hot-spot" of 500 pCi/g established for the DW1 1630 site (BJC 2006). The ORISE radiological sample results are comparable to the BJC field screen results for U-238 concentrations in surface soil.

FIGURES

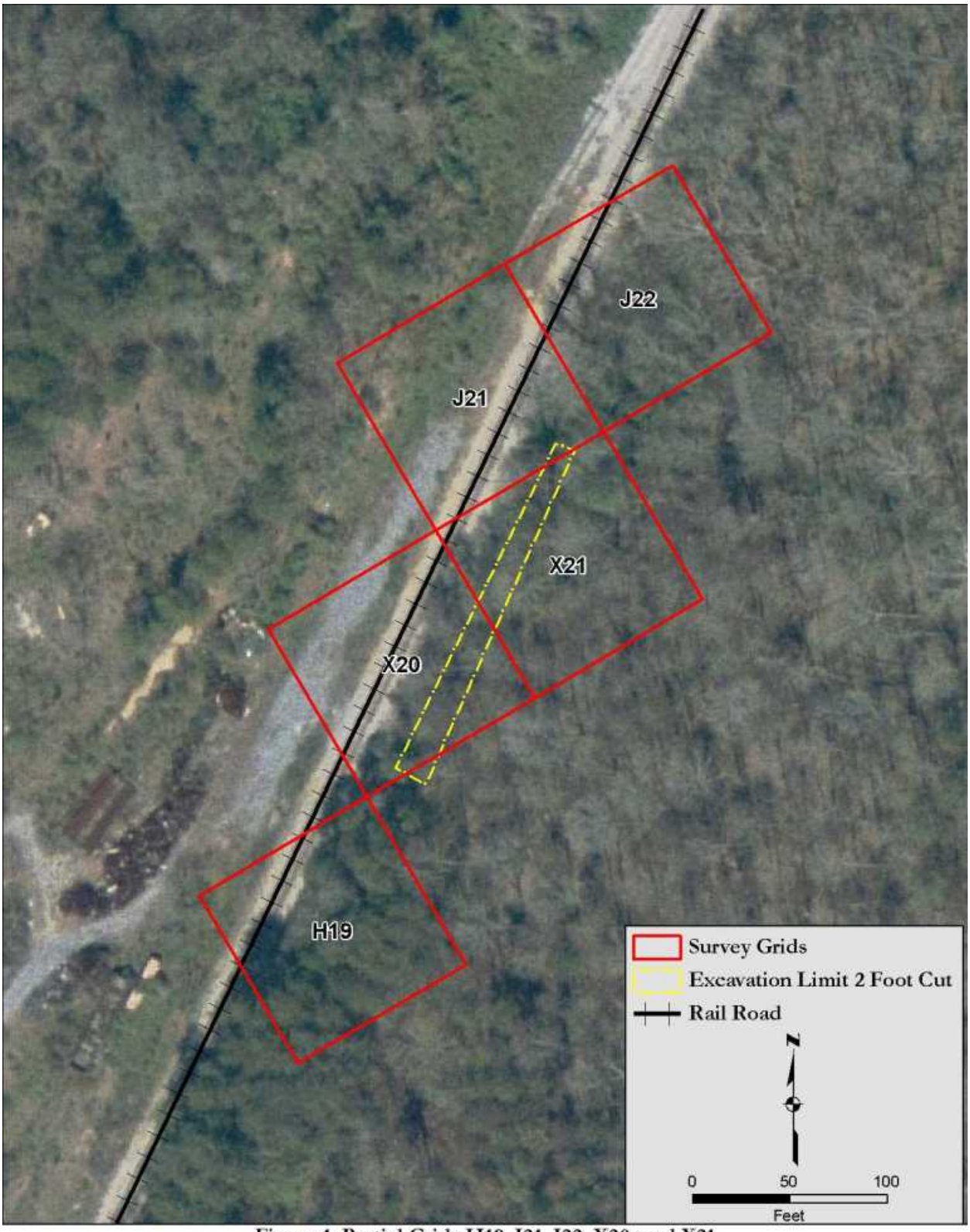

Figure 1: Partial Grids H19, J21, J22, X20, and X21

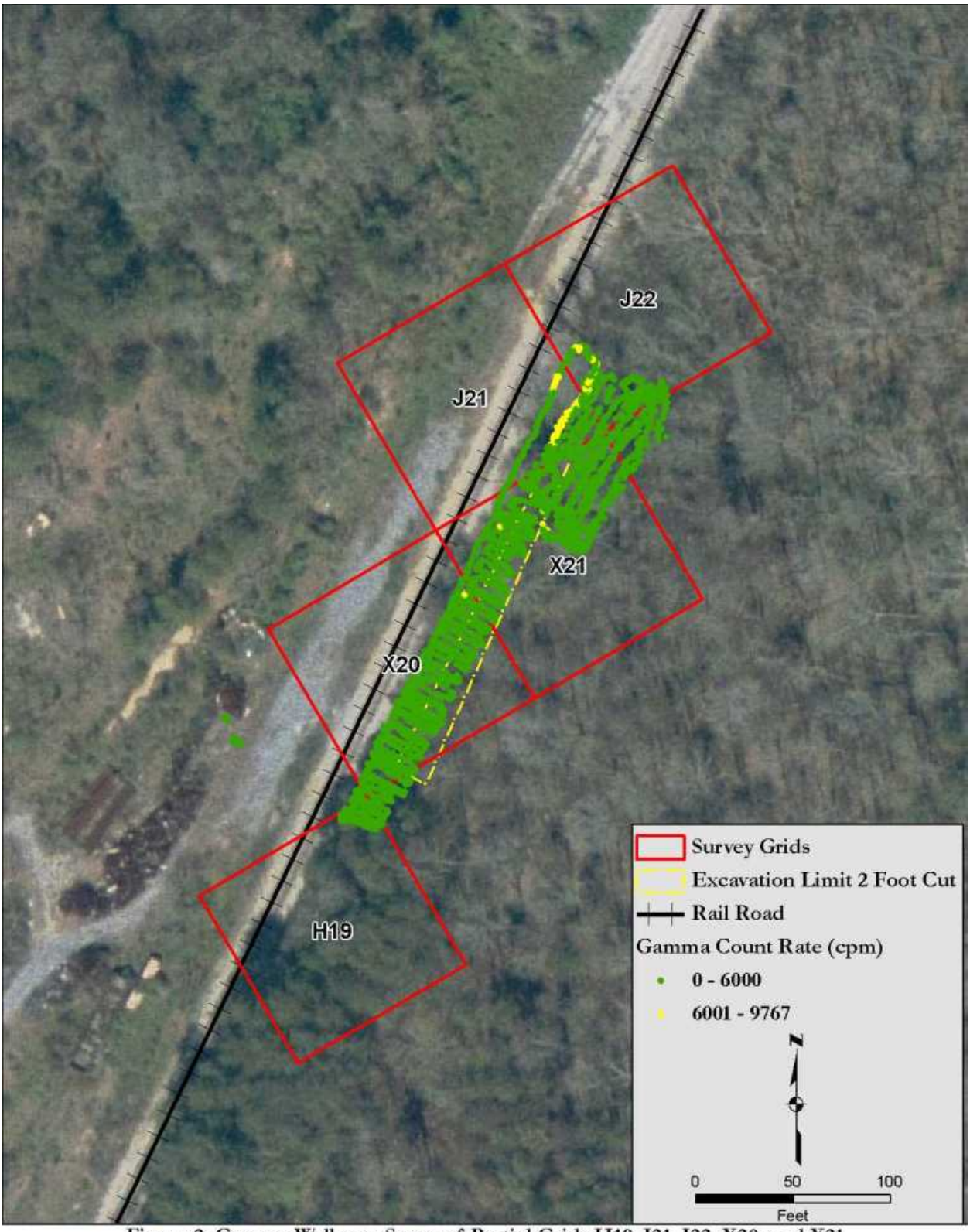

Figure 2: Gamma Walkover Scans of Partial Grids H19, J21, J22, X20, and X21

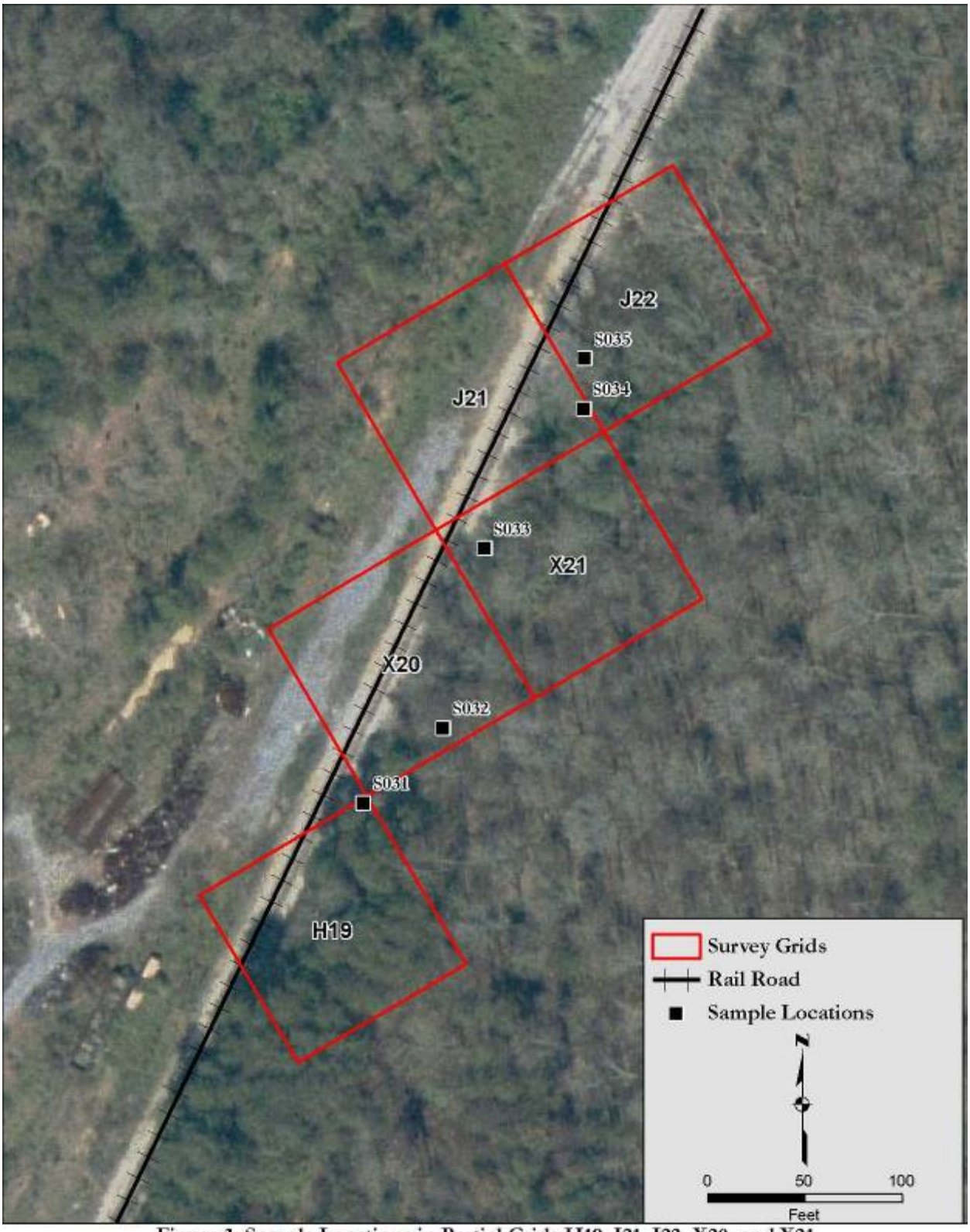

Figure 3: Sample Locations in Partial Grids H19, J21, J22, X20, and X21

TABLES

TABLE 1

RADIONUCLIDE CONCENTRATIONS IN SOIL
PARTIAL GRIDS H19, J21, J22, X20, AND X21
DAVID WITHERSPOON, INC. 1630 SITE
KNOXVILLE, TENNESSEE

Sample ID/Location[a]	Radionuclide Concentration (pCi/g)						
	Ra-226	Th-228	Th-232	Total Th[b]	U-238	U-235	Total U[c]
S031	0.72 ± 0.11[d]	1.59 ± 0.13	1.69 ± 0.25	3.28 ± 0.29	2.94 ± 0.89	0.16 ± 0.15	6.0 ± 1.3
S032	0.79 ± 0.09	1.48 ± 0.12	1.71 ± 0.22	3.19 ± 0.25	2.42 ± 0.65	0.12 ± 0.14	5.0 ± 0.9
S033	0.80 ± 0.10	1.32 ± 0.11	1.24 ± 0.19	2.56 ± 0.22	34.6 ± 2.0	1.78 ± 0.22	71.0 ± 2.8
S034	0.72 ± 0.15	1.17 ± 0.14	1.34 ± 0.24	2.51 ± 0.28	215 ± 11	10.30 ± 0.85	440 ± 16
S035	1.09 ± 0.17	2.11 ± 0.23	2.32 ± 0.31	4.43 ± 0.39	34.3 ± 2.4	1.76 ± 0.35	70.4 ± 3.4

[a]Refer to Figure 3.
[b]Total thorium concentrations determined as follows: (Th-228 + Th-232).
[c]Total uranium concentrations determined as follows: (U-238 x 2) + U-235.
[d]Uncertainties represent the 95% confidence level based on total propagated uncertainties.

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