U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Inspection Nos.	03003754/2010003 07001100/2010002
Docket Nos.	03003754 07001100
License Nos.	06-00217-06 SNM-1067
Licensee:	ABB Inc.
Location:	2000 Day Hill Road Windsor, CT 06095
Inspection Dates:	June 15, 2010 and September 3, 2010
Dates Split Soil Sample Analysis Received:	August 11, and 24, 2010

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EXECUTIVE SUMMARY

ABB Inc.
NRC Inspection Report Nos. 03003754/2010003 and 07001100/2010002

During the June 15, 2010 site visit, the NRC inspectors observed the collection of Final Status Survey (FSS) samples from the clam shell pile (CSP) area. Seventeen split soil samples were taken by the licensee. The inspectors sent the samples to the NRC's contractor, Oak Ridge Institute for Science and Education (ORISE), for radiological analysis. In a report dated August 9, 2010, ORISE provided their results from the soil samples analysis. A radiological analysis was performed for total uranium, cobalt-60, radium-226 and thorium-232. The results for total uranium and cobalt-60 were compared to the site-specific derived concentration guideline levels (DCGLs) in Decommissioning Plan (DP), Rev. 0 which was approved by the NRC on June 1, 2004. The DCGL's for total uranium and cobalt-60 are 557 pCi/g and 5 pCi/g, respectively. The results for radium-226 and thorium-232 were compared to the site-specific DCGL's proposed in the DP, Rev. 2, which have not yet been approved by the NRC. The proposed DCGL's for radium-226 and thorium-232 are 4.5pCi/g and 4.0 pCi/g, respectively. Both the licensee's results and the NRC confirmatory results from the split soil samples met the approved DCGL's for total uranium and cobalt-60 and the proposed DCGL's for radium-226 and thorium-232. The licensee's and ORISE's soil sample analysis may be found in the Agencywide Documents Access and Management System (ADAMS) Accession Numbers ML102440225 and ML102310232, respectively. The soil sample analysis results will be reviewed again when the final site-specific DCGL's have been approved and the licensee has submitted the FSS for the entire site.

No findings of significance were identified.

REPORT DETAILS

I. Introduction

The ABB Inc., Combustion Engineering Site, in Windsor, CT, which is referred to as the CE Windsor Site, is situated on approximately 612 acres, approximately eight miles north of Hartford, Connecticut. Between 1956 and 2001, the site was used for 1) research and development (R&D) and manufacture of naval fuel; 2) construction and operation of the S1C submarine prototype training reactor; and 3) R&D, component services and manufacture of commercial fuel. Residual contamination is present on facility structures, systems and soil as a result of the previous licensed activities. The primary contaminants on the site are enriched uranium, thorium -232, radium-226, and a small amount of cobalt-60. The objective of ABB Inc. is to decommission the entire CE Windsor Site such that it will meet the criteria for unrestricted release specified by 10 CFR 20.1402.

To date, remediation/decommissioning activities at the site have included: 1) successful dismantlement, remediation and decommissioning of the S1C Naval test reactor by Naval Reactors and the Department of Energy in 2006; 2) successful remediation, decommissioning and unrestricted release of 364 acres of the site associated the commercial fuel activities under NRC oversight; and 3) the ongoing preparations for the remediation of Formally Utilized Sites Remedial Action Program (FUSRAP) areas by ABB under NRC oversight. As part of the future FUSRAP-related activities, the Memorandum of Understanding (MOU) between EPA and NRC has been implemented.

II. Organization, Scope, and Oversight of the Remediation Program

a. Inspection Scope

The inspectors toured the facility, interviewed licensee and licensee contractor personnel and compared the organization, scope and oversight of ongoing remediation activities to those authorized by the existing NRC license.

b. Observations and Findings

No findings of significance were identified.

Authorized licensed activities were limited to decommissioning and associated material possession activities for the CE Windsor Site. ABB maintains a decommissioning senior project manager who is assigned full-time onsite to support ongoing remediation activities. Technical support and professional staffing for these activities were contracted primarily to MACTEC, Inc. who provided the radiation safety officer (RSO) who in turn provides direct supervision for ongoing decommissioning field activities. Discussions with the licensee and the licensee's contractor identified that surveys and ongoing remediation activities are being performed at the CSP, burning grounds, drum burial pit, woods area and sanitary sewer lines.

a. Conclusions

The licensed activities being conducted at the CE Windsor site were consistent with those authorized by NRC License Nos. 06-00217-06 and SNM-1067. The licensee's radiation safety and decommissioning organization was adequately organized and staffed to support current authorized activities. ABB and their contractors coordinate the remediation project of the CE Windsor Site and keep the NRC and the Connecticut Department of Environmental Protection (CTDEP) informed of the project status.

III. Analysis of Confirmatory Soil Samples

a. Inspection Scope

The inspection included the collection of split soil samples from the CSP area for confirmatory analysis by ORISE, and a review of the split soil sample analysis results provided to the NRC by ORISE and by the licensee.

b. Observations and Findings

No findings of significance were identified.

ABB notified the NRC that remediation of the CSP area, and the collection of FSS soil samples of the CSP area had been completed by ABB. The inspectors observed the collection of the confirmatory split soil samples. The inspectors then took possession of one set of the soil samples and sent them to ORISE for analysis. The ORISE results from the analysis of the soil samples collected from the CSP are tabulated below. The ORISE analysis is also located in ADAMS, Accession Number ML102310232. The licensee's soil sample analysis is located at ADAMS, Accession Number ML102440225.

The inspectors compared the ORISE results with the samples analyzed by ABB and determined that all soil sample results were less than the proposed site-specific DCGLs. Total uranium was approximately 1%, or less, of the proposed site-specific DCGL for total uranium.

ORISE performed gamma spectroscopy on all the samples collected (Table 1) and alpha spectroscopy on approximately one-third of the samples, specifically those samples which indicated some detectable activity in the gamma spectroscopy (Table 2). The alpha spectroscopy was performed as further confirmation of the gamma spectroscopy results.

Table 1
Gamma Spectroscopy of Soil Samples – ABB Clam Shell Pile
Results in units of picocuries/gram (pCi/g)

		Radionuclide Concentrations (pCi/g dry weight)					
ORISE Sample ID	NRC Sample ID	Th-232 by Ac-228	Ra-226 by Pb-214	Co-60	U-238 by Th-234	U-235	Total U[a,b]
2016S0001	ABB-10-1-1	0.65 ± 0.13[c], 0.16[d]	0.62 ± 0.07, 0.08	-0.04 ± 0.06, 0.10	0.80 ± 0.35, 0.95	-0.03 ± 0.22, 0.34	1.57 ± 0.73
2016S0002	ABB-10-1-2	0.62 ± 0.10, 0.11	0.46 ± 0.05, 0.06	0.01 ± 0.04, 0.06	0.51 ± 0.23, 0.70	0.04 ± 0.14, 0.24	1.06 ± 0.48
2016S0003	ABB-10-1-3	0.66 ± 0.12, 0.15	0.52 ± 0.05, 0.05	0.01 ± 0.03, 0.06	0.87 ± 0.26, 0.71	-0.01 ± 0.10, 0.20	1.73 ± 0.53
2016S0004	ABB-10-1-4	0.74 ± 0.12, 0.14	0.51 ± 0.06, 0.08	0.03 ± 0.04, 0.08	0.77 ± 0.31, 0.74	-0.05 ± 0.13, 0.24	1.49 ± 0.63
2016S0005	ABB-10-1-5	0.70 ± 0.12, 0.14	0.56 ± 0.06, 0.07	0.02 ± 0.04, 0.08	0.62 ± 0.29, 0.96	0.02 ± 0.19, 0.30	1.26 ± 0.61
2016S0006	ABB-10-1-6	0.63 ± 0.11, 0.13	0.46 ± 0.05, 0.06	-0.02 ± 0.05, 0.07	0.51 ± 0.05, 0.66	-0.08 ± 0.16, 0.26	0.94 ± 0.19
2016S0007	ABB-10-1-7	0.65 ± 0.12, 0.15	0.52 ± 0.06, 0.07	-0.03 ± 0.05, 0.07	0.62 ± 0.07, 0.85	-0.02 ± 0.13, 0.25	1.22 ± 0.19
2016S0008	ABB-10-1-8	0.94 ± 0.17, 0.16	0.70 ± 0.08, 0.09	0.02 ± 0.06, 0.11	0.54 ± 0.38, 1.10	0.22 ± 0.09, 0.27	5.5 ± 2.0
2016S0009	ABB-10-1-9	0.88 ± 0.15, 0.17	0.61 ± 0.07, 0.09	0.06 ± 0.05, 0.10	0.92 ± 0.40, 1.0	1.04 ± 0.13, 0.25	24.5 ± 2.9
2016S00010	ABB-10-1-10	0.87 ± 0.12, 0.10	0.63 ± 0.05, 0.06	0.01 ± 0.03, 0.06	0.85 ± 0.25, 0.64	0.93 ± 0.10, 0.18	22.0 ± 2.2
2016S00011	ABB-10-1-11	0.57 ± 0.19, 0.41	0.69 ± 0.07, 0.07	-0.01 ± 0.05, 0.08	0.77 ± 0.98, 1.70	1.57 ± 0.16, 0.29	36.4 ± 3.6
2016S00012	ABB-10-1-12	0.93 ± 0.15, 0.16	0.71 ± 0.07, 0.07	0.02 ± 0.05, 0.08	0.75 ± 0.30, 0.82	0.10 ± 0.14, 0.27	1.60 ± 0.62
2016S00013	ABB-10-1-13	0.85 ± 0.14, 0.13	0.63 ± 0.07, 0.07	0.03 ± 0.05, 0.08	0.91 ± 0.31, 0.81	0.26 ± 0.20, 0.33	2.08 ± 0.65
2016S00014	ABB-10-1-14	1.07 ± 0.15, 0.10	0.74 ± 0.06, 0.05	0.02 ± 0.04, 0.07	0.81 ± 0.27, 0.78	0.10 ± 0.16, 0.28	1.72 ± 0.56
2016S00015	ABB-10-1-15	1.04 ± 0.16, 0.15	0.73 ± 0.07, 0.06	0.02 ± 0.03, 0.06	0.82 ± 0.29, 0.90	0.89 ± 0.10, 0.18	21.0 ± 2.2
2016S00016	ABB-10-1-16	0.90 ± 0.15, 0.14	0.62 ± 0.07, 0.08	0.00e ± 0.05, 0.09	0.82 ± 0.30, 1.00	0.08 ± 0.21, 0.34	1.72 ± 0.64
2016S00017	ABB-10-1-17	0.86 ± 0.14, 0.15	0.70 ± 0.07, 0.07	-0.03 ± 0.06, 0.09	0.92 ± 0.33, 0.84	0.31 ± 0.09, 0.23	8.0 ± 2.0

[a]Total uranium is calculated using U-238*2 + U-235 for samples S0001-S0007, S0012-S0014, and S0016.
[b]Total uranium is calculated using U-238 + U-235 + (21.7*U-235) for samples S0008-S0011, S0015, and S0017.
[c]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.
[d]MDCs are after the commas.
[e]Zero values are due to rounding.

Table 2
Alpha Spectroscopy of Soil Samples – ABB Clam Shell Pile
Results in units of picocuries/gram (pCi/g)

		Radionuclide Concentrations (pCi/g dry weight)			
ORISE Sample ID	NRC Sample ID	U-234	U-235	U-238	Total U[a]
2016S0009	ABB-10-1-9	22.5 ± 1.8[b], 0.0[c,d]	0.77 ± 0.10, 0.01	0.77 ± 0.10, 0.02	24.0 ± 1.8
2016S00010	ABB-10-1-10	27.4 ± 2.2, 0.0	1.02 ± 0.13, 0.02	1.02 ± 0.12, 0.03	29.4 ± 2.2
2016S00011	ABB-10-1-11	45.3 ± 3.7, 0.0	1.61 ± 0.18, 0.03	0.88 ± 0.11, 0.02	47.8 ± 3.7
2016S00013	ABB-10-1-13	2.01 ± 0.20, 0.01	0.07 ± 0.03, 0.01	0.79 ± 0.10, 0.01	2.87 ± 0.23
2016S00015	ABB-10-1-15	22.5 ± 1.8, 0.0	.77 ± 0.10, 0.01	00.83 ± 0.10, 0.02	24.1 ± 1.8
2016S00017	ABB-10-1-17	6.33 ± 0.55, 0.03	0.25 ± 0.05, 0.03	0.69 ± 0.09, 0.02	7.28 ± 0.56

[a]Total uranium is calculated using U-234 + U-235 + U-238.
[b]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.
[c]MDCs are after the commas.
[d]Zero values are due to rounding.

c. Conclusions

Split soil samples were analyzed for total uranium, cobalt-60, radium-226 and thorium-232. Data for each of the samples were in general agreement with each other and all results were below the approved DCGL's for total uranium and cobalt-60, as well as the proposed DCGL's for radium-226 and thorium-232. The soil sample analysis results will be reviewed again when the final site-specific DCGL's have been approved and the licensee has submitted the FSS for the entire site.

IV. Exit Meeting

The inspectors discussed the observations during the June 15, 2010 site visit with the ABB RSO (MACTEC contractor) and ABB field project manager. The inspectors held a telephone exit meeting with the ABB senior project manager and RSO on September 3, 2010 to discuss the ORISE laboratory analysis results.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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PARTIAL LIST OF PERSONS CONTACTED

Licensee

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State of Connecticut Department of Environmental Protection

Robert Clark,
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Dale Condra, Laboratory Manager (via phone)

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CSP	clam shell pile
CT DEP	Connecticut Department of Environmental Protection
DCGL	derived concentration guideline level
DP	decommissioning plan
EPA	Environmental Protection Agency
FSS	Final Status Surveys
FUSRAP	Formerly Utilized Sites Remedial Action Program
MOU	Memorandum of Understanding
NRC	Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education