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Mr. John Nicholson
U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Subject: **NRC Request for Additional Information – February 9, 2012**

References: (A) Letter, J. Nicholson (NRC) to J. Conant (ABB), dated February 9, 2012

Dear Mr. Nicholson:

ABB Inc. ("ABB") is providing additional information to facilitate NRC's review of Final Status Survey Report Submittal No. 1 for the CE Windsor Site at 2000 Day Hill Road in Windsor Connecticut. NRC requested additional information in your letter of February 9, 2012 (Reference A). This submittal provides for the requested information.

If there are any questions or comments regarding this submittal, please contact Mr. Heath Downey, ABB's Radiation Safety Officer, at (207) 939-5560 or me at (860) 418-0370 or by e-mail at john.conant@us.abb.com.

Sincerely,

ABB INC.

John F. Conant
Director, Nuclear Engineering and Compliance

Enclosure

xc: Charles Petrillo (Town of Windsor)
Edward Wilds (CTDEEP)

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NMSS/RGN1 MATERIALS-002

Response to NRC Request for Additional Information
Dated February 9, 2012

CE Windsor Site
Windsor, Connecticut

NRC License Number 06-00217-06
Docket Number 030-03754
Control Number 575762

March 8, 2012

Request for Additional Information Question 1:
Final Status Survey Report (FSSR) Submittal #1 references in several instances the Final Status Survey Plan for CE Windsor Site, Revision 1 (FSSP), dated July 2011. This has not been submitted to the NRC. Please submit a copy.

Response:
A copy of the FSSP, Revision 1 is being provided for your information under separate cover to the NRC no later than March 30, 2012.

Request for Additional Information Question 2:
Gamma walkover survey results for several FSSR survey units have data logger measurements exceeding the investigational level of 4,104 counts per minute (cpm) and these are discounted as false positive. Please provide the rationale for this.

Response:
There are several issues associated with gamma walkover survey data collected by data logger that may lead to the conclusion that the data points are false positive results. In addition to discussing these issues, an overview of the gamma walkover data review process is provided to help clarify this response.

Gamma walkover surveys are performed by trained and qualified staff who are evaluating the instrument readings in real-time as they perform the surveys. As discussed in the FSS Report, surveyors will take additional readings and attempt to delineate elevated areas identified utilizing the real-time readings. The false positive results discussed in the FSS Report are essentially due to data logging of the data. The use of data logging for gamma walkover surveys was implemented since it provides a more robust and defendable data set; however, the tradeoff is that it produces more false positive results than traditional methods with no data logging.

The first reason is that by utilizing a data logger for gamma walkover surveys, readings from the survey instrument are recorded each second, and we are providing the complete data set as recorded (no editing). So some data points may be recorded outside the actual survey unit or during an event that causes the instrument to respond greater than the investigational level even

though it is not actually measuring residual radioactivity in soil as part of the survey unit. For example, bumping the detector on the ground, a tree, or rock during performance of gamma walkover surveys will typically produce a spurious reading due to the physical shock to the detector that is a false positive result. Another issue that can cause a spurious reading is unusual stress or degradation of the cable connecting the detector to the instrument. While the instrument, detector and cable are carefully inspected and response checked prior to use, a cable may degrade during use, especially when used outdoors. During performance of gamma walkover surveys without a data logger, these types of readings would not be recorded by the surveyor; however, with a data logger attached there is no easy way to identify occurrence of these types of events in the large data files produced. Given the concentrations of radionuclides in soil that would trigger a valid exceedance of the investigational level, isolated singularities greater than the investigational level would be considered a false positive result, as described below.

The second reason is that if actual elevated levels of residual radioactivity were present in the soils undergoing gamma walkover surveys, the results greater than the investigational level would be present for more than a single one second data point. Gamma rays emitted by radionuclides are isotropic (uniform in all directions), so the radiation detector will have elevated readings as it approaches an elevated area, while over the area, and as it moves away. Therefore, isolated data points that exceed the investigational level are due to spurious noise (as indicated above) or anomalies in the data set that are captured by the data logger that would not be considered as a valid exceedance of the investigational level.

The third reason is that by design, our investigational level for gamma walkover surveys is essentially as low as we can have it without creating significant amounts of false positive results. By setting the investigational level low, we create a bias that leads to an increase in false positive results during gamma walkover surveys. This was done to ensure that our Final Status Surveys are performed in a conservative manner and reduces the possibility that elevated areas that could cause a survey unit to fail the decision criteria would be missed.

The process of the gamma walkover survey data file evaluation includes performing statistics on the data and checking to see if there are clusters, or blocks of data that are over the investigation level. The statistics give a good indicator of the normality of the data and if there are smaller elevated areas that the systematic volumetric soil samples would not have identified. The walkover scan uses the judgment of the technician to perform a subjective evaluation of areas that result in an elevated count rate relative to background, by performing a 5-10 second pause at the elevated location. If the area is indeed elevated, the area can be easily confirmed by a visual plot of the smoothed data.

The walkover scanning technique relies on a relatively constant survey unit area background to use as the metric for an audible increase in count rate. A false positive measurement would normally be confirmed by the instrument operator as a "non-detect" by performing the "pause and identify" method in an attempt to verify the source of the audible increase. An elevated area (not false-positive) is confirmed by a "cluster" of data points of audible increase greater than general background by the operator, that can be compared to the investigation levels specified in the survey package. While the "pause and identify" method by the operator is a subjective way to

discover elevated pockets of activity, it allows the operator to use skill-of-the-craft techniques to add confidence to decision makers that the survey unit doesn't contain a significant number of "discrete anomalies" or "singularities" that might otherwise be discounted as a random event or background fluctuation.

A false positive result is when no significant amount or radioactivity was present. A false positive might result in a secondary inspection taking time and manpower. Most false positives will not reoccur, so the simplest way to ensure it is not false is to repeat the measurement, which is accounted by the survey technician "pause and identify" technique. While a confirmed positive reading is considered statistically significant, only those positive values that average over the investigation level are of concern during FSS requiring a biased volumetric investigation sample as the decision for evaluation against the dose release criteria.

Request for Additional Information Question 3:
Certain areas in FSSR survey units that exceeded investigational criteria were discounted due to the levels of naturally occurring radioactive materials (NORM) present. Please provide a brief description on how you disposition these areas analytically.

Response:
The concentrations of naturally occurring radioactive material (NORM) found at the CE Windsor site fluctuate across the site due to changes in geology and composition of the soils. Final Status Survey Report Submittal Number 1 addressed primarily large excavations at depth where the nature of the soils surveyed are different than the surface soils. During remediation activities in these areas, it was noted that there was elevated levels of NORM as identified by gamma spectroscopy analysis of volumetric soil samples collected during these activities.

While there is no direct correlation between the gross scan measurement values and the elevated activity values of NORM found in the investigation sample, it is reasonable to conclude that the increased levels of gross gamma activity are a result of NORM radioactivity present in the soils since there were essentially no site-derived materials (U-235 and Co-60) present in the sample which could explain the elevated scan results, especially for soils at depth that clearly preceded the introduction of site contaminants.

Request for Additional Information Question 4:
Describe how the analysis results of the independent, biased verification soil samples collected by the Connecticut Department of Energy and Environmental Protection (CTDEEP) and split between CTDEEP, NRC, and ABB are utilized in drafting the FSSR.

Response:
Independent verification (IV) soil samples are collected at biased locations utilizing a three-way split method to ensure that all parties have a sufficient amount of sample for adequate analysis. Since the ABB split of these samples is analyzed on-site by gamma spectroscopy to determine the offsite shipment DOT classification, it is also used as an a priori indicator of the IV results from CTDEEP and NRC. If the ABB split sample result is >$DCGL_W$, and/or the NRC/CTDEEP

split result is > $DCGL_W$, then the elevated result location is investigated using the same methodology for elevated results identified during FSS. The only IV sample results which are provided in the FSSR are those that are >$DCGL_W$ that are included in an elevated area evaluation.

Request for Additional Information Question 5:
In the Final Status Survey Volumetric Soil Sample Results tables associated with each survey unit there are suffixes associated with some of the samples. Describe what the "LR", "AVE", and "S" suffixes mean and how the data is handled for samples with these designations.

Response:
The suffixes "LR", "AVE", and "S" are designations that refer to "laboratory recount", "average", and "split" respectively. As explained in each FSSR, a laboratory recount is a duplicate analysis of a systematic or biased investigative volumetric sample. A quality control (QC) comparison is performed to demonstrate that accuracy and precision metrics as well as reproducibility are met between gamma analyses of the same sample on either the same detector, or similar detector systems. A split is a volumetric duplicate of a systematic or biased investigative volumetric sample. The QC comparison of the original systematic or biased investigative volumetric sample result and its corresponding split result is a QC metric which demonstrates adequate performance of the sample collection process, as well as accuracy and precision metrics. The average result is provided for locations with more than one result (LR or S) and are used in the presentation of the systematic volumetric survey unit sample results (Survey Unit Appendices) and the descriptive statistical and T-Test compliance reports, and if applicable the biased investigative volumetric results. This method ensures a more statistically accurate value by using two measurement results of the same sample (LR) or a sample result and its corresponding split (S) result.