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December 23, 2013

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Ms. Laurie A. Kauffman, Health Physicist
Decommissioning Branch, Division of Nuclear Materials Safety
United States Nuclear Regulatory Commission
2100 Renaissance Boulevard, Suite 100
King of Prussia, Pennsylvania 19406-2713

RE: UNC Naval Products: Request for Additional Information Regarding Decommissioning
Plan Addendum for the Former United Nuclear Corporation Manufacturing Facility, New
Haven, Connecticut – Response Letter

Dear Ms. Kauffman:

Pursuant to your November 21, 2013 letter received by General Electric (GE) and United Nuclear Corporation (UNC) on November 27, 2013 requesting additional information regarding the Characterization Survey Plan for the former United Nuclear Corporation (UNC) site, located at 71 Shelton Avenue in New Haven, Connecticut, Cabrera Services, Inc., on behalf of GE and UNC, is providing additional information for the Nuclear Regulatory Commission's (NRC's) technical review.

We are also sending you a hardcopy of this letter and its attachments via regular mail.

If you have any questions regarding the information presented, please do not hesitate to contact Cabrera Services at (860) 569-0095.

Sincerely,
Cabrera Services, Inc. on behalf of GE/UNC

Gregory Bright

Attachments:

Comments – Responses for the “Characterization Survey Plan Former UNC Manufacturing Facility,” FINAL – June 2013

UNCNH Request for Additional Information NRC

Comments-Responses for "Characterization Survey Plan Former UNC Manufacturing Facility," FINAL – June 2013
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Reviewer: NRC			
1	1.0	In Section 1.0 of your characterization survey plan, you mentioned that Final Status Surveys will be completed in accordance with your Decommissioning Plan (DP), dated August 17, 1998 and Final Status Survey Plan (FSSP), dated September 6, 2006. However, you did not mention your DP Addendum, dated July 5, 2012. Please consider including the DP Addendum as a reference in your characterization survey plan.	The references to the FSSP will be removed. The reference for the DP Addendum, dated July 5, 2012, will be added in order to reference the current DCGLw at the site of 435 pCi/g. The areas being addressed in this characterization survey are not discussed in the FSS Plan. The purpose of this survey is to focus characterization efforts on soils beneath the South Trench where contamination was identified during previous characterization work. This survey is a continuation of the previous characterization work, and is intended to identify the nature and extent of contamination in soils beneath the trenches.
2	General	We understand you intend to conduct surveys in accordance with your established DP, FSSP, and contractor procedures however, during our review of the characterization survey plan, we noted that it appears to double as a Final Status Survey Plan. As such, Final Status Survey Plans depend on sufficient characterization and remediation that has been completed. Please confirm that this is a Characterization Plan and not also a Final Status Survey Plan. Please note that you may need to update your FSSP to include the area(s) described in this Characterization Survey Plan.	<p>Please see response to Comment 1. The purpose of this survey is to focus characterization efforts on soils beneath the South Trench where contamination was identified during previous characterization work. This survey is a continuation of the previous characterization work, and is intended to identify the nature and extent of contamination in soils beneath the trenches. The plan will be updated throughout to clearly state the objectives of this survey.</p> <p>Cabrera and UNC acknowledge that some amount of remediation will likely be required, especially under the South Trench in the southeastern portion of the building (see the map in Attachment 1). This survey is attempting to bound that residual radioactivity beneath the building to determine the extent of the future remediation. We acknowledge that updates to the FSSP will likely be required.</p> <p>This characterization survey is not unlike the one previously performed at the former UNC Manufacturing facility by AAA</p>

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			Environmental and IEM (report was dated May 31, 2005). That sampling was approved by the USNRC in 1999. The goal of that characterization survey was to identify the extent of residual radioactivity beneath the building slab. A total of 21 boreholes were drilled throughout the building floor, and these locations were biased towards areas previously identified by ORISE during a survey in 1997. Areas where samples were collected that exceeded the release criteria of 30 pCi/g total uranium were identified in the subsequent Decommissioning Plan as requiring remediation and FSS. Areas that did not exceed the release criteria were used to "bound" the subfloor contamination and determine the scope of the remediation to follow. Cabrera considers the current characterization survey to be similar to the one in 2005.
3	2.0	In Section 2.0, you mentioned that final status survey operations of impacted land areas, exterior surfaces, and structures have been completed in accordance with the requirements specified in the FSSP and that all survey units were properly classified, surveyed and sampled. As part of the decommissioning process, described in NUREG 1757, Vol. 1, Rev. 2, Consolidated Decommissioning Guidance: Decommissioning Process for Materials Licensee, dated September 2006, the NRC makes the final determination of adequacy of final status survey operations. Please consider re-phrasing the statements to better reflect the decommissioning process.	Concur. Will re-phrase this comment to state that the survey units have been surveyed but results have not yet been reviewed by the NRC.
4	2.0	In Section 2.0, last paragraph, please clarify the number of samples locations around the drainage hole.	There were 8 total sample locations around the drainage hole, not including the original drainage hole location (four were west of the location, two were east of the location, and two were south of the location). This will be clarified in the text.
5	3.0	In Section 3.0, you provided discussed the project data	Concur. Cabrera will add the sample collection and analysis of

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		quality objectives (DQOs) related to soil sampling, but the DQOs did not appear to consider sampling/analyzing concrete cores from the trenches. Please expand your DQO process.	concrete cores to this section and Sections 5 and 6 of the plan. Concrete core collection and analysis could provide additional information on potential residual HEU contamination. Concrete core samples will be collected at selected biased borehole locations and analyzed for HEU. This will provide additional information about whether the concrete floor contains HEU contamination above the applicable release criteria at the areas exhibiting the highest known soil concentrations.
6	4.2, 4.3	In Section 4.2 and 4.3, you mention pre-remediation field activities and remediation field activities. Because characterization and remediation are two separate processes, do you intend to mean preliminary survey considerations such as those mentioned in MARSSIM, Section 4.8.4.2? Also, do you plan to remove the debris from the building and check for underground utilities prior to implementing the characterization survey plan?	This plan is meant to guide all work associated with the characterization survey, including all activities required to prepare for the drilling and sampling of subsurface soils. These activities include asbestos abatement, cutting pipes, etc. Cabrera will remove references to "remediation" and instead use terminology from MARSSIM Section 4.8.4.1. Cabrera plans to move debris as necessary to access sampling locations and to check for underground utilities, as necessary.
7	5.1	In Section 5.1, second paragraph, you mention that the <i>Derived Concentration Guideline Levels for the Decommissioning of the former UNC Manufacturing Facility</i> (IEM, 2008) was submitted to the NRC for approval on July 11, 2012 and was approved for use on June 5, 2013. In fact, in June 2008, the <i>Derived Concentration Guideline Levels for the Decommissioning of the former UNC Manufacturing Facility, Revision 1</i> , dated June 23, 2008, was submitted to the NRC for an acceptance review. The NRC issued a letter dated July 7, 2008 that stated the NRC completed our acceptance review and had no further questions. In addition, the document you submitted on July 11, 2012 to the NRC, for a separate acceptance review, was your <i>Decommissioning Plan</i>	Paragraph will be revised as requested. The appropriate reference will be added to the reference section.

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		<i>Addendum</i> , dated July 5, 2012. This document included the <i>Derived Concentration Guideline Levels for the Decommissioning of the former UNC Manufacturing Facility, Revision 1</i> , dated June 23, 2008 as an attachment to compare the Derived Concentration Guideline Levels (DCGLs) generated in 2008 with DCGLs generated in 2012, using the most recent revision of the RESRAD computer program. The NRC issued a letter on May 5, 2013, that stated the NRC completed our acceptance review and had no further questions. Please consider the above clarifications and revise the second paragraph of Section 5.1, accordingly.	
8	5.3	In Section 5.3, you indicated that the size of the trench soils survey unit (SU) is approximately 494 square meters (m^2). How did you arrive at this estimate? Please explain, either in this section or in the DQO section.	<p>We determined this area based on:</p> <ol style="list-style-type: none"> 1. North Trench = 480 ft length by 4 ft width = 1,920 ft^2 (178.4 m^2) 2. Column 17/18 Lateral Trench= 80 ft length by 4 ft width = 320 ft^2 (29.7 m^2) 3. South Trench = 768 ft length by 4 ft width = 3,072 ft^2 (285.4 m^2) <p>This is based on the South Trench footprint running the full length of the building while the North Trench footprint only runs approximately 30 columns (each one 16 ft apart). This information will be added to the text and in the DQO section for clarity.</p>
9	5.3.1	In Section 5.3.1, you mentioned that the gross soil sample data will be directly compared to the soil $DCGL_w$ for conservatism. If all samples are below the $DCGL_w$ then a direct comparison is acceptable. However, we noted conflicting statements	We will employ the WRS test, and use the reference area data that was developed and sampled during Cabrera's previous FSS in 2011-2012. This will be clarified in the text.

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		in Section 5.4.2. In Section 5.4.2, you mentioned that the Wilcoxon Rank Sum (WRS) test will be used to determine when soils will be suitable for release. If the WRS test is in fact being used, then a sufficient number of samples must also come from a background reference area for comparison. Please clarify which test you plan to use.	
10	5.4	In Section 5.4, you generated the required number of samples based upon the DCGL for average concentrations over a wide area ($DCGL_w$) and the standard deviation (σ). In addition, the lower bound of the gray region (LBGR) was set to the σ . According to your characterization survey plan, the reason for setting the LBGR equal to σ was due to the large variability of uranium concentrations in soils below the utility trenches and the fact that the standard deviation is over half the $DCGL_w$. This may be a good starting point since MARSSIM guidance recommends initially setting the LBGR to 50% of the DCGL. However, the high variability in the data set may indicate that you have not completely characterized the area. In addition, the variability in the data may also indicate that the survey unit is not homogenous. Please explain how you will achieve a lower variability in the data set and the methods you will apply to demonstrate the area has been completely characterized.	Cabrera is attempting to make assumptions about the dataset based on current information from drainage hole sample data collected during the previous field effort. Cabrera recognizes that this survey is attempting to shed light on a difficult problem, and although MARSSIM usually recommends a relative shift between 1 and 3, there is going to be a high variability in the dataset due to the spot contamination. If sample results are confirmed to be <435 pCi/g, there will be less variability then we assumed in this plan. If sample results are confirmed to be >435 pCi/g, remediation will be performed to remove those areas that exceed the $DCGL_w$, lowering the variability of the dataset during the final status survey. By requiring 48 systematic samples and at least 12 biased samples to be collected, we recognize the need to collect a lot of data to determine the extent of contamination in the survey area and ensure our survey meets our data quality objectives. This approach is expected to overestimate the number of samples required, resulting in a conservative survey design.
11	General	Based our review, we noted you characterized the area to be remediated as a Class 1 SU. NUREG 1575, Rev. 1 Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), dated August 2000, states that a Class 1 SU is to be surface scanned	It is acknowledged that these inaccessible soils beneath the building cannot be scanned with 100% coverage with Building 3H/6H still intact. This survey approach was developed in an attempt to satisfy the project stakeholders based on Cabrera's knowledge of how subsurface soils became contaminated

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		with 100% coverage in order to locate hot spots. Because it appears that all sampling takes place via drilling through concrete, with no mention of soil surface scanning, surface scans would presumably not be possible through the concrete. Please explain how you will attain a 100% surface soil scan for this Class 1 survey unit and adequately detect hot spots that may be underneath concrete. Please explain how the DCGL _{EMC} will be incorporated into the plan in order to deal with small areas of elevated contamination.	(preferential pathway from drainage holes in the trenches allowed contamination to be washed into underlying soils). Cabrera has sampled every accessible drainage hole in the trenches and provided sample concentrations in Attachment A of this plan. The DCGL _{EMC} will not be used for this characterization survey. Any soil contamination that exceeds the DCGL _W will be recommended for remediation. Remediation activities will be outlined in a subsequent work plan to be developed after the completion of this survey and submittal of a Characterization Survey Report to the NRC. This Characterization Survey Plan will be updated to reflect the fact that the DCGL _{EMC} will not be used.
12	5.4	In Section 5.4, Table 5-3, you provide drainage hole characterization data summary statistics. Based on our review, we noted that the table may not be finalized (example: for the Maximum value of Total Uranium you have the phrase "is this correct" in parenthesis; the median is not correct. In addition, the calculation for the relative shift equation does not appear to be correct. Please edit table and equation accordingly.	<p>The phrase "is this correct" will be removed from the table. The median is will be revised to the value 53.83. In the paragraph prior to the relative shift equation, it is stated that the standard deviation of 230 pCi/g, and not half of the DCGL_W (218 pCi/g) will be used. Therefore, the equation was confirmed to be correct. Text will be added to this paragraph for further clarification.</p> <p>This survey process will be an iterative one. We will assess our survey data together and compare the actual variability in the data set to our assumptions to assess the quality/representativeness of our data. Higher variability in our results will show the presence of residual radioactivity and that remediation is required. See also the response to comment 10 describing the conservatism of the survey design.</p>
13	5.4.2	In Section 5.4.2, you indicated that the number of required measurement locations, based on the WRS is 48. You also indicated that the number of samples is effectively tripled to 144 because of sampling at 3 depth intervals per location. For the purpose of a	The sentence, "The number of samples is effectively tripled to 144 because of sampling at three depth intervals per location (refer to Section 6.3.1)" will be removed from this section. The sample collected closest to the surface will be used as the representative sample for that location. The purpose of this

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		MARSSIM statistical analysis, sampling various depths at the same location does not equate to additional random sampling. Please re-evaluate this section and provide an explanation as to how you will meet MARSSIM statistical analysis and random sampling.	characterization survey is also to guide potential future remedial efforts based on the horizontal and vertical extent of contamination. For that reason, samples will also be collected from subsurface soils to assess residual radioactivity at depth at each location. Also see response to comment 14 for further clarification.
14	6.3.1	In Section 6.3.1, discusses sampling at multiple depth intervals and states that once samples above 435 pCi/g are remediated, the next lower depth interval sample at each location will serve as the FSS sample for that location. An example is also provided which states, "if at a given location the 1-2' sample has 600 pCi/g and the 2-3' sample has 400 pCi/g, the location will be remediated to a depth of two feet below grade and the 2-3' sample will serve as the FSS sample for that location." This is not an appropriate implementation of a MARSSIM Final Status Survey, and is basically a demonstration that a FSS of the survey unit has failed and requires remediation. This example appears to be more like a Remedial Action Support Survey than a Final Status Survey. Please provide a section to describe the types of Remedial Action Support Surveys that will be performed and include a DQO of how you will determine an area will be adequately remediated.	Cabrera will remove the statement in question in Section 6.3.1. Remedial action support surveys will be described in a remediation work plan. If a sample exceeds the DCGLw and remediation is required, then the overlying concrete slab and contaminated soils will be removed, as necessary, based on remedial support surveys. Confirmation samples will be collected at remediated locations to confirm the adequacy of the remediation. Subsurface core samples will not be used in the FSS evaluation of the survey unit samples in locations where the surface soil results exceed the DCGLw. Subsurface samples have instead been added to this survey in order to characterize soils at depth to guide potential future remediation efforts and estimate potential waste volumes.
15	10	In Section 10, you mentioned that you will prepare a Remedial Action Completion Report and a FSS Report however there is no mention to submit a Characterization Survey Report to the NRC to review the characterization survey results. Please include a statement that you will prepare and submit a Characterization Survey Report to the NRC.	A <i>Characterization Survey Report</i> will be developed after the survey is completed and submitted to the NRC for review. This statement will be added to the text.

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16	Attachment 5	In Attachment 5, Step 6, you stated that the measured background at the site is 10 microRoentgens per hour (uR/hr) and the background gamma radiation generally resembles the 662 keV gamma particle emitted by Cs-137, which will be used as your model for ambient background radiation. Please explain this statement	The sentence in Attachment 5 that states, "Background gamma radiation generally resembles the 662 keV gamma particle emitted by Cs-137, which will be used as our model for ambient background radiation" is not technically correct and will be removed. An average reference area count rate for the G-5 detector that was recorded during previous Cabrera remediation/FSS activities (8,150 counts per minute) will be used to calculate the HEU scan MDC. This results in a scan MDC of 19.3 pCi/g for HEU for the G-5 detector. The plan and attachment will be updated to reflect this information.
End of Comments			