



*GrafTech International Ltd.*

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CORPORATE HS&EP DEPARTMENT

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Juanita Bursley  
Corporate Sr. Manager, Environmental Protection

August 1, 2005

U.S. Nuclear Regulatory Commission  
Attention: Mr. Ken L. Kalman  
Mail Stop T7-F27  
Washington, D.C. 200555-0111

**SUBJECT:** UCAR Carbon Company Inc., Lawrenceburg, Tennessee  
Evaluation of Elevated Activity in Soil in Accordance with NUREG/CR 5849

Dear Mr. Kalman:

UCAR commissioned Nuclear Fuel Services (NFS), its technical consultant and remediation contractor, to review the criteria in Section 8 of NUREG/CR 5849 for applicability and to conduct an evaluation of the analytical data for soil removed from Room 108, Building 5 Annex at the decommissioned UCAR Lawrenceburg, Tennessee site. As part of its Final Status Survey Report, UCAR had previously submitted to NRC independent laboratory results for six core soil samples taken from this room, which all were substantially below the established release criteria for this decommissioning project. However, elevated U234 was found in one composite soil sample taken from the same area during NRC's confirmatory survey conducted at this UCAR site in February 2005. NFS evaluated this elevated activity in accordance with the referenced NRC guidance criteria, and issued a report of their findings (copy attached). Based on their experts' technical reviews and conservative assumptions, NFS has concluded that both criteria for evaluating elevated areas of activity were met and, therefore, "no further remediation or sampling in this room is required".

With this submittal, UCAR has now provided NRC with all requested information concerning the two open issues associated with NRC's confirmatory survey, which were communicated by NRC staff in a conference call with UCAR on June 22, 2005. UCAR trusts that this information sufficiently addresses NRC's questions and knows of no outstanding issues of concern.

UCAR understands that NRC's confirmatory survey, including the additional supplied information, concludes that all release criteria, in accordance with UCAR's approved Decommissioning Plan, have been met at the UCAR Lawrenceburg site. Therefore, we anticipate receiving NRC's final Confirmatory Survey Report and a formal letter releasing the UCAR Lawrenceburg site for Unrestricted Use. UCAR wishes to take this opportunity to thank you and the rest of the NRC staff for the assistance provided to support UCAR's successful completion of this remediation project.

Very truly yours,

UCAR Carbon Company Inc.

Juanita M. Bursley  
Corporate Sr. Manager, Environmental Protection

attachments



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71G-05-003  
GLH-05-007  
DEC-01-01-02  
ENG-10-06

July 20, 2005

Ms. Juanita Bursley  
Manager, Environmental Protection  
Graftech International  
12900 Snow Road  
Parma, OH 44130

**Subject: Evaluation of Elevated Confirmatory Soil Sample – Building 5,  
Room 108**

**Reference: Final Status Survey Report – Part 1 for Building 5 Annex and  
Metallurgy Laboratory at the Formerly Licensed Union Carbide  
Corporation Facility (UCC) Lawrenceburg, TN**

Dear Ms. Bursley:

During remediation of Building 5, Room 108, NFS identified a seam between the east wall and the floor which exhibited elevated activity as measured by an alpha survey meter. As a result, a section of the concrete floor, approximately 1 meter x 4.5 meters, was removed and the small amount of soil adjacent to the east wall was removed. The wall was decontaminated and surveyed to demonstrate compliance with the release criteria. Six soil samples were collected from Room 108 and analyzed to confirm that the unrestricted release criteria had been met. Three samples were from the area where the concrete had been removed and three samples taken from the other corners of the room. The results of the NFS collected samples are presented in Table 1. A map of the building, showing sample and sampling grid locations, is attached.

Table 2 presents the results of the NRC confirmatory sample. As indicated, the NRC confirmatory samples not only significantly differed from the NFS collected samples but also exceeded the unrestricted release criteria for the U234 isotopic. The U235 and U238 activities of the NRC collected samples were less than the unrestricted release criteria (Table 3).

NUREG/CR 5849 (Draft), *Manual for Conducting Radiological Surveys in Support of License Termination*, identifies that 0 – 15 cm (0 – 6”) soil core samples should be collected, the sample material homogenized, and an aliquot randomly collected from the

homogenized material and submitted for analysis. The NRC confirmatory samples did not follow this recommended approach. This sample was collected by compositing small aliquots of soil, removed from the top surface, from several locations within the uncovered area. The sample was then split into two aliquots and each aliquot analyzed. It is believed that this sample represent an isolated area of elevated activity and is not representative of residual uranium present in the entire room.

NUREG/CR 5849, Section 8.5.2 provides criteria for evaluating elevated areas of activity for compliance with the approved release criteria. Two criteria must be met. First, the soil activity at any location must be less than three times the release limit. The activity attributed to the U234 isotope, for both NRC sample results, is below three times the release limit. Second, the average concentration must be less than  $(100/A)^{1/2}$  times the release limit, where A is the area of the elevated activity. For this test, the area of elevated activity is defined as the uncovered area (approximately 1 meter x 4.5 meters). The size of Room 108 is approximately 7.5 meters x 5.5 meters or 41.25 square meters. For conservatism, the size of the survey unit was limited to the size of the room. Therefore, the 41.25 m<sup>2</sup> instead of 100 m<sup>2</sup> was used in calculating the level of permitted activity. This calculation indicates that an elevated U234 concentration up to 990 pCi/g is permitted within this area and still met the unrestricted release criteria.

$$(41.25 \text{ m}^2 / 4.5 \text{ m}^2)^{1/2} * 327 \text{ pCi/g} = 990 \text{ pCi/g}$$

Since each result of the NRC collected sample was less the 990 pCi/g, the second criterion is also met.

Notwithstanding the elevated result of the sample collected by the NRC, NFS believes no further remediation or sampling in this room is required for the following reasons.

1. Each of the six NFS collected samples, even after adjusting the concentration to represent a 6" core sample, were below the approved unrestricted release criteria at the 95% confidence level.
2. The Sum of Fractions (SOF) calculation for each of the adjusted sample results were below 1. The SOF at the 95% confidence level was 1.02. While UCAR did agree to incorporate a SOF calculation into Section 4.4.1 of the Decommissioning Plan, there is not a requirement for a confidence level to be placed on the SOF calculation.
3. The uncovered area may be treated as an area of elevated activity using the NRC sample result (670 pCi/g) as the average U234 concentration within the area. Even so, the survey unit still passes the tests for compliance with the release criteria.
4. NFS chose to limit the survey unit to the size of the room (41.25 m<sup>2</sup>) rather than 100m<sup>2</sup> based on its contamination history and use only the samples collected inside this room in evaluation to determine if the release criteria had been achieved. Samples collected adjacent to Room 108 (108D, 109A and outside

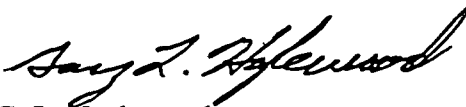
samples E108A and E108B) are all at or slightly above background. This is further indication that contamination above the release criteria is not present at the survey unit level.

In addition, NFS understands that the immediate plans are to pour new concrete over the uncovered area so that the area can be used to support plant operations. By covering the uncovered area with concrete, future worker exposure to any areas of elevated activity are eliminated. In addition, future remediation and/or construction activities impacting these soils will result in intermixing of any elevated soil with "clean" soil and debris thereby reducing and/or eliminating worker exposure.

Should you have any questions or need additional information, please contact me at (423) 743-2516.

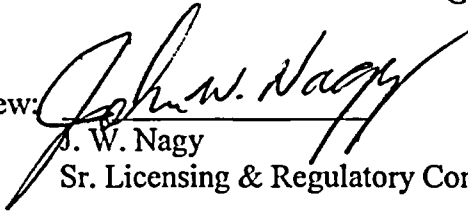
Best Regards,

NUCLEAR FUEL SERVICES, INC.



G. L. Hazlewood

Peer Review:



J. W. Nagy

Sr. Licensing & Regulatory Compliance Officer

## Building 105, Room 108 Soil Sample Results

Table 1 – 0' - 4' Composite Sample Results

Sample Results (0' - 4' Sample Depth)				
Sample ID	U234*	U235*	U238*	SOF
Background	0.86	0.05	0.82	N/A
108A	6.69	0.436	.21	0.03
108B	12.64	0.592	.19	0.05
108C	28.14	1.630	0.146	0.12
108E	0.95	<0	<0	0.00
108F	0.32	<0	0.15	0.00
108G	0.14	<0	0.05	0.00
Average	8.1	0.4	0.1	0.03
Standard Dev.	10.9	0.6	0.1	0.05
# of Samples	6	6	6	6
t-value	2.015	2.015	2.015	2.015
95% CL	30.1	1.6	0.3	0.13

### Sample Results Adjusted for 6" Sample Depth (pCi/g)

Sample results were adjusted to reflect an assumption that all the activity from the core sample was contained within the first 6 inches of the sample by multiplying the concentration values above by 8 (the ratio of the volume (4'/0.5')). The results are presented below.

Sample	U234*	U235*	U238*	SOF
108A	53.5	3.5	1.7	0.24
108B	101.1	4.7	1.5	0.41
108C	225.1	13.0	1.2	0.95
108E	7.6	<0	<0	0.23
108F	2.56	<0	1.2	0.01
108G	1.12	<0	0.4	0.01
Average	65.2	3.5	1.0	0.31
Standard Dev.	87.6	5.1	0.7	0.35
# of Samples	6	6	6	6
t-value	2.015	2.015	2.015	2.015
95% CL	241.7	13.8	2.4	1.02

\*All units in pCi/g, background corrected (0.86 pCi/g U234, 0.05 pCi/g U235, 0.82 pCi/g U238)

Table 2 – NRC Confirmatory Sample Results

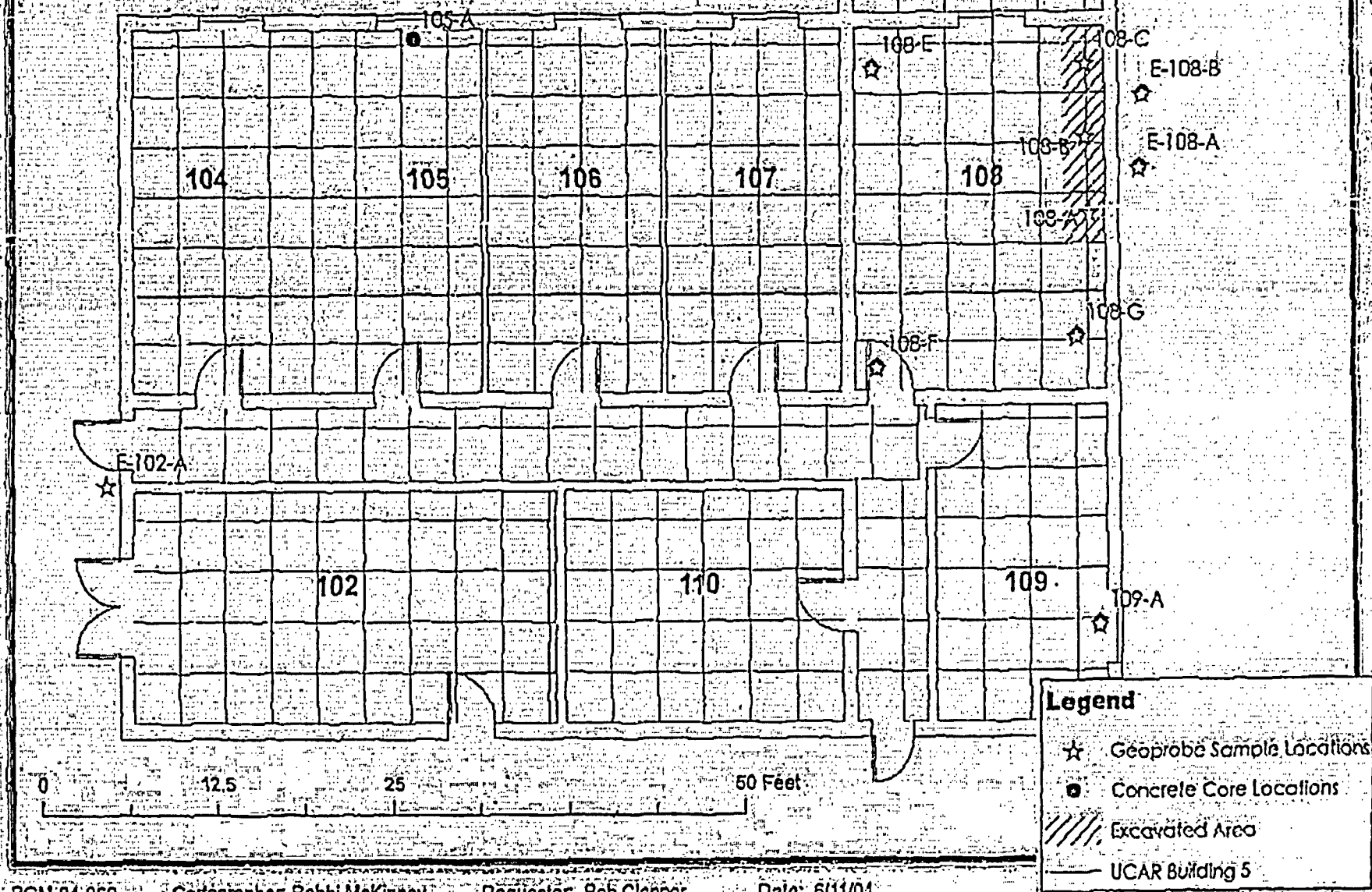
Sample Results (Surface Grab Samples)				
Sample	U234*	U235*	U238*	SOF
NRC Sample	530	20.6	4.9	2.05
Split Result	670	32.8	7.2	2.73
* All units in pCi/g				

Table 3 – Approved NRC Release Criteria

Approved NRC Unrestricted Release Guidelines			
U234*	U235*	U238*	Th 232*
327	51.3	172	2.6
*All units in pCi/g			

# UCAR

## Building 5 Confirmatory Sampling



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