



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

June 25, 1996

Mr. Anthony Campitelli  
Manager, Environmental Affairs  
Cabot Performance Materials  
P.O. Box 1608  
Boyertown, PA 19512

Dear Mr. Campitelli:

The Nuclear Regulatory Commission has reviewed the Risk Assessment (RA) that Cabot Corporation submitted by letter dated April 25, 1996. We have not yet reviewed the Revised Site Decommissioning Plan (RSDP) or the as low as reasonably achievable (ALARA) analysis. However, since these other two documents are highly dependent upon the RA results, we are commenting on the RA first, and we expect that Cabot will modify the other two documents as necessary to conform to the modifications NRC believes are necessary in the RA.

The NRC has several major concerns with the RA. The following concerns must be addressed before the RA and RSDP could be approved:

1. As NRC has previously commented on the Reading site characterization, the methodology that Cabot utilized to calculate a leach rate is invalid. Cabot cannot simply divide the value for slowly available uranium by the value for totally available uranium because the tests that are utilized to obtain those two values are completely different. For example, the test for slowly available uranium uses a basic solution, and the test for totally available uranium uses an acidic solution. Also, there is no justification provided for assuming that "slowly available" uranium corresponds to the amount of uranium expected to leach from the slag in a ten-year period.

As we explained in our recent letter to you dated May 29, 1996, on the Reading Slag Pile, the NRC does not have any general guidance for licensees on the calculation of a leach rate for slag waste based upon leach testing. This is an evolving technical area. However, in order to give you an example of a method which NRC has found acceptable in one case, we enclosed in our prior letter the preliminary NRC draft Environmental Impact Statement (EIS) for the decommissioning of the Shieldalloy Metallurgical Corporation facility in Cambridge, Ohio. For that EIS, NRC calculated a leach rate based on the readily available uranium leach test (the SPLP method), assuming a somewhat conservative mechanism for release of radionuclides from the slag. According to the draft EIS,

Long-term releases of contaminants...are assumed to occur as a simple "wash-off"...The primary mechanism controlling the release rate is the partitioning of contaminants

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between the solid surface and the water moving through the pile, represented by the distribution coefficient (Kd)...Estimated distribution coefficients were made by taking the ratio of the concentration of chemicals within the soil and slag and the concentration within the leachate from the SPLP method...distribution coefficients estimated from this procedure cannot be viewed as real values, but only provide a means of bounding estimated releases.

This method may or may not be applicable to the conditions at the Revere site. However, I would recommend that you consider the Shieldalloy EIS in developing an approach that is appropriate for your site. If you would like further information on the leach rate calculation for the Shieldalloy site, please contact Mark Thaggard at (301) 415-6718.

If you have or can obtain more information on the solid phases present and the chemical composition of the slag, contact John Bradbury at (301) 415-6597. Mr. Bradbury could assist you in developing a less conservative leach rate than would be derived from the methodology used at the Shieldalloy site.

In addition, Cabot should determine (a) how to apply the uranium leach test results to a mixture of thorium and uranium--i.e., whether the same leach rate should be used for the thorium and the uranium or whether fractions of the leach rate should be applied to each constituent, and if so whether it should be the mass fraction or the radioactivity fraction; (b) the basis, if any, for simply dividing the slowly available test results by the totally available test results, since the tests are so different; and (c) justification for the NES assumption that the slowly available lab test corresponds to a period of ten years in the real environment, and does not depend on individual site characteristics.

2. Cabot selected a well depth of 2000 feet because there is a well of that depth on the site, which is used for irrigation. However, there is also a much shallower onsite well used for industrial purposes. Cabot should assume a shallower well consistent with other wells completed in the immediate vicinity of the site or demonstrate that shallower groundwater is unsuitable for use based on yield or quality.
3. Cabot did not model the radon pathway. In a telephone conversation with Judi Greenwald on May 15, 1996, Cabot explained that the radon pathway was not modeled because the 15 mrem/yr dose standard in NRC's proposed decommissioning rule (59 FR 43200, August 22, 1994) excludes dose from the radon exposure. However, since the decommissioning rule is only a proposed rule, and not currently applicable, Cabot should estimate the dose from radon exposure. This is consistent with the Commission policy described in the SDMP Action Plan (57 FR 13389, April 16, 1992), which applies existing criteria and ALARA until the new rule is completed. NRC staff implemented that policy in Policy and Guidance Directive 8-08, which includes consideration of radon dose. In addition, if the risk analysis will be used to support an environmental analysis under NEPA, the dose calculation should represent estimates of potential human exposure, including radon and decay product inhalation.

4. The RA should carefully distinguish between "clean rubble" and "clean soil."

5. There are a number of issues related to the specification of the scenarios.

(a) For the industrial scenario, Cabot cannot take credit for the soil cover. Although NRC understands that Cabot intends to put a cover on the site, NRC does not generally give credit in dose modeling for covers because NRC assumes that, under an unrestricted release scenario, at a later date someone other than the licensee could remove the cover.

(b) In the case of the resident farmer scenario and onsite resident scenarios, there could also be no credit for a soil cover for the reason cited above. However, exposure to onsite residents via agricultural pathways may not be plausible, if Cabot can reasonably show that the rubble will not degrade into soil like material within the 1000-year assessment period. NRC staff agree that it would be extremely unlikely for a farmer to grow crops or graze cows or beef cattle in bare slag and rubble.

(c) Cabot needs to model an additional residential scenario in which someone lives on the site, receives his or her water from an onsite well, and builds the foundation of his house on the slag (see Scenario B in PG-8-08). Depending on whether Cabot can justify the assumption that the rubble will remain rock-like for the 1000-year period, Cabot could assume that no food is produced onsite directly on top of the slag because there would be no soil to sustain crops or grass.

6. Cabot apparently made an error in its calculation of inhalation rate and soil ingestion rate. These input parameters are supposed to include the total amount of air inhaled and total soil ingested during the entire year--both offsite and onsite. Instead, Cabot only calculated these values for the time spent onsite. RESRAD internally reduces these values by the occupancy factor. The same problem may apply to the drinking water intake. These errors should be corrected.

7. Cabot used 510 liters per year in lieu of the 730 liters per year standard assumption in PG-8-08. According to EPA's 1989 Exposure Factors Handbook (EPA/450/1-89/004), the 730 liters per year number represents the 90th percentile of annual water use for American adults; 510 is the mean. Cabot should assume 730 liters/year or justify an alternative value based on site characteristics.

8. In the meeting between Cabot and NRC on October 23, 1995, Cabot agreed to evaluate a scenario involving potential offsite use of the slag. That scenario was not included in the RA. Cabot informally informed NRC that they did not include that scenario because NUREG-1500 states that onsite scenarios are conservative enough to bound the doses that could occur offsite. NRC agrees with this explanation, but the RA should be revised to include the explanation.

9. Cabot does not discuss NRC's exposure rate criterion of 10  $\mu$ R per hour. The SDP should explain whether and how this criterion will be met.

A. Campitelli

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If you have any questions, please contact me at (301) 415-7298 or Judi Greenwald at (301) 415-6635.

Sincerely,



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Low-Level Waste and Decommissioning  
Projects Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
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