

June 20, 2002

Mr. David Allard, CHP
Director
Bureau of Radiation Protection
Rachel Carson State Office Building
P.O. Box 8469
Harrisburg, PA 17105-8469

SUBJECT: RESPONSE TO PADEP'S COMMENTS ON CABOT-READING SITE DECOMMISSIONING PLAN AND RADIOLOGICAL ASSESSMENT

Dear Mr. Allard:

This letter is to address concerns raised in your May 2, 2002 letter to US Nuclear Regulatory Commission (NRC) regarding the radiological condition of the Cabot Site in Reading, PA. The staff has evaluated the Commonwealth's concerns that the radiological assessment was inadequate to conclude that the Cabot license could be terminated and the site released for unrestricted use. The NRC staff has addressed each concern in the attached document.

Based upon the staff's review of Cabot's radiological assessment, in conjunction with the evaluation previously made by Sandia National Laboratories, we have concluded that the assessment adequately demonstrates that the site can be removed from the SDMP listing and released for unrestricted use without additional remediation.

If you have any questions regarding this letter, please contact me at (301) 415-7234 or you may speak to Rebecca Tadesse at (301) 415-6221.

Sincerely,

/RA/

Larry Camper, Chief
Decommissioning Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No.: 40-9027
License No.: SMC-1562

cc: Robert Meiers, PADEP

NRC's Response to PADEP Comments

1. The estimate of the amount of radioactivity used in the licensee's radiological assessment has not accounted for the large volume of waste shipped and disposed of at the site from out of state in 1977.

Response

In the "Radiological Assessment for the Reading Slag Pile" (Ref 1 p.1.10-1.11), the licensee explains that the current estimated volume is 180,000 ft³ which is greater than that stated in the 1996 characterization report (Ref 2) of 60,000 ft³. The licensee explains that the difference in calculated volume is due primarily to the use of visual estimation of the slope in the 1996 report. Visual estimates of the slope are commonly exaggerated by a factor of two or more due to human perceptions associated with slopes. The licensee's current estimate is consistent with the "Characterization of Radioactive Slags" Draft Letter Report (Ref 3 p.7).

2. The subsurface source of radioactive slag is not as homogeneously distributed as has been assumed in the assessment.

Response

We agree that the radiological slag is not homogenous. However, this should not effect the overall conclusion because the scenario used in the dose analysis (i.e., resident gardener) assumes average exposure conditions.

3. The Split-spoon technique used for subsurface characterization would be unable to sample the larger blocks of radioactive slag that are known to be buried at the site. Furthermore, no test borings are made along the slope of the slag pile where the larger blocks of radioactive slag are known to have been dumped. Both factors appear to have reduced the radioactive slag source term for dose assessments. Based on these factors, trenching on the slope of the slag pile may be required for accurate characterization.

Response

We agree that split-spoon technique used for subsurface characterization would be unable to sample the larger blocks of radioactive slag. However, since the staff has opted to use the resident gardener scenario, which is a very conservative, credible, bounding scenario, the detection of large blocks of radioactive slag is not critical. Because the resident gardener scenario depends on shallow concentration and increased concentrations at depth are not a significant source of dose. The slope area gamma exposure measurements are consistent with gamma measurements made elsewhere. In addition, while the staff's resident gardener scenario gives a low dose value of 20 mRem/yr, an argument can be made that a light industrial scenario is the most realistic scenario because this area is historically industrial. This scenario is further supported by the fact that, per the May 14, 2001 letter to Theodore Smith of the NRC, St. Joseph Medical Center is planning to build a new hospital in the vicinity of the Cabot site. In the likelihood that St. Joseph Medical Center constructs a hospital and its associated infrastructure (e.g. roads, parking lots and doctors offices), such land use would preclude the resident gardener scenario well into the foreseeable future. Therefore, the conservative nature of the analysis does not necessitate further refinement of sampling techniques to accurately assess future dose.

4. Recent limited measurements of the gamma exposure levels by PADEP personnel significantly exceed the results by the licensee and its contractors.

Response

The staff has addressed the licensee exposure rate measurements in its evaluation of the radiological assessment. In Ref 4 (page 4-5) the staff derived an equation to calculate the dose associated with various exposure times and fitted the data with a regression analysis. This analysis uses an approximate exposure rate of 45 microRem/hr. However, the staff used a lower occupancy time, due to the bounding scenario chosen.

5. As a result of these lower reported surface gamma exposure levels, the licensee's contractor has reduced the reported measurements of near-surface contamination levels by over a factor of 2 for the dose assessment calculations.

Response

Given the uncertainty associated with any dose assessment (because of the long time frames), the staff considers a factor of 3 or 4 uncertainty to be reasonable. However, we believe that our dose analysis still bounds the potential effects at the site based upon the conservative nature of the assumed exposure scenario.

6. Parameters used for some of the dose assessments may not be adequately conservative, given the uncertainty in the characterization of the source term.

Response

The concerns raised by Sandia National Laboratories (SNL) regarding the various parameters were considered in the staff's dose assessment of the site (Ref 2) as shown below:

- a) For their radiological assessment, the licensee assumed a plant mass loading value of $1 \times 10^{-4} \text{ g/m}^3$. This value was derived by Argonne National Laboratory to represent transportable particles (i.e., primarily dust particles) at sites undergoing farming activities. Given that the radioactivity at the Cabot-Reading site is primarily contained in slag, which is not expected to be very transportable, the NRC staff consider the use of a $1 \times 10^{-4} \text{ g/m}^3$ mass factor to be conservative.
 - b) Although the garden area assumed in the licensee's assessment only represents about 20% of the available area on the top of the slag pile, the NRC considers it to be somewhat bounding based on national data on home vegetable gardens.
 - c) NRC's independently derived consumption rates (i.e., 5.1 kg/y for leafy vegetables and 25.6 kg/y for non-leafy vegetables) were essentially the same as the values derived by the licensee.
 - d) The NRC's own independent dose assessment did not assume that only two consumers were using the site and still obtained a dose less than 25 mrem/y (i.e., 20 mrem/y).
7. Scenarios that may be realistic over the 1000-year assessment time frame and could result in doses above the NRC's criteria for unrestricted use have not been considered.

Response

It is the staff's position that the resident gardener scenario is the bounding scenario due to the nature of the site (i.e., the slope of the pile, its width and the nature of the material). A resident living in a trailer on the slag pile is not considered credible given the serious hazard that this would pose. An excavation scenario was also evaluated by the licensee and concluded that it would not result in a greater exposure. As pointed out in our response to question 3, the resident gardener scenario conservatively bounds the future use of the site. Even though the resident gardener scenario has provided a dose less than 25 mRem/yr, it would appear that the most appropriate scenario would be the light industrial scenario given the fact that St. Joseph hospital is planning to build a hospital in vicinity of Cabot site.

References:

1. "Radiological Assessment for the Reading Slag Pile Site", Revision 1, March 2000, ST Environmental Professionals Inc.
2. "Characterization Report for the Reading Slag Pile", Revision 1, April 1996, NES, Inc.
3. "Characterization of Radioactive Slags" March 2000, Draft Report Prepared by Johns Hopkins Univ., et.al.,
4. "Technical Assistance Regarding the Radiological Assessment for the Cabot-Reading Pennsylvania Site", Draft, March 8, 2002, NRC (Mark Thaggard).

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cc: Robert Meiers, PADEP

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