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ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

September 30, 1994

Mr. Dean Chaney
U. S. Nuclear Regulatory Commission
Region IV, Walnut Creek Office
1450 Maria Lane
Suite 210
Walnut Creek, CA 94596-5368

SUBJECT: DOCUMENT REVIEW—SVA DECOMMISSIONING PROJECT, PHASE II FINAL SURVEY REPORT, GENERAL ATOMICS, JULY 1994 (DOCKET NO. 70-734)

Dear Mr. Chaney:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) has reviewed the subject document and offers the attached comments for your consideration. If you have any questions or comments please contact me at (615) 576-0065 or Jack Beck at (615) 576-5031.

Sincerely,

Wade C. Adams

Wade C. Adams
Health Physicist/Project Leader
Environmental Survey and
Site Assessment Program

WCA:rde

Enclosure

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DOCUMENT REVIEW
SVA DECOMMISSIONING PROJECT
PHASE II
FINAL SURVEY REPORT
(DOCKET NO. 50-734)

General Comments

1. It is not clear from the report whether there will be any clean waste to be released, for which ESSAP is expected to perform confirmatory surveys?

2. The figures are presented in meters and the text often refers to depths in feet. To enable direct comparison to guidelines which are in metric units, and for document consistency, the use of metric units would be preferable.

3. What is the depth of the trenches from which confirmatory soil samples will be collected? This information is necessary for determining whether or not the trenches may be classified as confined spaces and will require special health and safety considerations.

Specific Comments

1. Page 3-7: Were direct measurements performed on the pile caps that were cut off at 10 feet below the surface?

2. Page 3-7: Because 30% of the total linear feet of the trenches were backfilled, will ESSAP be required to perform soil sampling down to the original depth, and, if so, will SVA be able to provide ESSAP with the actual or approximate depths of the original trenches? Does SVA have archived samples from these backfilled areas that ESSAP may select for confirmatory analyses? ESSAP is also interested in where the backfill material originated and if the material was sampled and analyzed before being used as fill material?

3. Pages 3-7 and 3-9: Trichloroethylene (TCE) is a suspected carcinogen and, depending on concentration levels in the soil, can be considered a possible exposure hazard. ESSAP requests that data be provided on the TCE levels in the soil so that ESSAP may evaluate the necessity for personal protective equipment or special handling of samples. If agreed upon, since the radiological data from this area has indicated that there has been no radiological contamination, ESSAP recommends that a typical percentage of 10% of soil samples previously collected from this area by the licensee be provided to ESSAP for confirmatory analyses.

4. Page 4-4, Table 4-1:

   (a) Provide an explanation for the wide alpha efficiency range of 10 to 25% for the same type of detectors.

(b) ESSAP questions the appropriateness of using the described floor monitor to demonstrate compliance with contamination guidelines which are applied to an area of not more than 100 cm^2. The following example is given on page 4-7:

Floor Monitor, α Activity

$$100\ cpm\ x\ 1/4.34^{(1)}\ x\ 1/0.25^{(2)} = 92\ dpm/100\ cm^2$$

(1) Correction for geometry (instrument has a 434 cm^2 area).

(2) Correction for efficiency (detector has a typical alpha efficiency of 25%).

ESSAP contends that the activity of small areas of contamination, i.e., areas less than 100 cm^2, may be underestimated by using the floor monitor to perform these measurements. For example, if the contamination within the above example was within a 100 cm^2 area the result would be as follows:

$$100\ cpm\ x\ 100\ cm^2/100\ cm^2\ x\ 1/0.25 = 400\ dpm/100\ cm^2$$

Therefore, for the first calculation, the actual surface contamination level would be underestimated due to the "overaveraging" effect of the large area detector. ESSAP recognizes that gross radiation levels may not approach guideline levels; however, the calculational model used by the licensee may not reflect the conditions at the site or demonstrate compliance with guidelines. The same would also hold true for beta measurements.

(c) Provide an explanation for the wide range of GM detector backgrounds, which are 40 to 100 counts per minute (cpm). Was the appropriate background subtracted for the various surface materials encountered during the final-status survey? Perhaps an explanation would be that different surfaces have different backgrounds, such as brick walls and sheetrock; were these type of differences accounted for during the final survey data calculations prior to release of materials as either clean or radiological waste?

5. Page 4-6 and 4-7: It is stated that the Ludlum Model 239-1F floor monitor has a detection sensitivity of $\leq 25\%$ of the release guidelines. The example calculation also states the efficiency as 25%; however, this efficiency was determined by static measurements. The equations used do not include any factor to account for probe movement. Was scanning used to demonstrate compliance with surface activity guidelines? Please explain the rationale for using the static measurement efficiency for determining that contamination levels were above background when the detector was in motion.

6. Page 4-8: Provide an explanation that describes how using NaI(Tl) detectors wrapped in 1/4 inch of lead to reduce background is capable of determining soil contamination at guideline levels.

7. Page 4-10: Twenty cpm of alpha activity for a background measurement on concrete seems rather high, especially when Table 4-1 lists typical backgrounds for alpha activity as 0 cpm. Does SVA have actual background measurement data for unaffected surfaces? Different surfaces have different natural backgrounds associated with the material from which it is made, i.e., a higher background is typically associated with red brick than for asphalt or concrete. Were different backgrounds taken into consideration during the dismantlement of the building?

8. Page 5-1: Should ESSAP obtain a sample from General Atomics and confirm the U-234:U-235 ratio of 30:1?

9. Page 5-2, Table 5-1: Change "External dose limit" to "External exposure rate limit".

10. Page 5-3, Table 5-2, footnote 1: The footnote should state that samples were analyzed by gamma spectrometry and not gamma scanned for 1 hour. Also provide an example calculation for determining the 2 σ error when calculating the mean.

11. Page 5-6: Explain how a NaI(Tl) detector count rate of greater than 50,000 cpm, used during scanning activities, indicates more than 0.5 grams of U-235 per linear foot of pipe.

12. Page 5-10: In the discussion of sample preparation, no mention was made of whether the samples were allowed to reach secular equilibrium. Please specify the rationale for secular equilibrium use (refer to Table 6-1, page 6-9) and for using Ac-228 to represent the amount of Th-232 in soil; and Pb-212 and Tl-208 to represent the amount of Th-228 in soil. Also, Tl-208 has a branching ratio of 36%; was this accounted for in the averaging of the Th-228 concentration?

13. Page 6-3 and Page 6-9, Table 6-1 and subsequent tables: Provide an explanation for reporting only the U-235 soil concentration for soil sample results. The guidelines are stated as 30 pCi/g for enriched uranium and the ratio of U-234:U-235 was reported as 30:1 (page 5-1). It is recommended that total uranium results be reported. Furthermore, the sample labeled as Survey #S11-93-01 (page 6-9), which has a U-235 concentration of 26.56 pCi/g, would have a total uranium concentration of approximately 800 pCi/g, which would be well above the 30 pCi/g guideline level for enriched uranium. Perhaps it could be stated that a working limit of 1 pCi/g for U-235 and the gamma spectrometry method provides a conservative estimate for the total uranium concentration in soil.

14. Page 6-3, last paragraph: The estimated detection limit for thorium is stated as < 1.5 pCi/g; shouldn't this be stated separately for Th-232 and Th-228, since both are quantified using different progeny, for which each of the progeny would have individual estimated detection limits?

15. Page 6-9, Table 6-1 and subsequent tables): The units for the data should be reported or presented in the column headings.

16. Page 6-64, Table 6-3: Survey #S01-94-374 has a standard deviation for the thorium concentration which is high compared to other samples; please explain.

17. Page 6-17, Table 6-8: the title of the table is "Samples Above Release Criteria"; however, most of the sample results are below release criteria. Please explain.