

DOCKET NO: 040-00017

LICENSE NO: STB-527

LICENSEE: THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

SUBJECT: SAFETY EVALUATION REPORT, LICENSE AMENDMENT REQUEST DATED OCTOBER 12, 1993, WITH SUPPLEMENTS DATED DECEMBER 6, 1995, MARCH 11, 1996, AND MARCH 31, 1997, RE: FINAL SURVEY PLAN FOR DECOMMISSIONING OF MAGNESIUM-THORIUM SLAG STORAGE SITES AT MIDLAND AND BAY CITY, MICHIGAN

1. INTRODUCTION

The Dow Chemical Company's (Dow) thorium slag storage sites are listed in the U.S. Nuclear Regulatory Commission's "Action Plan to Ensure Timely Remediation of Sites Listed in the Site Decommissioning Management Plan" (SDMP Action Plan)(57 FR 13389-92) as Midland and Bay City, Michigan. Dow submitted its plan for the final survey of these sites by letters dated October 12, 1993; December 6, 1995; March 11, 1996; and March 31, 1997; and has requested that its license be amended to approve the final survey plan.

Dow has been decommissioning its thorium slag storage sites under a decommissioning plan approved by NRC on July 19, 1996. The removal project involves the excavation and transport (by truck) of the thorium-contaminated material from the Midland facility to the Bay City facility. The thorium-contaminated material from both facilities is being transported by rail for disposal at the Envirocare of Utah, Inc., low-level radioactive waste disposal facility.

2. SAFETY EVALUATION

The final survey project will be conducted under Dow's approved radiation safety program for decommissioning. The staff has reviewed the licensee's established radiation safety program and found that it is acceptable for use during the final survey, in accordance with the requirements contained in 10 CFR 20.1101(a) and (b).

3. DESIGN OF THE FINAL SURVEY

NRC's guidance for the design of final surveys for open land areas is contained in NUREG/CR-5849, entitled, "Manual for Conducting Radiological Surveys in Support of License Termination." The NUREG/CR-5849 design provides for four separate samples in each 10-m-by-10-m (33-ft-by-33-ft) grid square. Taking more than one separate sample from a grid square allows for the use of a hot-spot averaging criterion where concentrations above the release criteria are allowed if the elevated readings are confined to a localized area within the grid square.

The maximum area (A) of a hot spot in a 100 m^2 (1080 ft^2) area is defined by how many times (x) above the release criteria the concentration in the hot spot is.

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$$x = (100 \text{ m}^2/A)^{1/2} \text{ or } A = 100 \text{ m}^2/x^2.$$

Dow has proposed a final survey design different than that in NUREG/CR-5849. Dow's proposal is to take nine samples in each grid square (each sample representing an area of 11.1 m^2 (120 ft^2) or 100 m^2 (1080 ft^2)/9) and composite them into one sample that will represent that grid square. The total thorium concentration for each composite sample is then compared with the unrestricted release criterion evaluated in the environmental assessment for this license amendment.

NRC guidance in NUREG/CR-5849 suggests that any elevated soil contamination areas within a grid square should be no more than 3 times the release criteria. Because the licensee is compositing the samples from each grid square, there is the potential, because of sample dilution, that an area with elevated residual activity, more than 3 times the release criteria, could exist within the grid square, and the grid square composite sample could still pass the release criteria.

To avoid the possibility that any individual sample could have a concentration more than 3 times the release criteria, the licensee will perform an integrated gamma reading at each of the individual sampling locations before collection of the sample. Gamma scanning is appropriate with thorium-232 because its daughter product, actinium-228, yields a high gamma abundance when it decays. If the integrated gamma count rate is more than 3 times the relative background at the sample location, additional soil is removed until the gamma scan shows that the sample location is less than 3 times background. After the hot spot is removed, a soil sample is collected from that location and composited with the other eight individual samples from the grid square.

4. GENERAL CONCLUSIONS

The staff reviewed Dow's proposed final survey plan for the Midland and Bay City sites to ensure that it can be carried out in accordance with NRC regulations and the as low as is reasonably achievable principle. The proposed methods for performing the final survey are adequately described in the licensee's submittals. The techniques and equipment described have been successfully applied to final surveys of other contaminated sites and are acceptable to NRC.

The staff recommends that condition 12 of the license be amended to delete the current surface contamination guideline for trucks, to approve and reference Dow's plans for the final survey, and to approve the proposed release criteria (evaluated in the environmental assessment for this action). Therefore, the staff recommends that condition 12 of Dow's license number STB-527 be amended to read:

CONDITION 12.A. The Dow Chemical Company shall conduct the final survey of the Midland and Bay City sites in accordance with the final survey plans submitted by letters dated October 12, 1993; December 6, 1995; March 11, 1996; and March 31, 1997.

CONDITION 12.B. The Dow Chemical Company shall use the release criteria for surfaces and soil established in submittal of March 11, 1996.

The staff concludes that with these conditions, the license amendment approving Dow's final survey plan and release criteria for the magnesium-thorium storage sites can be issued without undue risk to workers, the public, or the environment, and that the amendment meets the requirements for approval described in 10 CFR 40.32.