

30 NOV 1989

RICHARD E. CUNNINGHAM

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MEMORANDUM FOR: Richard E. Cunningham, Director  
 Division of Industrial and  
 Medical Nuclear Safety, NMSS

FROM: Richard L. Bangart, Director  
 Division of Low-Level Waste Management  
 and Decommissioning, NMSS

SUBJECT: CORE LABORATORIES' SEPTEMBER 15, 1989, REQUEST TO  
 REGION IV FOR PERMISSION TO DISPOSE OF CONTAMINATED SOIL

Per your request of October 6, 1989, on the above cited subject, presented below is our analysis and recommended approval conditions for Core Laboratories to dispose of drilling mud contaminated with scandium-46 in a mud pit.

LLWM developed the following criteria for onsite disposal of fracturing sands labelled with radioactive tracers. These criteria are meant to ensure proper control of the contaminated material. They should ensure that during the control period, allowing for radioactive decay, the material will not be unintentionally excavated and spread to the environment or misused by individuals, and that there is adequate protection of usable water resources. Although not fracturing sands, the contaminated soil at the UNOCAL drilling site--Core Laboratories provided a tracer service for the fracturing operation--contains similar radioactive tracer materials. LLWM staff considers the criteria for frac sand disposal appropriate and applicable for disposal of this material.

The general criteria are as follows:

1. The radioactive tracer must be limited to iridium-192, scandium-46, gold-198, and antimony-124.
2. The total activity and concentration must be less than 4.0 millicuries and 550 pCi/gram, respectively.
3. The cover thickness must be greater than 1.2 meters.
4. The distance to groundwater must be greater than 3.0 meters.
5. The distance to nearest residence, potable water well or irrigation well must be greater than 200 meters.

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6. A documented radiation survey, during and after disposal must be maintained to ensure the absence of contamination.
7. A written agreement must be documented between the licensee and the landowner or well operator prior to disposal, if the licensee and the landowner or well operator are not of the same company.
8. Administrative controls for a two-year period (if the direct gamma dose exceeds the 1 mrem per day criteria) must be documented to ensure post-burial control by the landowner or well operator. Access should be limited by posted signs indicating that no excavation is to be conducted within the area during the two-year period and that the landowner or well operator should be contacted, if necessary. If the direct gamma dose is less than 1 mrem per day, administrative controls should be imposed for a one-year period.
9. A record of disposal operations must be maintained, including a description of radioactive materials involved, half-lives, quantities and kinds of such materials.
10. All state and local requirements must be met before disposing of contaminated sands.

On October 30, 1989 Core Laboratories supplied additional information on the material to be disposed, details of the proposed disposal operation and made commitments requested by LLWM staff. Core Laboratories' submittal states that (1) the total activity in the pile is 0.588 millicuries or less of scandium-46; (2) the volume of the contaminated soil pile was estimated to be 720 cubic feet at 100 pounds per cubic foot; (3) the highest concentration of the six soil samples analyzed was 18 picocuries per gram; (4) the reserve pit on site is about 100 feet x 60 feet x 12 feet deep, the site is on top of a mesa and the bottom of the pit remained dry after it was dug, and that the water table is believed to be greater than 10 feet below the bottom of the pit; (5) a pit depth of 7 feet will be considered for placement of contamination-free soil; (6) a cover thickness greater than 4 feet (1.2 meters) will be used for contaminated soil; (7) the site is located several miles from the nearest residential or business water supply; (8) a radiation survey will be conducted over the pit area, the area where the soil had been stored, the area between, and adjacent areas to ensure that radiation levels are within 10 micro roentgens per hour above background levels; (9) a report of the procedures and results of the final radiation survey will be submitted to Region IV; and (10) administrative controls will be imposed over the pit area for a one-year period, including the posting of a sign to prevent excavation.

In summary, Core Laboratories wants permission to bury a small amount of soil (720 cubic feet (20.4 cubic meters)) contaminated with scandium-46. The amount (0.588 millicuries) and concentration (18 pCi/gram) of scandium-46 are well below the LLWM criteria above. The calculated direct gamma dose for soil contaminated with 18 pCi/gram is less than 1 mrem per day and therefore, the one-year administrative control period, proposed by Core Laboratories is acceptable.



Core Laboratories does not provide confirmation for the assertion in item number 4 above that the bottom of the pit remained dry after it was dug, and therefore, the water table is believed to be greater than 10 feet (3 meters) below the bottom of the pit. Core Laboratories should confirm the assertion that the water table is greater than 10 feet (3 meters) below the bottom of the pit.

Core Laboratories has met all but two of the proposed criteria: (1) assurance that all state and local requirements have been met; (2) providing a written agreement between Core Laboratories and the landowner prior to disposal since the operator is UNOCAL and the land is owned by the Bureau of Land Management--Department of the Interior. If these remaining conditions are addressed in a satisfactory manner, in addition to the commitments made in their October 30, 1989 submittal, and confirmation is provided that the water table is greater than 10 feet (3 meters) below the bottom of the pit, we recommend that Core Laboratories be allowed to dispose of the contaminated material as they have proposed.

This action has been coordinated with Charles Cain (R-IV) and Bruce Carrico of your staff. The review was conducted by Yvonne Young of my staff who may be reached by phone on extension 23445.

(SIGNED) RICHARD L. BANGART

Richard L. Bangart, Director  
Division of Low-Level Waste Management  
and Decommissioning, NMSS

(LLWM 89-105)

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ABSTRACT: CORE LABORATORIES' SEPTEMBER 15, 1989 REQUEST TO REGION IV FOR PERMISSION TO DISPOSE OF CONTAMINATED SOIL

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