

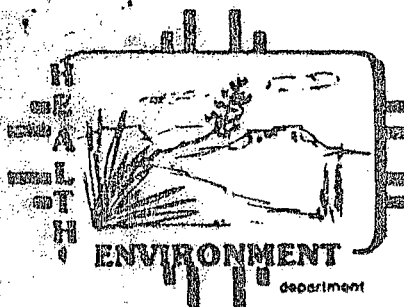
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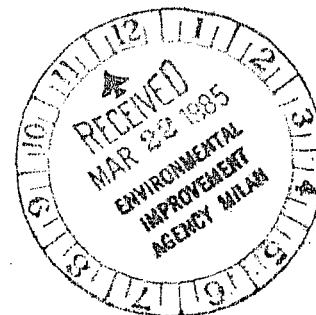
MEMORANDUM

TO: Felix Miera, Program Manager
Uranium Licensing Section

FROM: JM Jere Millard, Radiation Specialist
Radiation Protection Bureau

DATE: March 14, 1985

SUBJECT: Johnny M. Mine Site Reclamation



This memo evaluates the effectiveness of completed reclamation activities undertaken at the Johnny M. Mine Site and presents recommendations for further action.

Attachment 1. shows the location of eight soil samples taken at both the north and south vent holes used during the licensed backfilling operation by Ranchers Exploration and Development Corporation. The following composite soil samples were taken to evaluate the radiological content of background soil materials used for cover and the cover materials themselves. External exposure rate readings at one meter from the ground surface were also taken at each composite soil sample location.

SAMPLE NUMBER	uR/h	DESCRIPTION
North Vent Hole		
1.	30	Native Mancos Shale
2.	900	Soil from Non-Licensed Area
3.	19	Native Mancos Shale
4.	13	Native Sandstone
5.	380	Cover Material
South Vent Hole		
6.	14	Native Mancos Shale
7.	14	Soil From Borrow Pit
8.	470	Cover Material

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Attachments 2 and 3 summarize the gross alpha, gross beta and specific radionuclide concentrations in the eight soil samples collected. This data confirms that reclamation efforts to date have not been successful in isolating remaining backfill materials. Samples of cover materials (#5, 8) showed relatively high concentrations of radionuclides but were depleted in U-238 and U-234. Sample #2 from the non-licensed area also showed relatively high concentrations but depleted uranium. All three samples clearly show the presence of exposed backfill materials. Attachment 4, showing a gamma spectrum from samples #1 and #2, clearly demonstrates the differences in the levels of activity and the depleted uranium in sample #2 for peaks at 320 Kev and 460 Kev, when compared to a standard pitchblend sample which has all U-238 decay chain nuclides in secular equilibrium.

It has been previously stated that "the acquisition of cover materials from adjacent borrow material zones undoubtedly generated the elevated levels of radioactivity at the storage areas" (memo from Sam Simpson to Felix Miera, January 24, 1984). However, samples from background soils used for cover materials #1, 3, 6, and 7) showed concentrations from 1-3 pCi/g for all radionuclides. Sample #4 from a nearby sandstone formation also had relatively low concentrations of radionuclides (4-5 pCi/g). Therefore, it is clear that the use of these earthen materials for cover, could not have resulted in the observed elevated gamma exposure rates at both licensed areas following reclamation.

External exposure rate data presented in the Johnny M. Mine Termination report, shows no significant change in mean uR/h levels through three separate phases of reclamation at the North Vent Hole. The mean level was 158 uR/h following the initial step by Ranchers when "all backfill material and debris were removed from the areas by loading and scraping." This level greatly exceeded the agreed upon target of 25 uR/h in accordance with the ALARA principle (Simpson to Miera memo, page 2 - reclamation standards provided to Ranchers). At the South Vent Hole, there was a significant increase in mean external exposure levels from the initial (47 uR/h) to final cleanup (183 uR/h). Since cover materials are very low in radionuclide concentrations and backfill materials have been found at the surface of both licensed areas, it must be assumed that the original backfill materials were never adequately removed or isolated. In addition, exposed backfill materials were left in non-licensed areas despite their close proximity to licensed areas.

The existing reclamation is inadequate in protecting the environment through the spread of radioactive contaminants and there currently exists a potential for excessive exposure to ionizing radiations as referenced to the 500 mrem/y whole-body standard (ICRP II, 10 CFR 20).

Additional on site reclamation may be feasible, however there is a great erosion potential at both sites and there is little additional cover material available nearby to successfully stabilize radioactive materials. It should be determined whether or not it is feasible to place any remaining

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materials in the mine shaft on site.

If on site reclamation is not feasible, then contaminated materials should be removed to another location. Only two possible sites exist for this approach, the existing Quivira Mining Company tailings pile where these materials originated and the soon to be stabilized Ambrosia Lake inactive pile. If no monies are available from Ranchers then the Ranchers site may qualify as an EPA Superfund site. However, since both sites are currently licensed, they may be excluded from Superfund.

Since, past EID Staff did knowingly allow, approve and participate in the Ranchers reclamation activities, the present legal status of our position and therefore our constraints in pursuing additional reclamation on the part of the licensee must be evaluated. Before termination of the Ranchers radioactive materials license, the anticipated use and potential access by members of the general public must also be evaluated. Land use could be a controlling factor in determining the degree of stabilization or removal of licensed radioactive materials needed to adequately protect the public health. The ALARA principle must also be factored into final reclamation with potential land use in mind.

JM/cvg

encs.

cc. Ken Hargis, Chief, Radiation Protection Bureau
[redacted] Environmental Scientist, Milan Field Office