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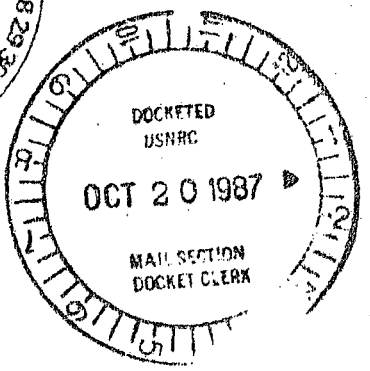
Hecla Mining Company

October 16, 1987



CERTIFIED MAIL --
RETURN RECEIPT REQUESTED

Mr. Harry J. Pettengill
U.S. Nuclear Regulatory Commission, Region IV
Uranium Recovery Field Office
P.O. Box 25325
Denver, Colorado 80225

RE: Johnny M Mine Work Plan

Dear Mr. Pettengill:

We are enclosing a document entitled "Work Plan for Site Surveys and Cleanup" with respect to the Johnny M Mine in McKinley County, New Mexico, pursuant to our agreement with you at our September 15 meeting at your offices. Performance of these tasks in a timely manner is subject to weather conditions and reasonable access. We are currently negotiating with attorneys representing the landowners of the property between N.M. state road 55-334 and the mine site for a right-of-way easement.

Please direct your response to Ms. Colleen D. Kelley, Senior Environmental Engineer, at Hecla's Coeur d'Alene office.

Yours truly,

HECLA MINING COMPANY

By _____
Harry M. Lane, Attorney

HML:ldr
Enclosure

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WORK PLAN FOR SITE SURVEYS AND CLEANUP
JOHNNY M MINE
HECLA MINING COMPANY

October 17, 1987

In accordance with commitments made during the meeting of September 15, 1987, between Hecla Mining Company and the USNRC concerning the Johnny M Mine site, this work plan has been prepared for review and approval by the NRC prior to its implementation by Hecla. The work plan covers the three activities or issues addressed by the commitment, namely:

A) A survey to delineate the areal extent and depth of soil contamination at the Johnny M tailings storage areas.

B) The methodology for determination of background radium levels in soil, including locations of background samples, to be used in the survey.

C) Candidate cleanup methods or approaches and post cleanup verification survey methodology.

Hecla personnel and consultants inspected the site on October 2, and both visual observations and gamma readings were made to delineate the areas around the north and south tailings storage locations that should be surveyed. Based on this information as well as the results of previous surveys and soil tests, the following work plans are proposed.

SITE SURVEY AND SOIL TESTING PLAN

This plan responds to commitments A and B. It consists of several sequential tasks which will follow standard protocols to produce completely documented, traceable, and reproducible results.

The first task will be a land survey to set up ground control for gamma measurements and soil sampling.

The next task will be determination of background gamma radiation and sampling for background soil Ra 226 tests.

The third task will be the gamma survey and soil sampling to delineate the extent of tailings contamination.

Land Survey

To perform the first task a licensed surveyor will survey and stake the ground control necessary to locate all gamma measurement and soil sampling points. Control and turning points will be set at permanent features or benchmarks so that the same control system can be used during cleanup activities and verification surveys. The surveyor will prepare a base map of the control system and survey grid.

Background Survey

The background survey will consist of gamma radiation measurements and sampling/testing of Mancos shale outcrops and natural soil around the storage areas. In the north area 10 background readings will be taken in the basal portions of the canyon walls, in the Mancos shale that also underlies the canyon floor. Radiological survey personnel will select locations for these background measurements that are removed or sheltered from tailings shine and that are otherwise undisturbed. Five soil samples will be collected from background gamma measurement locations and tested for moisture and concentrations of Ra 226, Th 234 and/or Unat, in accordance with the procedures of NUREG/CR 2954, to determine natural disequilibrium ratios in the background soils. The samples will be selected to represent the range of gamma readings found at the 10 background locations. The statistical means and standard deviations of all values (gamma, Ra 226 concentrations, and disequilibrium ratios) will be calculated and used to set the background values for the area.

As a related effort, samples of ore at ground surface around the site might also be sampled and tested to identify the gamma, Ra 226, and natural disequilibrium of the ore for use in distinguishing residual ore from tailings. Sampling and testing for natural disequilibrium will be necessary only if those distinctions become relevant.

In the south area background gamma measurements and soil sampling/testing will be performed in a similar manner. Ten locations of known natural materials, such as the bench cut and the basal portion of the mesa slope where the Mancos shale crops out, will be selected for gamma readings. Samples will be taken from half (five) of these locations for testing as described above.

All background locations will be marked by a stake, measured and plotted with respect to the survey grid. Field compass bearings and measured distances will relate the background locations to the survey grid and control points.

Contamination Survey

The areas to be surveyed for contamination include and extend beyond the limits of the two tailings storage areas, as delineated in Figure 1. The north area covers the canyon floor north of a line extending due west of the south edge of the quonset building, approximately 200-250 feet north of the section 7/18 boundary (see Figure 1). The south area extends from the foot of the mesa on the east, near the south vent hole, west to the fence line, and from the bench cut along the arroyo on the south to the east-west alignment of the power line on the north. For the entire north area a 100 foot square grid will be used for the gamma survey, and for the south area a 100 foot grid will extend over the entire area as described above and shown on Figure 1. A 16-line radial survey pattern will be centered on the middle of and extend from the outer limits of the 100 foot square grid in the south storage area.

Gamma measurements will be made at every node point in the 100 foot square grids and at 100 foot intervals along the radial patterns beyond the square grid in the south area. Each radial will be extended until two consecutive readings are within one standard deviation of the mean background gamma level for the south area. Using the procedure developed by the Bendix Corporation for the U.S. Department of Energy, these measurements will be correlated to soil radium concentrations to permit the gamma survey to delineate the areas requiring remediation.

At not fewer than 10 grid nodes in both storage areas, soil samples will be collected by bucket auger at 15 cm intervals to at least three feet depth. Sample locations will be selected by gamma survey personnel to represent the range of gamma readings obtained in each area. All samples will be split and approximately 20% of the splits will be sent to a second laboratory for quality assurance check against the results of the primary lab, which will test the first split of all samples for moisture, Ra 226 and Th 234 and/or Unat. Other properties such as ph could be useful in identifying tailings and might be tested, as well.

Statistical analyses of gamma measurements and soil test data will be performed to determine the means and standard deviations of the several parameters. If necessary, the ratios of Ra 226 to Th 234 or to Unat in background soil, and, if needed, in ore, will be calculated to compare with those of the tailings. These ratios will be the primary analytical means of distinguishing between tailings, natural soil, and ore. Therefore, both the means and the standard deviations of these ratios will be important. The most important relationship will be the correlation between radium concentration and gamma radiation. Regression analyses of these two parameters will provide the basis for delineating the areas and depths of soils requiring remediation as well as verification of adequate cleanup after remediation.

Methodologies

The gamma measurements will be made by Dr. Lyda Hersloff of REM using a micoR meter as described in the attached Field Gamma Survey Standard Operating Procedure. Sampling of soil, tailings, and ore will be in accordance with the attached Soil Sampling Standard Operating Procedure. The samples will be obtained by a contractor experienced in this type of work who will be under the supervision of either Dr. Hersloff or Dr. Alan Kuhn.

CANDIDATE CLEANUP METHODS

This portion of the plan responds to commitment C concerning identification of candidate cleanup methods. Possible cleanup methods can be divided into two categories - stabilization in place or removal to a licensed facility offsite.

Both the technical feasibility and cost of a cleanup method are heavily impacted by the quantity of tailings material that exceeds the allowable radium concentration limit. Therefore, until the surveys and soil testing are completed, Hecla cannot estimate the quantities closely enough to compare the candidate methods or to discuss their relative merits. The following descriptions of candidate methods are accordingly general.

Removal to Offsite Facility

Five licensed tailings disposal impoundments are located within 60 miles of the Johnny M Mine. However, only one is in operation at this time. Assuming that one or more of them would be willing to accept the Johnny M tailings and contaminated soil on reasonable terms, Hecla would excavate the contaminated materials delineated by the survey and truck them to the receiving facility.

Stabilization on Site

In terms of technical feasibility, the contaminated material can be stabilized in place regardless of quantity. Given the nature and history of the materials involved, Appendix A on its face provides some flexibility in defining and achieving regulatory compliance, making on-site stabilization a potentially reasonable and viable option. In light of this, three stabilization methods should be explored:

1. Stabilization In Place - In utilizing this method, the contaminated materials would remain where they are now and would be covered by soil. The soil cover would be designed to restrict radon emissions to acceptable levels and would be shaped and protected as necessary to resist erosion.

2. Concentration and Stabilization - If the contaminated soils are thinly distributed over a relatively large area, the preferred method could be movement of the material to one or two concentrated fill locations on the site. A fill location would be selected to minimize both risk of erosion and amount of soil and rock cover required for long-term stabilization.

3. Backfilling into Mine - Depending upon the volume of materials requiring cleanup, disposal of tailings through the site's north vent hole may be a feasible option. The accessible void in the mine needs to be evaluated to determine the quantity of tailings which could be placed.

If stabilization on site is used, Hecla will conduct field and laboratory investigations to characterize potential cover materials and their relevant properties. The stabilization design would consider protection against excess radon emissions and against erosion of the cover for events up to and including runoff from the one-hour PMP in the area.

Verification Survey

Regardless of the cleanup method selected, a gamma survey will be performed after cleanup to verify that the site conforms to requirements for radium levels attributable to tailings. The survey will be conducted over the same grid, with measurements taken at the same node points where excessive gamma readings (indicating excessive radium) were recorded in the contamination survey. No additional soil sampling will occur. Radium concentrations will be determined from the gamma-Ra 226 correlations established previously for delineation of the areas requiring cleanup. If the verification survey finds spots of residual contamination in excess of permissible limits, these spots will be delineated by gamma readings on a 30 foot square grid centered on the original node point and extending to the limit of excess gamma readings. After the necessary additional cleanup has been completed on such spots, another set of gamma measurements will be taken on the 30 foot grid to verify adequate cleanup.