License No. SMB-179
Docket No. 04000672
MLER-RI - 91-201

NUCLEAR METALS, INC.

October 3, 1991

Mr. John Kinneman
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Ms. Rodene De Rice
Massachusetts Department of
Environmental Protection
Metropolitan Boston - Northeast Region
5 Commonwealth Avenue
Woburn, MA 01801

Mr. Bradford S. Leach, Health Officer
Town of Concord
Board of Health
133 Keyes Road
Concord, MA 01742

Reference: NRC License No. SMB-179
Docket No. 040-00672
DEP Case No. 3-295

Subject: Remediation of Banking

To the Addressees:

This letter provides additional information relating to the discovery of a black powder on the surface of a banking southeast of our buildings and within our property boundary. Further to the east of the discovery site is a large accumulation of trash. An access pathway to facilitate removal of the trash accumulation was in preparation when a black powdery material was discovered beneath the leafmold and pine needles that covered the sand and gravel of the banking. The material appeared to be a carbon-based powder such as coke or coal dust or powdered graphite and was slightly radioactive, some four to five times natural background. Work was stopped, the area was secured and you were notified. Radiation measurements taken on the surface of the ground on a one foot grid reveal an area some 10 feet by 60 feet to be above background. Samples of the black material were taken from several locations in ways to minimize cross-contamination with soil or vegetation and dried for analysis.

Moisture content averaged 50 percent. X-ray diffraction analysis revealed the crystalline pattern of graphite, a chemically inert form of carbon.

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REG1 LIC40
SMB-0179 CF

2229 Main Street, Concord, Massachusetts 01742 (508) 369-5410

Chemical analysis for metals showed the following percent by weight on a natural moisture basis:

Potassium	0.098 w/o
Copper	0.106 w/o
Nickel	0.037 w/o
Iron	1.33 w/o
Beryllium	0.08 w/o
Molybdenum	0.003 w/o
Titanium	0.02 w/o
Zirconium	0.0005 w/o
Uranium	2.07 w/o
Water	50 w/o

Chemical analysis for non-metals showed the following:

Carbon	36.4 w/o
Sulfer	0.5 w/o
Nitrogen	0.25 w/o
Oxygen	5.0 w/o

The balance of the sample weight, about 4.1 w/o, is believed to be soil constituents such as silica and feldspar.

The radiation spectrum of active species within the sample was also determined. Cesium-137 and Thorium -228 were observed in quantities typical of local soil background concentrations - about one to two picocuries per gram of dried sample. The U-235 to U-238 ratio was characteristic of natural uranium.

The removal technique we have developed begins with use of a water hose with a fogging nozzle to generate a fine mist-like spray, which will be used to thoroughly dampen and saturate the surface layers of vegetation, graphite powder, underlying sand and gravel, after which it will be safe to remove by the raking and packaging technique defined in the attached work plan. The work plan would be run for one day, then we would stop until data from personal air monitors and environmental air monitors was evaluated and found acceptable, otherwise the work plan would be modified as needed. After removal, the site will be resampled and evaluated for residual uranium and beryllium concentration against an acceptable residual level of 0.05 w/o, then covered with bark mulch to restore a natural appearance to the area.

Interviews with long-term employees have led to the conclusion that the material most probably came from a graphite machining operation terminated in the mid 1960's. Prior to that time, graphite block was machined into shapes useful in foundry operations: crucibles, pour cups, and molds. The resulting graphite powder was as chemically inert as sand and may have been discarded on the banking for that reason. It is possible that some touch-up machining of parts already used could explain the beryllium and uranium found with the graphite.

Should you have additional questions, please contact the undersigned.

Sincerely,

Alden R. Gilman
V.P., Health/Safety

ARG/dw

1 October 1991

PLAN FOR REMOVAL OF GRAPHITE

1. SITE PREPARATION

- o INSTALL HAY BALES (STAKED) AND SILTATION FENCE AT FOOT OF SLOPE WHERE REMEDIATION WORK WILL TAKE PLACE.

2. HEALTH/SAFETY

ALL WORK IS TO BE DONE UNDER THE CONDITIONS SET FORTH BY HEALTH/SAFETY TO PROTECT WORKERS

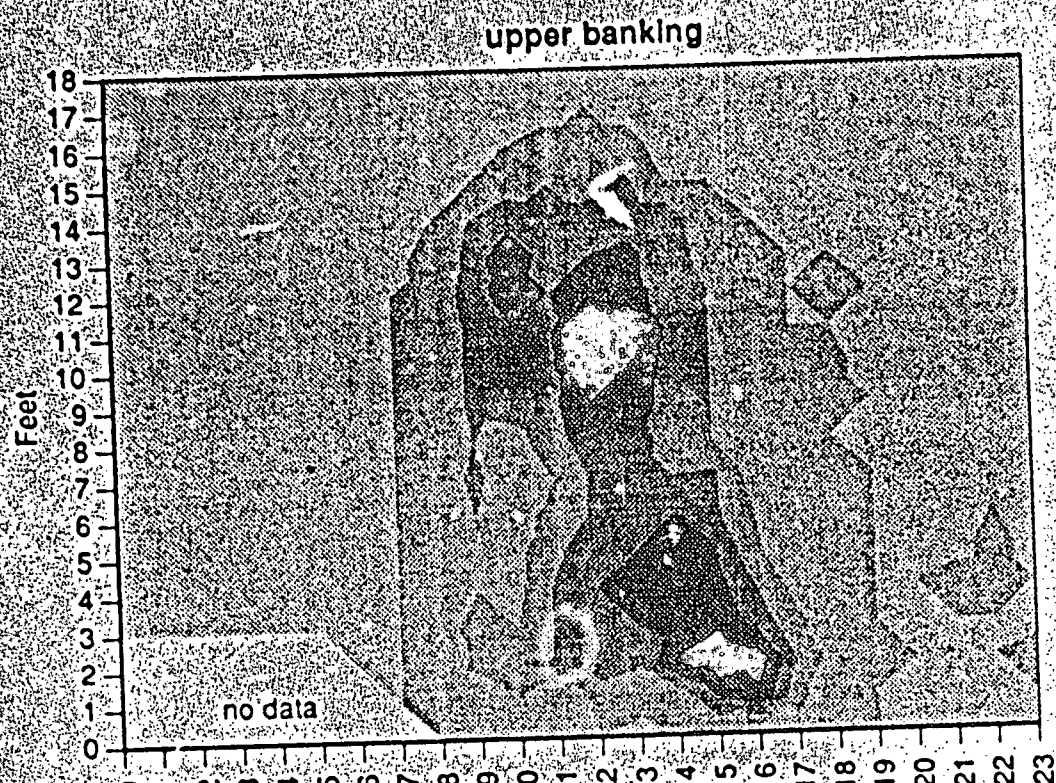
3. OVERBURDEN REMOVAL

- o MOISTEN GROUND TO BE WORKED - THOROUGHLY DAMPEN BUT DO NOT SOAK
- o START AT TOP OF BANKING - FOLLOW GRID SURVEY OF AREA
- o USE LIGHT LEAF RAKE TO REMOVE APPROXIMATELY 30 YEARS OF PINE NEEDLES AND LEAVES COVERING THE GRAPHITE
  NOTE: THIS CAN ONLY BE DONE IN AREAS WITH UNDISTURBED SOIL COVER
- o PACK IN HEAVY DUTY PLASTIC BAGS
- o IDENTIFY LOCATION ON GRID WHERE EACH BAG CAME FROM
- o STABILIZE EXCAVATED SLOPE WITH THIN LAYER OF HAY IF NECESSARY TO PREVENT WASH IF WORK UNDER (4) CANNOT IMMEDIATELY FOLLOW

4. GRAPHITE LAYER REMOVAL

- o MOISTEN GROUND TO BE WORKED - THOROUGHLY DAMPEN BUT DO NOT SOAK
- o REMOVE ANY TEMPORARY STABILIZATION COVER
- o START AT TOP OF BANK - FOLLOW GRID SURVEY OF AREA
- o USE GARDEN RAKE AND SHOVEL
- o RAKE GRAPHITE LAYER INTO SMALL PILES
- o USE SHOVEL TO SCOOP UP PILES
- o PLACE DIRT INTO 55 GALLON DRUMS, PLASTIC LINED. IF MORE CONVENIENT TO WORKING CONDITIONS, USE 5 GALLON PAILS AND TRANSFER MATERIAL TO 55 GALLON DRUMS NEARBY
- o STABILIZE EXCAVATED SLOPE WITH THIN LAYER OF HAY IF NECESSARY TO PREVENT WAST UNTIL FINAL SURVEY OF AREA IS COMPLETE

LAND SURVEY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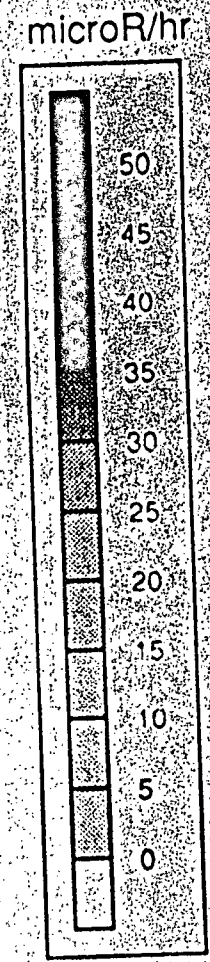
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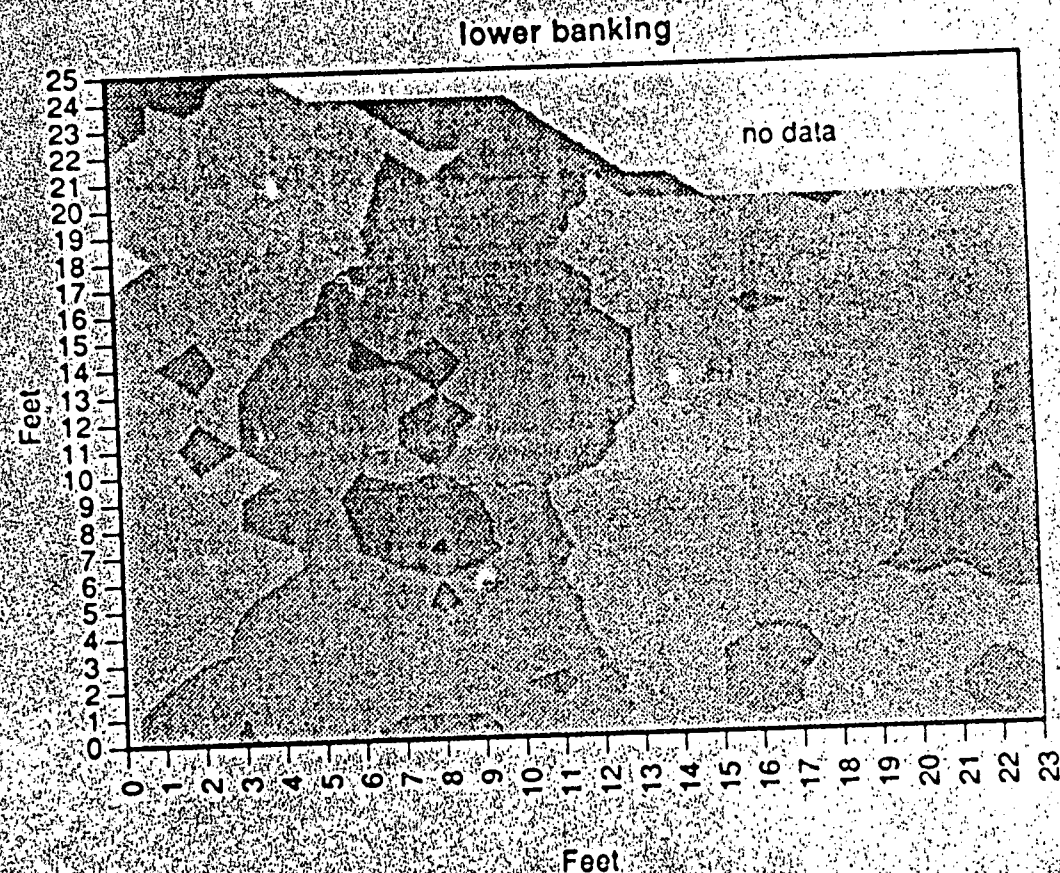
lower banking
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0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Feet

REGION I

NMSS LICENSEE EVENT REPORT

License No. SMB-179

Docket No. 040-00672

MLER-RI-91 201

I. ACTION CONTROL DATA

Licensee Nuclear Metals, Inc.

Event Description R/M found in unrestricted area

Event Date 10-3-91 Report Date 10-11-91

II. REPORTING REQUIREMENT

[ ] 10 CFR 20.402 - theft or loss

[ ] 10 CFR 20.403(a)(b) overexposure/release

[ ] 10 CFR 20.405 - 30 day report

[✓] Other None

[ ] 10 CFR 35.33 Therapeutic Misadministration

[ ] 10 CFR 35.33 Diagnostic Misadministration

[ ] License Condition

III. REGION I RESPONSE

[ ] Immediate Site Inspection Inspector _____ Date _____

[ ] Special Inspection Inspector _____ Date _____

[ ] Telephone Inquiry Inspector _____ Date _____

Licensee Representative and Title _____

[ ] PN [ ] Daily Report

[ ] Information entered - Region I log and Outstanding Items List

[✓] Review at next routine inspection

IV. REPORT EVALUATION

[✓] Description of Event

[✓] Levels of R/M involved

[✓] Cause of Event

[✓] Corrective Actions

[✓] Calculation Adequate

[ ] Letter to Licensee requesting additional information

Completed by: [signature] Date 11-25-91

Reviewed by: [signature] Date 12-3-91

V. SPECIAL INSTRUCTIONS OR COMMENTS

Copy given to J Kinneman