NUCLEAR METALS, INC.

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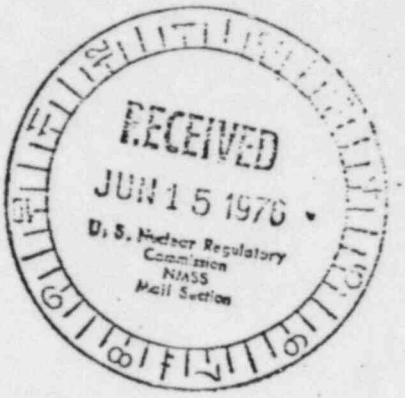
REGISTERED MAIL

June 9, 1976



U.S. Nuclear Regulatory Commission
Division of Fuel Cycle and Material Safety
Washington, D.C. 20555

Attention: Ms. Kitty S. Dragonette
Materials Branch

Subject: License No. SMB-179
Docket No. 40-672

Gentlemen:

In response to requests for additional information contained in your letter of November 11, 1975, we submit the following:

1. Ventilation equipment systems: Nuclear Metals, Inc. has been working over the years to maintain inplant exposures to airborne uranium particulates at as low a level as practicable. This ongoing program of evaluation of ventilation system effectiveness includes review of equipment, filtration, and operational parameters, including reviews with our consultants to assure full utilization of current engineering and process capability. Concentration limits as stated in 10CFR20 are not used as design limits.

Criteria for use and ongoing evaluation of a ventilation system are based on engineering and technical reviews, followed by actual measurements for such operations as are judged likely to release concentrations of airborne radioactive materials. Air samples exist in each area where uranium is processed. Need for new ventilation systems or additions or modifications to existing systems is a continuing evaluation during reviews of air concentration data. Investigation of ventilation system effectiveness occurs on findings of inplant air concentrations in excess of 10% of the concentrations stated in 10CFR20.

2. Specification of radiation safety responsibilities and duties:

a) Director of Industrial Safety and Radiation Safety Officer - answers to Company President, establishes policy, maintains regulations in current status, reviews measurements and data, e.g., film badge, air sample and survey data, performs final inspection and sign-off on shipments, coordinates services provided by consultants, initiates action items as needed.

b) Safety Engineer - answers to Director of Industrial Safety. Maintains records and logs of inspections, tests, and surveys, performs or directs per-

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formance of surveys and inspections, including film badge and air sample collection. Monitors operations for safe performance, supervises program for radioactive waste disposal, inspects ventilation equipment.

c) Consultants:

(i) Radiation Safety Consultant - reviews air sample data (effluent, inplant, and breathing zone) as well as surface smear (wipe test) sample data. Meets with Director of Industrial Safety and Company President as needed to review all aspects of radiation safety program, conducts impromptu tests and inspections on-site. Assists in preparation and review of training aids and safety manual.

(ii) Radiation Measurement Consultants - perform analysis of samples collected relative to radiological safety program.

(iii) Survey Equipment Consultant - recommends equipment acquisitions, performs equipment maintenance and repair, as well as periodic equipment calibration.

(iv) Ventilation Consultant - reviews operation of existing ventilation equipment, evaluates measurements of ventilation equipment parameters, performs calibrations. Assists in design of new ventilation systems or modifications to existing systems.

(v) Medical Consultant - interviews and examines employees. Reviews medical aspects of radiation safety program with Director of Industrial Safety and Company President as needed.

(vi) Safety Program Consultant - reviews Company safety program. Works with Company fire brigade. Assists in training of Company fire brigade relative to emergency situations involving radioactive materials.

The program of radiation safety is a major part of the overall NMI safety program. Operation of the overall program is the subject of periodic review by the NMI Management Committee, a group composed of the Company President and the managers of each department.

3. Restricted Areas and Change Areas: Restricted areas are established around specific operations to enhance assurance of safety by reason of access control. A physical barrier is established around the area and placarded. A monitoring station exists at each restricted area, and survey meters are located at egress points. If judged necessary as part of control over the spread of particulate contamination, a change area may be established contiguous with a restricted

area, and personnel provided with protective clothing to be worn while inside the processing area and left behind on exit. Control over change areas and processing areas includes issue of procedural documents and training sessions.

4. Personnel Safety Equipment: Operating personnel wear Company-issue clothing which is cleaned by a laundry licensed to handle contaminated clothing. Additionally, other protective clothing includes lab coats, rubbers, shoe covers, and gloves. Lab coats are worn when practicable, but are not permitted in such operations as lathe work because of the hazard with rotating machinery. Plastic shoe covers, industrial rubbers, or a special pair of safety shoes are worn in restricted areas. Use of gloves is encouraged for any operation involving the handling of uranium to limit dosage to the hands, but is not made mandatory since the potential for dropping the object or for getting the hand caught in machinery may actually be greater for gloved hands than for bare hands.

Protective clothing is available as follows: in the work areas, by issue from the Company stockroom, or issue from the office of the Safety Engineer. Potentially contaminated clothing is monitored by the user of the clothing and monitored at random by the Safety Engineer or his assistants during each month.

5. Records Management: Formal records are kept for all aspects of the radiation safety program and are reviewed by the RSO and consultants on a regular basis. Both log books and the individual reports or records are also reviewed by compliance inspectors during their visits.

6. Training Program: Attached to this letter are three copies of a document establishing policy and procedures for personnel involved with source materials. New employees receive initial orientation from the Safety Engineer and the Foreman of the department. Additionally, quarterly safety lectures for all workers with source materials focus on safe handling practices with radioactive materials. Demonstrations of the use of monitoring equipment and discussions of the extent of the safety program also occur at these meetings.

7. Survey Program: Survey instruments owned by the Company at the time of writing include:

3 alpha survey meters
1 alpha gas proportional survey meter
7 beta-gamma survey meters
3 beta-gamma count rate meters
3 ionization chamber survey meters

Usual location of use:

Employees' entrance/exit -- 1 beta-gamma count rate meter
Foundry change room -- 1 beta-gamma survey meter
Machine shop -- 1 beta-gamma survey meter
Grinding room -- 1 beta-gamma survey meter
Shipping/Receiving -- 1 alpha survey meter
1 beta-gamma survey meter
Mezzanine -- 1 beta-gamma survey meter
Safety Office -- 2 alpha survey meters
1 alpha gas proportional survey meter
2 beta-gamma survey meters
2 beta-gamma count rate meters
3 ionization chamber survey meters

To correct an apparent misunderstanding relative to thorium-containing materials, the license request was for 90% thorium minimum. We plan to operate under the same philosophy of control when working with thorium as for depleted uranium.

Relative to action levels for surface contamination control as revealed by the survey program, we have established an action level at 50% of the stated guide values on supplemental sheet No. 8 of our license renewal application, at which point definitive investigation and imposition of corrective action would occur. Our limits for fixed and removable contamination are a reflection of our experience, though we agree that storage areas do not require the same limits as processing areas and we have therefore established new limits for storage areas at 25% of the limits for processing areas.

8. Storage Areas: Storage areas for as-received and in-process materials are within buildings; as-received in a warehouse adjacent to the plant and in-process within the plant. Scrap destined for land burial is stored in an outdoor, fenced enclosure behind the plant.

Plant security provisions include a watchman on duty at all non-working hours, periodic tours of building and grounds, usage of door alarms, and frequent telephone contact with local police.

Storage areas are delineated by roping off an area or marking area outlines on the floor, and are posted in accordance with 10CFR 20.203(e)(2). Source materials within storage areas are covered or contained in such ways as to minimize the potential for particulate contamination. For example, use is made of drums, pails, the original shipping container, and sheet plastic covers or overwraps. At present no intentionally placed shielding materials are employed

within storage areas, though of course both self shielding and shielding by containment occur. Dose rates adjacent to storage areas are such that an enclosure type shield is not necessary. Storage areas are surveyed and inspected to assure proper positioning of area demarcation, and surveyed for particulate contamination and external radiation dose rates with the same frequency as for processing areas.

9. Assay Procedures: Smear samples and filter discs from air samples are counted in AC operated proportional counting systems calibrated by use of standards traceable to the National Bureau of Standards. Both gross alpha (for uranium) and beta (for the daughter product) are evaluated.

10. Dosimetry Program: The Landauer service we now use consists of three types of evaluation:

a) whole body dose is evaluated by a "Gardray 8 beta-gamma film badge", data therefrom being designated as "G1" data by Landauer;

b) skin dose is evaluated by a second measurement made on the same badge and designated as "G2" data by Landauer;

c) dosage to the hands is evaluated by a "Special TLD Badge" and designated as "X3" data.

This last item is the same TLD chip normally placed within a ring or bracelet, but in this case supplied by Landauer, heat sealed within a protective plastic overwrap with identification inside to avoid possibility of loss of identification such as may occur with the conventional Landauer ring badge. The device is of the order of ¼" x 3/8" and is taped to the hand by pressure sensitive tape, resulting in a lighter and less bulky assembly than a ring badge, and facilitating the putting on and taking off of gloves.

At present unalloyed thorium is not being handled in the plant. Whenever such work commences, the same dosimetry program will be used.

11. Bioassay Program: We have reviewed Regulatory Guide 8.11 with our consultants and with representatives of NEL-PIA and have concluded we are well within the "Minimum Program" per Table 2, pg. 8.11-5. Guidelines for this program are compared with our experience in the tabulation presented below:

	Avg.	Max.
Guidelines per 8.11	10%	25%
NMI experience (4th Qtr.'75)	.29%	2.5%

Nonetheless, we have concluded that we could better monitor body burden by semi-annual urinalyses, rather than annual, and will now do so. Our Supplemental Sheet No. 8, Item 9, should therefore state that urinalyses are semi-annual. We anticipate continuation of the same program as defined, were we to begin to handle significant amounts of thorium.

12. Maintenance and Repair: Routine or preventative maintenance and simple repairs are the responsibility of operating personnel, i.e., those persons normally assigned to work in the area. Significant repairs, modifications of existing equipment, or installation of new equipment, is the responsibility of our Facilities Dept. Our practices relating to operations performed by Facilities personnel include prior decontamination to levels below those stated for unrestricted areas, and periodic monitoring during the operation. Additionally, personnel involved in repair/installation activities receive semi-annual urinalyses. Of course stationary in-plant air samples are operational during any repair or equipment installation activities. Usage may also be made of the portable breathing zone air sampler should the nature of the operation suggest a potential for significant airborne contamination. Monitoring for external radiation is accomplished by personnel monitoring badges and by measurement with survey meters.

13. Liquid Effluent Discharge: The location of the sludge pit is directly behind (and therefore southeast of) the Acid Treatment Facility as shown on the attached "Plan of Buildings and Grounds". While a fence exists around the sludge pit, there is no formal control of access, since both the quantity of source material discharged to the pit and its concentration are so low. An evaluation of a 21-month period (April 1974 through December 1975) shows source material deposition in the pit to have averaged 84.39 grams per month (or 30.38 micro-curies, since only depleted uranium was involved). The concentration of source material in the effluent over this time period averaged 1% of 10CFR20 Appendix B limits. The maximum concentration was 7.5% of the limit.

The waste is generated by treatment of metallic uranium with nitric acid:

$$U + HNO_3 \longrightarrow UO_2(NO_3) + NO_2 + H_2$$

The waste is then treated with an excess of hydrated lime to precipitate insoluble uranium dioxide:

$$Ca(OH)_2 + UO_2(NO_3) \longrightarrow UO_2 + Ca(NO_3)_2 + H_2O$$

These equations have not been balanced chemically, they simply indicate reactants

and reaction products.

The purpose of the nitric acid treatment is removal of sacrificial jacketing or cladding of steel or copper that accompanies the extrusion of uranium billets, but some of the uranium also goes into solution.

14. Treatment of Fines: In no way was this section of the application intended to imply that any separate incineration process was part of the preparation of scrap for disposal; no wastes are disposed of by incineration.

The reference to oxidation was in the interests of completeness: abrasive cutting or grinding generates finely divided scrap with significantly more oxygen than the starting stock because of reaction with air. In that sense the fines are partly oxidized.

15. Product Distribution: Under provisions of 10CFR 40.13(c)(5), Nuclear Metals may from time to time receive purchase orders for aircraft or missile counterweights from organizations not in themselves licensed to possess depleted uranium. As part of the final inspection and again as part of the inspection attendant to packaging, labellingand marking that precedes the certification required by 49CFR 173.430, and inspection is performed by both the Quality Control and Health/Safety functions to assure that both the labelling and source material containment criteria of this subparagraph have been complied with.

Should you have further questions, please do not hesitate to contact the undersigned.

Very truly yours,

A. R. Gilman
Director of Industrial Safety

Att.