

040-00672

NUCLEAR METALS, INC.

2229 MAIN STREET  
CONCORD MASSACHUSETTS 01742  
TELEPHONE 617 369-5410

June 30, 1978

U.S. Nuclear Regulatory Commission, Region I  
Office of Inspection and Enforcement  
631 Park Avenue  
King of Prussia, Pa. 19496

Subject: REPORT OF OVEREXPOSURE

Gentlemen:

This is a report of overexposure of the skin of the whole body to beta plus gamma radiation as required by 10CFR20.405(a)(1). This is our first experience of such an apparent overexposure during our 35 years of operations with uranium. We have completed our investigation, we have had the films re-evaluated by the film badge service, and we are filing this report based on confirmation of the film badge data as received by us on May 30, 1978.

1. Extent of Exposure:

To help assure accurate assessment of exposure, we have for some time been assigning two film badges to each foundry worker. Exposures of beta plus gamma recorded for the first quarter of 1978 for the badges worn by two foundry workers are as follows:

Badge No.	Exposure in Rems (Beta plus Gamma)			
	Jan.	Feb.	March	Total
300	4.210	1.780	2.550	8.540
301	3.770	1.480	2.070	7.320
231	4.180	2.020	3.440	9.640
278	3.020	1.670	3.500	8.190

The total gamma ray dosage for each individual was below the quarterly permissible dose of 1.25 Rems.

(1) Information required by 10CFR20.405(b) appears on a separate attachment.

9804030412 780630  
REG1 ADDSK 04000672  
CF

Information in this record was deleted  
in accordance with the Freedom of Information  
Act, exemptions  
FOIA

Status 4

IX 30

BT

June 30, 1978

U.S. Nuclear Regulatory Commission, Region I

Page -2-

2. Levels of Radiation:

Surveys have been made of the materials involved in all foundry operations with particular attention to post-melt cleanup. The highest radiation levels related to the cleaning of the crucibles. A maximum beta ray dose rate of approximately one Rem per hour was determined by radiation measurements at the operator's location relative to the open end of the crucible (the closest expected approach of the film badge). The associated gamma ray dose rate was approximately 0.020 Rem per hour.

3. Cause of Overexposure:

The source of radiation exposure, principally beta rays, results from the selective deposition of daughter products on crucible surfaces following uranium melting operations. An exposure equivalent to being in close juxtaposition to the crucibles for some eight to ten hours during the calendar quarter could produce the reported exposures.

4. Corrective Action:

We are implementing a number of corrective actions to avoid a recurrence:

- A. Reassignment of Personnel: The two individuals were transferred to non-foundry activities pending completion of our evaluation and implementation of corrective action.
- B. Early Alert: Our processor of film badges has been directed to telephone us immediately on the finding of any individual badge reading in excess of one third the limits stated in 10CFR20.101(a). This will allow prompt investigation of exposures exceeding the average permissible monthly limit.
- C. Shielded Storage: Used crucibles and covers stored within the work area are now placed inside steel containers of sufficient thickness to shield against beta radiation.

NUCLEAR METALS, INC.

June 30, 1978

U.S. Nuclear Regulatory Commission, Region 1

Page -3-

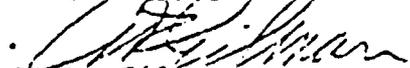
- D. Shielding during Operations: Wherever possible during the post-melting cleanup cycle, added shielding will be used to reduce the beta ray exposure to the body.
- E. Increased Supervisory Attention: The supervisors of foundry employees are placing still greater emphasis on the education of the workers and on efficient work techniques to reduce exposures.

While foundry operations certainly involve exposure to heat and the handling of heavy objects that could place pressure on the badges, our review has discovered no conclusive indication that these factors have influenced the reported exposures.

We are of the opinion the corrective actions defined above will be effective in minimizing the possibility of a recurrence. The exposures to the skin of the whole body for foundry workers during the month of April are indicative of our efforts in this regard -- the average exposure was 0.4 Rems, with a maximum of 0.67 Rems, and during the month of May the average exposure was 0.5 Rems, with a maximum of 1.2 Rems.

Please let us know if any added information is needed.

Very truly yours,

  
A. R. Gilman  
Radiation Safety Officer

Attachment (Per 10CFR20.405)(b))

CC: Director of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

NUCLEAR METALS, INC.

INFORMATION REQUIRED BY 10CFR20.405(b)

Name

SSN

DOB

Badge Nos.

(b)(6)