70-1151

PDR

Westinghouse
Electric Corporation

Nuclear Fuel Division
Manufacturing Department
Drawer R
Columbia South Carolina 29250
(803) 776 2610

May 29, 1980

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

ATTENTION: Mr. W. T. Crow, Section Leader
Uranium Process Licensing Branch

SUBJECT: Molybdenum Decontamination and Surveillance Report, License SNM-1107, Docket 70-1151

Gentlemen:

Westinghouse Electric Corporation hereby submits the attached Molybdenum Decontamination and Surveillance Report in accordance with the requirements of Annex C of SNM-1107. The report describes the decontamination technique and surveillance of approximately 1,200 pounds of molybdenum scrap which was formerly used as boats to transfer low-enriched uranium pellets through our sintering furnaces.

The molybdenum scrap is in the form of one to two pound pieces of broken molybdenum boats which have been decontaminated and subjected to 100% alpha and beta-gamma surveys. The results of this surveillance are given in the enclosure to this letter.

Survey results indicate that surface contamination levels are well below acceptable levels as defined in Annex C, Table I of SNM 1107. Consequently, Westinghouse plans to release the molybdenum as scrap for unrestricted use on or after June 30, 1980.

If you have any questions regarding this matter, please write to me at the above address or telephone me on 803 776-2610.

Very truly yours,

Edward Reitler

Edward Reitler
Fellow Engineer

ER/ff

Attachment

cc: USNRC Office of Inspection and Enforcement, Region II

FEE EXEMPT
info only
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ENCLOSURE TO TRANSMITTAL OF MAY 29, 1980

SNM-1107, DOCKET 70-1151

MOLYBDENUM DECONTAMINATION AND SURVEILLANCE REPORT

IDENTIFICATION

The material consists of approximately 900 pieces of molybdenum, each piece weighing from approximately one to two pounds. The molybdenum originally consisted of boats used to transport low-enriched uranium pellets through our reduction furnaces. During routine operations, boats become damaged or broken and must be scrapped. When this occurs, the boats are broken into smaller pieces to facilitate decontamination and surveillance.

DECONTAMINATION TECHNIQUE

Uranium contamination of the molybdenum was restricted to the exterior surfaces; consequently, an electro-chemical process was chosen as the most efficient method of contamination removal to reduce uranium levels to As-Low-As-Reasonably-Achievable. The technique involved complete immersion of the molybdenum pieces in an electrolytic bath containing a strategically located cathode. The passage of electric current resulted in a progressive smoothing of the surfaces and the removal of a thin layer of surface material. Following this treatment, the material was thoroughly rinsed, dried, and surveyed to determine decontamination effectiveness.

SURVEILLANCE PROCEDURE

Each piece of molybdenum was thoroughly surveyed for total direct alpha and total direct beta-gamma on all surfaces, front, back and edges. Removable alpha contamination surveys were performed for those pieces which exceeded 400 dpm/100 cm^2 total direct alpha and/or 1,000 dpm/100 cm^2 total direct beta-gamma.

Special precautions were taken to assure that all surfaces of the molybdenum were accessible to the detector probes. This resulted in essentially flat pieces of molybdenum with minimal surface cracks or crevices.

For total direct alpha surveys, the folloiwng instruments were used: Eberline PAC 4G with an AC-21 alpha probe and Eberline RM-19 with an AC-3 alpha probe. For total direct beta-gamma surveys, an Eberline E-120 with an HP-210 probe was used. Surveys were performed by slowly scanning all surfaces of the molybdenum at a scanning speed of approximately 1 cm/sec. When contamination was detected, the probe was held stationary until equilibrium was attained. This method provided a high degree of confidence that no contamination was undetected. Instruments were calibrated with appropriate alpha and beta check sources and checked periodically during the surveillance to assure operability.

Removable contamination surveys were performed by wiping the surface of the molybdenum with a Whatman 41 filter paper using moderate pressure and counting with either of the alpha instruments described above.

SURVEILLANCE FINDINGS

For each piece of molybdenum, the following information was recorded: (1) average alpha results per piece (dpm/100 cm^2), (2) maximum alpha results per piece (dpm/100 cm^2), (3) average beta-gamma results per piece (dpm/100 cm^2), and (4) maximum beta-gamma results per piece (dpm/100 cm^2). Summary data are presented below:

	Total Alpha (dpm/100 cm^2)		Total Beta-Gamma (dpm/100 cm^2)	
	Average	Maximum	Average	Maximum
Range	Bkgd - 800	Bkgd - 1,000	Bkgd - 2,250	Bkgd - 3,750
Average	240	400	750	1,200

Removable contamination surveys were performed for those pieces exceeding 400 dpm/100 cm^2 total alpha and/or 1,000 dpm/100 cm^2 beta-gamma. The average for those pieces surveyed was 68 dpm/100 cm^2, with a maximum of 160 dpm/100 cm^2 alpha.

Gamma measurements were performed with a Victoreen 444 portable ionization chamber. Based upon comparison data, it was concluded that the beta-gamma results as measured by the Eberline E-120 with the HP-210 probe were the limiting factor. For example, a beta-gamma reading of approximately 10,000 dpm/100 cm^2 on the HP-210 probe corresponded to approximately 0.2 mr/hr on the Victoreen 444 with an unshielded window (less than 3 mg/cm^2 window). As shown above, the maximum beta-gamma result was 2,500 dpm/100 cm^2. Spot check measurements with the Victoreen 444 indicated no results above background; i.e., less than 0.1 mr/hr.

Detailed survey data are available for each piece of molybdenum, consisting of survey results, date of survey, signature of the surveyor and a certification that the surveillance was performed in accordance with the above procedure. This information will be retained indefinitely for your review.

For both alpha and beta-gamma, survey results are well below Annex C, Table I acceptable levels. Consequently, we feel that the molybdenum decontamination meets the As-Low-As-Reasonably-Achievable philosophy.

The off-site shipment of the molybdenum shall meet all applicable federal and state regulations.

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