



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Radiological Health
3rd Floor, L & C Annex, 401 Church Street
Nashville, TN 37243-1532
Phone: 615-532-0360, Fax: 615-532-7938

November 16, 1999

Paul Lohaus, Director
Nuclear Regulatory Commission
Office of State Programs (03H20)
One White Flint North
11555 Rockville Pike, 3rd Floor
Rockville, MD 20852

Dear Mr. Lohaus:

Enclosed please find copies of the March 1999 and subsequent amendments and the referenced backup material for Tennessee Radioactive Material Licenses R-01078-L00 and S-01046-L00 issued to Manufacturing Sciences Corporation. The information submitted contains no proprietary material, as you requested.

The amendments to authorize the unrestricted release of decontaminated nickel were issued as part of an ongoing series of licensing actions dating back to about 1990. Throughout the last 9 years MSC has been performing licensed research and development activities on various materials to demonstrate the effectiveness of the decontamination process. During this timeframe the R&D has moved from the lab to the plant floor by way of additional amendments. Much of the process detail is contained in the referenced backup material for those amendments, most if not all of which is proprietary.

Please let us know if we can be of further assistance.

Sincerely,

A handwritten signature in cursive script, appearing to read "Eddie".

Lawrence E. Nanney
Acting Director

LEN:jhg

Enclosure

99 NOV 17 AM 10:53

OSP



A BNFL Inc. Company

The Metals Recycling Specialists

December 8, 1998

Attention: Mr. Johnny Graves
Tennessee Division of Radiological Health
3rd Floor, L & C Annex
401 Church Street
Nashville, Tennessee 37243-1532

Gentlemen:

It is requested that License R-01078-L00 be amended to allow MSC to conduct decontamination and unrestricted release operations of DOE volumetric contaminated nickel metal. Unrestricted release of decontaminated nickel metal from MSC will be based on currently accepted *removable* surface contamination release criterion with an additional volumetric contamination release criteria for ⁹⁹Tc of *an average of 3 Bq/g (180 dpm beta/g or 81 pCi/g) in a single shipment of nickel not to exceed 20 tons and with no single ingot in the shipment to exceed 6 Bq/g (360 dpm/g or 162 pCi/g)*. The release criteria for uranium (inclusive of ²³⁴U, ²³⁵U, and ²³⁸U, all of which are considered in total) will be an average of *0.3 Bq/g (18 dpm/g or 8.1 pCi/g) in a single shipment of nickel not to exceed 20 tons and with no single ingot in the shipment to exceed 0.6 Bq/g (36 dpm alpha/g or 16.2 pCi/g)*.

Releaseability with regard to ⁹⁹Tc will be demonstrated via beta particle assay. With regard to uranium, releaseability will be demonstrated via alpha particle assay.

SNM license quantity limits will require isotopic determinations, but will not have any bearing on unrestricted release. Unrestricted release with regard to uranium is based on alpha activity in total as in *Regulatory Guide 1.86*.

Due to the nature of the nickel contamination and the methods necessary for decontamination, MSC is requesting the above volumetric release criterion be established. This criterion will assure that the risk in using this metal in consumer products is in the range of other "safe" products as demonstrated in the attached risk assessment. This risk assessment demonstrates that under the requested release criteria, the risk of cancer to the most exposed individual is less than $\sim 10^{-6}$. Shipments will not be larger than 20 tons. This volumetric unrestricted release criterion is additional to standard accepted removable surface contamination unrestricted release criteria.

Experiments to date indicate that the MSC procedure is capable of producing an ingot of nickel that contains approximately 3 Bq/g or less of ^{99}Tc and levels uranium at less than 0.3 Bq/g each. There is full expectation that the production units will perform as well as, if not better than, the experimental full-scale units in regard to the decontamination of technetium. Decontamination of the uranium is not expected to present any difficulty at this level. See the attached example of nickel unrestricted release documentation for more detail on unrestricted release information.

The *Sampling and Analysis Plan for Nickel Recycle* attached along with its referenced MSC Instructions and Instruction Guides documents MSC's plan for sampling and analyzing the nickel to ensure that it meets all release criteria. It is presented along with the A&A report, "*Risk Analysis: Nickel Contaminated with ^{99}Tc and Uranium.*" These documents provide the technical information needed to support MSC's request for a state license amendment for unrestricted release of recycled nickel with very low levels of volumetric contamination.

Sincerely,


Bobby A. Adcock, RSO Manufacturing Sciences Corporation

Enclosures:

Sampling and Analysis Plan for Nickel Recycle

MSC Work Instruction: Unrestricted Release Survey of Materials

MSC Work Instruction: Unrestricted Release Calculations

MSC Work Instruction: Laboratory Analysis of Nickel for Technetium-99 and Uranium Utilizing Liquid Scintillation PDA Methods (draft)

MSC Work Instruction: Volumetric Sampling of Refined Nickel (draft)

Risk Analysis: Nickel Contaminated with ⁹⁹Tc and Uranium