

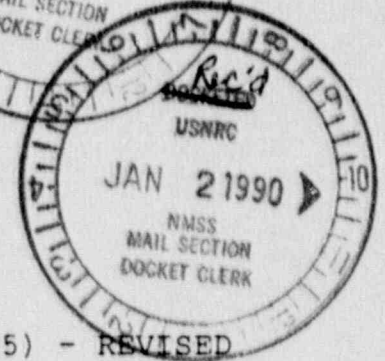
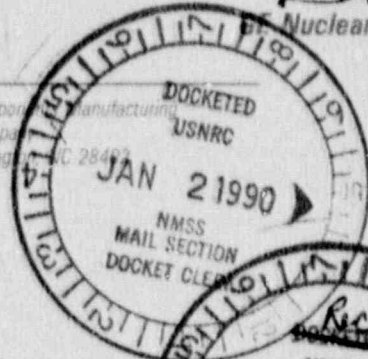


RETURN TO 396-SS ^{PI-37}

70-1113
PDR
Nuclear Energy

Nuclear Fuel & Components Manufacturing
General Electric Company
P.O. Box 780, Wilmington, DE 19880
819 675-5000

December 20, 1989



Mr. L. C. Rouse, Chief
Fuel Cycle Safety Branch
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Rouse:

Subject: LICENSE AMENDMENT REQUEST (REVISION #25) - REVISED

References: 1) NRC License SNM-1097, Docket #70-1113
2) License Amendment Request dtd October 27, 1989

GE Nuclear Fuel and Components Manufacturing hereby resubmits License Amendment Request (Revision # 25), originally dated 10/27/89, to include additional information that will clarify our submittal per your request. This request is to authorize the transfer of quantities of industrial waste treatment products (primarily calcium fluoride) for beneficial reuse without continuing NRC controls. This material contains low level amounts of uranium less than 30 picocuries per gram (pCi/gm) on a dry weight basis and will be used as a mixer with steel flux forming materials in the production of steel.

Attachment 1 of this letter describes the requested activities, the decision criteria, authorized recipient, and proposed controls.

Attachment 2 is a description of the requested revision and Attachment 3 is the revised pages to our SNM license.

Pursuant to 10 CFR 170.31, a check for \$150 was enclosed with the original submittal.

GE personnel would be pleased to discuss this matter further as you may deem necessary.

Very truly yours,

GE NUCLEAR ENERGY

SA Mallitt for
T. Preston Winslow, Manager
Licensing & Nuclear Materials Management

Attachments

cc: Region II - S. D. Ebnetter

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ATTACHMENT 1

PURPOSE

GE is reviewing methods for recycling materials that are now disposed of as waste. GE proposes to transfer one of these industrial waste products for beneficial reuse, having less than 30 pCi/gram on a dry weight basis, to the identified company for the manufacture of briquettes to be used in the production of steel.

REQUEST

GE hereby requests an amendment to License SNM-1097 to authorize free release to Cametco, Inc., without continuing NRC controls of calcium fluoride waste treatment products in which the concentration of uranium is less than 30 pCi/gram on a dry weight basis. We are requesting this amendment to authorize distribution of calcium fluoride to the briquette manufacturer to be mixed with other steel flux forming materials, briquetted, and further distributed to steel manufacturers in the production of steel. Chemical separation of the uranium from the waste would not be permitted.

BACKGROUND

The chemical conversion of uranium hexafluoride (UF_6) to uranium dioxide (UO_2) results in an aqueous waste containing ammonium fluoride (NH_4F) and a very low concentration of soluble uranium. This aqueous waste is treated with lime ($Ca(OH)_2$) to precipitate the fluoride ion and capture the remaining small amounts of uranium. This results in an insoluble calcium fluoride (CaF_2) precipitate.

The CaF_2 is filtered from the waste stream and the filtered liquid is pumped to the lagoons where it is discharged after processing.

The dewatered CaF_2 solids contain less than 30 pCi of uranium per gram on a dry weight basis. Currently, these solids are transported off-site to a waste burial facility for disposal as described in SNM-1097, Section 1.8.5.2.

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Attachment 1
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INTRODUCTION

The material to be shipped will be limited to calcium fluoride waste treatment products that have been dewatered and dried.

Prior to shipment, the material will be analyzed to assure that the uranium concentration limit is not exceeded. Material use by the recipient will be limited to those that preclude the chemical separation of uranium from the matrix.

The method of transportation will be a covered transport trailer.

STEEL INDUSTRY APPLICATION

Calcium fluoride is used as a fluxing agent in the steel making process. The calcium fluoride from naturally occurring ore (fluorspar) is made into briquettes by several manufacturers. The fluxed impurities in the steel making process end up as a slag for subsequent disposal. Fluorspar contains natural uranium ranging from 2 to 10 pCi/g.

The uranium concentration in calcium fluoride generated at the GE-Wilmington facility is effectively the same as the natural calcium fluoride (fluorspar) used as a fluxing agent in the manufacture of steel. GE-Wilmington's CaF_2 contains uranium in the 2-30 pCi/gram range.

DECISION CRITERIA

The environmental impact of calcium fluoride generated at the GE-Wilmington facility will not differ significantly from that generated by natural sources.

RADIOLOGICAL EVALUATION OF THE FREE RELEASE CALCIUM FLUORIDE TO STEEL-FLUXING BRIQUETTES MANUFACTURERS

The largest potential for radiation exposure due to the re-use of CaF_2 by Cametco, Inc. is in the manufacturing of the briquettes themselves. After the briquettes are manufactured the trace

quantities of uranium are encapsulated in the briquettes. The radiation doses from the manufacture and use of steel contaminated with trace amounts of uranium has been extensively evaluated in NUREG 0518 - Draft Environments Statement Concerning Proposed Rulemaking Exemption from Licensing Requirements for Smelted Alloys Containing Residual Technetium - 99 and Low-Enriched Uranium (USNRC, October 1980). This report indicates that there are no significant radiological problems for individual workers or members of the general public in the use of residually contaminated steel.

An analysis was made of the potential radiological impact of the use of CaF_2 on the workers at the Cametco facility. The data for the analysis was obtained by touring the Cametco facility and from discussions with Cametco management. The facts and assumptions for the analysis are as follows:

1. Cametco produces 1,000 tons of briquetted product per year.
2. GE shipments of CaF_2 with less than 30 pCi/g of up to 5% enriched uranium would be no more than 1000 tons per year.
3. It is assumed that GE CaF_2 would be present in the airborne dust in proportion to its mass fraction of the total Cametco briquette production.
4. For the purpose of estimating potential exposure levels, it is assumed that the average worker inhales 24 grams of dust per year. Dust levels at the Cametco facilities vary significantly through out the course of a normal work day. Workers wear a North Model 7170 Dust Respirator at their discretion. The 24 gram quantity is derived by assuming a worker inhales dust at a level just below the 10 mg/m³ silica dust limit recommended by the American Conference of Governmental Industrial Hygienists in the Threshold Limit Values and Biological Indices for 1988-89. Since there is no specific limit for CaF_2 or other briquette raw materials, the silica dust limit is commonly used as a surrogate limit for non-toxic respirable dust. An average breathing rate of 1.2 m³/hr. for 2000 hours per year is assumed.

5. A dose conversion factor of 62.5 rems/ μ Ci is derived by equating the 10 CFR 20 appendix B limit for insoluble uranium-234 of 1×10^{-10} μ Ci/ml times 1.2 m³/hr times 2,000 hours/year and equating the product with 15 rems dose to the lungs (the critical organ).

Combining these facts and assumptions the potential exposure to an individual worker can be calculated as follows:

$$24 \text{ g dust} \times \frac{1,000 \text{ t GE CaF}_2}{13,000 \text{ t of briquetted product}} \\ \times \frac{30 \text{ pCi}}{\text{g GE CaF}_2} \times \frac{\mu\text{Ci}}{10^6 \text{ pCi}} \times \frac{62.5 \text{ rems}}{\mu\text{Ci}} = 3.5 \text{ mrems}$$

A dose of 3.5 mrems per year is significantly less than the 40 CFR 190 limit of 25 mrems per year, and using a conventional risk factor of 2×10^{-4} adverse health effects per rem, corresponds to a risk level most would consider insignificant.

AUTHORIZED RECIPIENT

The following company is requested to be authorized to receive industrial waste treatment products as described in this request:

Cametco Inc.
600 Duquesne Blvd.
Pittsburgh, PA 15211

CRITERIA FOR SHIPMENT

1. Materials shall be limited to industrial waste treatment products (primarily calcium fluoride) and other homogeneous mixtures in which the uranium constituents are less than 30 picocuries per gram (dry basis).
2. The recipient shall be appraised of the typical chemical content of the materials, including uranium, and the limitations of its use and distribution.

3. Material use and distribution shall be limited to those that preclude the chemical separation of uranium from the matrix and entry of the product into the human food chain.
4. Materials shall be appropriately sampled and analyzed to assure that the shipments of CaF₂ contain less than 30 pCi/gram activity.
5. The following table summarizes actual data of samples from calcium fluoride shipped for burial.

Average Frequencies of pCi/g in CaF₂
(Based on Data from 1989)

Range pCi/g	Number of Data Points <u>Wet Basis</u>	Number of Data Points <u>Dry Basis*</u>	Number of Data Points Dry Basis <u>(Worst Case)**</u>
0-5	85	74	67
6-10	1	9	11
11-15	4	3	5
16-30	0	3	3
> 30	<u>0</u>	<u>1***</u>	<u>4***</u>
	90	90	90

*This material contains an average of 47.03% solids with a one sigma of 4.66.

**Conversion to dry basis at an average of 47.03% solids minus two times sigma.

***These cases would not be shipped to the vendor.

CONCLUSION

Disposal of low activity concentrations of the industrial waste treatment products (primarily CaF₂) by this alternative means will not pose an undue risk to the public health and safety.

This beneficial use of this material will have no adverse effects on members of the public or the environment. In addition, there will be a positive environmental impact from this approach because the calcium fluoride will be beneficially used instead of buried in a landfill.

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ATTACHMENT 2

DESCRIPTION OF REVISIONS

<u>Page(s)</u>	<u>Section</u>	<u>Description</u>
8		Changed to reflect current page application date for this amendment request. Changes are noted with an asterisk.
I-1.20	1.8.12	Revised condition to authorize the transfer of calcium fluoride to a vendor for briquette manufacturing and use as a steel flux forming material in the production of steel.

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December 20, 1989
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ATTACHMENT 3

REVISION #25

DATED 12/20/89

TO NRC LICENSE SNM-1097, DOCKET # 70-1113

1.8.12 Transfer of Calcium Fluoride (CaF₂) To Vendors for Beneficial Reuse

Authorization to transfer quantities of industrial waste treatment products (primarily CaF₂) to Cametco, Inc., Pittsburgh, PA, for the purpose of briquette manufacturing and use as a steel flux forming material in the production of steel as described in NF&CM's letter dated 12/20/89.

Measurements are made using a sample plan to provide at a 95% confidence level that the population mean for each shipment is less than 30 pCi per gram on a dry weight basis.

Activities and end use of the material will be limited to those that do not allow chemical separation of the uranium or entry of the product into the food chain.

LICENSE SNM-1397
DOCKET 70-1113

DATE 12/20/89
REVISION 25

Page
I-1.20