

# GENERAL ELECTRIC

## NUCLEAR FUEL MANUFACTURING DEPARTMENT

GENERAL ELECTRIC COMPANY - P. O. BOX 780 - WILMINGTON, NORTH CAROLINA 28402

July 1, 1985

Director  
Office of Nuclear Materials Safety & Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Mr. W. T. Crow, Section Leader  
Uranium Process Licensing Section  
M/S 396-SS

Dear Sir:

Reference: NRC License SNM-1097, Docket 70-1113

Subject: LICENSE AMENDMENT REQUEST - REVISION #9

With reference to activities authorized by NRC License SNM-1097 (reference 1), General Electric hereby requests the following:

Special authorization, pursuant to the technical position paper SECY-81-576 dated 10/5/81, to dispose of industrial waste products by burial, which contain not more than 250 pCi/gm of uranium activity, of which no more than 100 pCi/g is soluble.

The soluble and insoluble uranium concentrations in these wastes are sufficiently low to prevent the associated radioactivity from posing a threat to public health or safety using disposal Option 2. A specific example of the type of waste to be considered for disposal under Option 2 would be the calcium fluoride sludge produced as a result of the lime treatment of ammonium fluoride waste water. (See Attachment 1.)

Attachment 2 is a revised Chapter 1 of Part I of the renewal application for SNM-1097, which contains the requested authorization in paragraph 1.8.5.2.

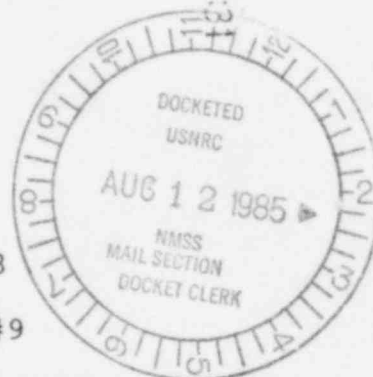
For informational purposes, the following is the status of three of GE-NFMD current projects:

- o General Electric Company, Nuclear Fuel Manufacturing Department requested and received NRC authorization in 1983 to construct a pilot plant for the Uranium Recovery from Lagoon Sludges (PURLS) project.

Construction has progressed to the point that the structure is essentially complete and the equipment is partially installed.

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However, it has been necessary to defer completion of construction of this pilot facility until 1986.

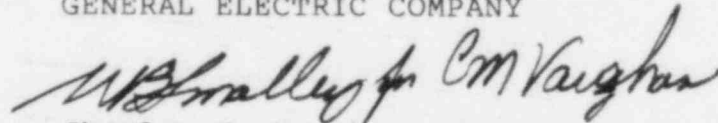
- o Concurrent with the URLS deferral, we are evaluating a desludging project for the nitrate waste lagoons. While the details and schedule for this project are not firm at present, it appears that we may need to use the URLS facility to support this work. Project startup is currently estimated to be around January 1986. We may also need to perform some pilot tests before 1986. In any event these needs will be communicated separately.
- o With regard to this current special authorization request, we expect UPMP operations (authorized by Amendments 2 and 3 to SNM-1097) and the new operations which will produce Option 2 material, to be ready for integrated pilot testing within approximately one month. Full routine operation is expected later this year.

Pursuant to 10 CFR 170.31, a GE check for \$150 for processing this amendment request will be forwarded under separate cover.

If you have any questions regarding this special authorization request, please contact me.

Very truly yours,

GENERAL ELECTRIC COMPANY



Charles M. Vaughan, Manager  
Regulatory Compliance  
M/C J26

/sbm

cc: Virgil R. Autry - South Carolina DHEC  
L. C. Martin - South Carolina DHEC

DOCKET NO. 70-1113  
CONTROL NO. 25635  
DATE OF DOC. 07/01/85  
DATE RCVD. 07/05/85  
FCUF ☒ PDR ☒  
FCAF ☐ LPDR ☐  
WM ☐ I&E REF. ☒  
WMUR ☐ SAFEGUARDS ☒  
FCTC ☐ OTHER ☐

DESCRIPTION:

Request amendment  
to their license

08/13/85 INITIAL CEC

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## ATTACHMENT 1

### DESCRIPTION OF MATERIAL FOR DISPOSITION

Conversion of uranium hexafluoride to uranium dioxide is one of the manufacturing steps used in the production of nuclear fuel at the Wilmington, N. C., facility of the General Electric Company.

The aqueous waste stream from this conversion must be chemically treated to remove impurities. The treatment process used at this facility for this waste stream is based on the addition of lime to precipitate insoluble impurities. The ammonia content of the waste stream is recycled for reuse in the conversion operation. The slurry, consisting of primarily calcium fluoride, calcium carbonate, excess lime and water, is directed to lagoons that are designed to provide for settling of the solid material. The small quantities of uranium in the waste stream precipitate and accumulate with the other settled impurities. These accumulated solids are generically referred to as calcium fluoride sludge. The aqueous supernate is discharged to the N. E. Cape Fear River after additional treatment.

The calcium fluoride sludge produced to date is stored on site with the intent of future processing to recover the uranium in the sludge.

The advent of the Uranium Process Management Project (reference Amendments 2 and 3 to SNM-1097) has resulted in the capability to produce a new generation of calcium fluoride sludge with sufficiently low uranium concentration to make further uranium recovery operations uneconomical. The anticipated uranium activity is also sufficiently low to allow consideration of disposal under the guidelines of Option 2, SECY 81-576 (i.e., less than 250 pCi/gm uranium activity, of which no more than 100 pCi/gm is soluble).

The composition of the calcium fluoride sludge would be expected to be relatively uniform and as follows:

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## Calcium Fluoride Sludge Composition\* Values in weight %

Calcium Fluoride	45
Calcium Carbonate	2.5
Calcium Hydroxide	2.5
Metals Plus Combined Ammonia & Nitrates	0.3
<hr/>	
Total Solids	50.3
Water	49.7
Total	100

\*Typical composition at 50% water content

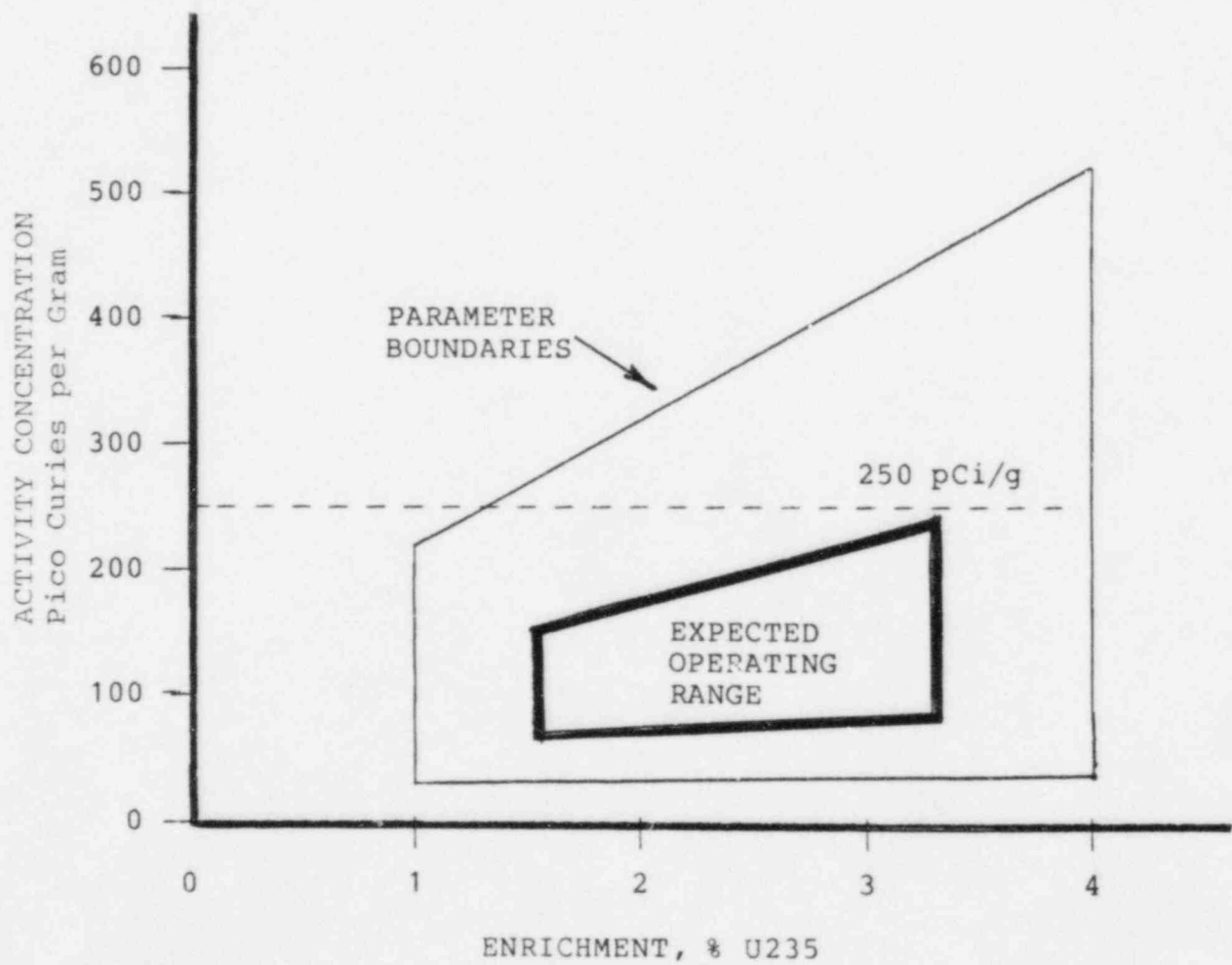
<u>Metal &amp; Combined Ammonia Nitrate Concentrations</u> (Example at 50% Water Content)	<u>Parts per Million</u> (Wet Basis)
Arsenic	< 25
Barium	< 25
Cadmium	< 5
Lead	< 5
Zinc	< 50
Chromium - Trivalent	< 5
- Hexavalent	< 5
Uranium	See Note
Silver	< 5
Nickel	8
Copper	< 5
Titanium	31
Aluminum	436
Iron	296
Manganese	8
Cobalt	< 5
Magnesium	1735
Combined Ammonia & Nitrates	408

Note: The chemical and activity concentration of the uranium in the sludge will vary as functions of the effectiveness of uranium removal from the waste water stream, the enrichment and the percent solids in the sludge after filtration. The information in Figure I

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FIGURE 1

URANIUM ACTIVITY IN  $\text{CaF}_2$  SLUDGE



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portrays the effect of the interrelationship of these variables and indicates the projected operating parameters.

The calcium fluoride sludge is not classified as a hazardous waste under Resource Conservation & Recovery Act Regulations. The pH is less than 12.5, e.g., 12.2. The EP toxicity values in the extract, when tested in accordance with 40 CFR 261.24, are:

<u>Contaminant</u>	<u>Milligrams per Liter</u>	
	<u>Maximum Allowable Concentration</u>	<u>Test Values</u>
Arsenic	5.0	< 0.05
Barium	100.0	< 0.8
Cadmium	1.0	< 0.04
Chromium	5.0	< 0.1
Lead	5.0	< 0.1
Mercury	0.2	< 0.002
Selenium	1.0	< 0.05
Silver	5.0	< 0.1

As expected, the uranium is present in an insoluble form. Analysis of leachate developed in accordance with 40 CFR 261.24 showed a uranium concentration of less than 0.02 parts per million and 0.04 parts per million on tests run in duplicate.

## PROPOSED MANNER & CONDITIONS OF DISPOSAL

The calcium fluoride sludge will be dewatered before loading into a transport for delivery to the GSX Corporation Facility near Pinewood, South Carolina for burial. The GSX Corporation Facility was formerly operated by SCA Services, Inc. The facility is operated as a hazardous waste burial facility under interim RCRA ID Number SCD 070375985 and South Carolina Permit Number IWP-145. The Part B application for hazardous waste management was submitted in August 1983 for the Pinewood Facility. It is currently in the review cycle.

GSX Corporation has confirmed their willingness to handle the material and initial discussions with South Carolina Department of

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Health and Environmental Control (DHEC) personnel have not identified any problems. A concern was raised by DHEC personnel that the adequacy of the transportation mode for preventing leakage would have to be established.

The specific truck trailer body design was chosen to address this concern. This trailer design incorporates a cup concept thus eliminating the need for a tailgate and the potential leakage problems that can be associated with tailgates.

The final steps in the sludge dewatering process will be performed in a filter press. The filter cake will be discharged into the over-the-road trailer body. The trailers will be covered by tarpaulines enroute to and from the burial facility and will be sole use vehicles.

While it is anticipated that there will be no free water (as defined by EPA in 40 CFR 264.314(c) which references EPA publication No. SW-846, "Test Methods for Evaluating Solid Wastes/Physical/Chemical Methods"), it is not yet known what the actual operating experience will be. A small quantity of an approved solidification media will be added if necessary prior to transportation. Similarly, actual over-the-road experience will be necessary to determine whether the physical vibration of the filtered calcium fluoride sludge during transit may result in the occurrence of free water. In this case, the sludge will be treated as necessary at the burial site to conform to South Carolina and U. S. Environmental Protection Agency Regulations pertaining to free water. In either case, our plans include the capability to address these options in an appropriate manner once we establish the characteristics of production quantities of the material.

All work with GSX Corporation requires prior authorization of intended activities via a South Carolina Department of Health and Environmental Control (DHEC) Authorization Request (see Exhibits 1 and 2). Exhibit 1 discusses zirconium sludge previously disposed of at this facility under Option 1, SECY 81-576. Exhibit 2 is a copy of the DHEC authorization request that will be supplied to GSX Corporation. GSX will then utilize this information to coordinate authorization with DHEC prior to receiving and disposing of calcium fluoride sludge disposal.

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## PERTINENT INFORMATION

A copy of the GENSTAR annual report for 1984 is attached as Exhibit 3. Please note pages 11-13 which reference the GSX facility and operations at the Pinewood, S. C., location.

As mentioned previously, the calcium fluoride sludge is not classified as a hazardous waste under RCRA regulations; nevertheless, the choice has been made to utilize a RCRA quality facility for disposal purposes. The GSX burial facility is presently subject to the 40 CFR 265 requirements as a minimum and also applicable South Carolina requirements. The burial facility will be subject to 40 CFR 264 requirements when the pending Part B permit application is processed. The present and future requirements address in detail the issues pertaining to containment of buried hazardous waste as defined in the Resource Conservation and Recovery Act and regulations pertaining thereto. For example, 40 CFR 264.119 "Notice to Local Land Authority" details requirements after closure for surveying and marking the property and submitting to the local zoning authority and to the Regional Administrator records as to types, quantities and locations of wastes at the facility. 40 CFR 264.120 "Notice in Deed to Property" details requirements for recording on a deed or other similar instrument, a notation that will in perpetuity notify any potential purchaser of the prior site of prior use, future use restrictions and the prior filing of the information required in 40 CFR 264.119.

The proposed work has been discussed extensively with GSX Corporation personnel. GSX has quoted on performing the work and, by the content of their quotations, clearly demonstrates their understanding of the nature of the material and an ability to safely handle it. Copies of these quotations are on file at General Electric for inspection.

Based on the radiological nature of the calcium fluoride sludge, the vendor's capabilities and procedures, and the procedures defined in this application, General Electric Company has determined that the calcium fluoride sludge can be disposed of without risk of unexpected or hazardous exposures. The amendment request should therefore be granted since it does not impact public safety. Further, these conclusions are in accordance with SECY 81-576 dated October 5, 1981.

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## SPECIFIC CONDITIONS OF LICENSE

In accordance with Option 2 of SECY 81-576, "Disposal or Onsite Storage of Residual Thorium or Uranium (Either as Natural Ores or Without Daughters Present From Past Operations)", the following special authorization is requested:

Notwithstanding any requirements for state or local government agency disposal permits, General Electric is authorized to dispose of industrial waste treatment products without continuing NRC controls provided that the uranium concentration in the material shipped for disposal shall not exceed 250 pCi per gram of uranium activity, of which no more than 100 pCi per gram shall be soluble. The minimum burial depth will be at least four feet below the surface.

This request has been incorporated into Section 1.8.5.2 of Part I of the GE application for renewal of SNM-1097 and is included as Attachment 2.

C. M. Vaughan/WBS

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## EXHIBIT 1

### PRIOR DISPOSAL OF ZIRCONIUM SLUDGE

Chemical etching of tubing and other zirconium reactor components is one of the manufacturing steps used in the production of nuclear fuel at the Wilmington, N. C., facility of General Electric Company.

It had been the practice during 1972-1982 to treat the waste chemical etch solution with lime to precipitate impurities and to neutralize the acid. The resulting precipitate, referred to as zirconium sludge, was accumulated in lined lagoons which from time to time had been used to treat other chemical wastes from the fuel manufacturing process.

A major portion of the accumulated zirconium sludge was removed from the lagoons, treated with a chemical fixation process and stored on the site during this time period.

A decision was made and implemented in 1982 to discontinue the on-site treatment of the waste etch acid and to dispose of both the chemically-fixed sludge stored on site and the zirconium sludge stored in the lagoon.

Even though this material was not a hazardous waste under the Resource Conservation & Recovery Act (RCRA) regulations, the decision was made to utilize the RCRA-quality facility at Pinewood, South Carolina for disposal. The concurrence of the South Carolina Department of Health & Environmental Control was obtained prior to commencing this effort.

As the zirconium sludge contained low concentrations of uranium activity (i.e., less than 30 pCi per gram) concurrence was also requested and obtained from the U. S. Nuclear Regulatory Commission for disposal at the Pinewood, S. C., facility under Option 1 of SECY 81-576.

Approximately 14,000 tons of fixed zirconium sludge and 2,000 tons of unfixed sludge were disposed in this effort.

WBS

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EXHIBIT 2

SOUTH CAROLINA

DEPARTMENT OF HEALTH & ENVIRONMENTAL CONTROL

AUTHORIZATION REQUEST FORM


DHEC 1969 (7/84), 3 PAGES

— Amendment <sup>X</sup> — New

South Carolina Department of Health and Environmental Control  
Bureau of Solid and Hazardous Waste (803) 758-5681

☒ Landfill    ☐ Reclaim  
☐ Recycle    ☐ Incinerate  
☐ Landfarm    ☐ Energy Recovery  
☐ Other \_\_\_\_\_

### AUTHORIZATION REQUEST FORM

Authorization Number:        -        -        (1-11)  To be entered by TSD Facility

#### Generator Information:

Generator ID # N C D 0 5 0 4 0 9 1 5 0 (12-23) Name GENERAL ELECTRIC COMPANY

Address P.O. BOX 780 M/C J26 City WILMINGTON State NC Zip Code 28402

Official Contact W.B. SMALLEY Title MGR-ENV PROT Telephone (919) 343 - 5646

SC County  
(for In-State Generator Only)

#### Treatment, Storage, or Disposal Facility Information:

Facility EPA ID # S C D 0 7 0 3 7 5 9 8 5 (24-35) Name GSX CORPORATION

Address P.O. BOX 210799 City COLUMBIA State SC Zip Code 29221

#### Description of Hazardous Waste:

CALCIUM FLUORIDE SLUDGE

EPA/DHEC Waste Codes: 7777 (1-4)        (5-8)        (9-12)        (13-16)        (17-20) (36-95)

Handling Method: D 8 U (21-23) Volume: (lbs/yr. only) 7 0 0 0 0 0 0 (24-32)

Enter Quarter for One-Time Disposal:        /        Qtr/yr. (33-35)

If Multiple Shipments Enter Frequency Here: 250 times/yr. (36-39)

Physical State of Waste @ 70°F (40):

1. ☒ solid 2. ☐ liquid 3. ☐ N/A

(SEMI SOLID)

Flash Point (cc) (41):

1. ☒ none 2. ☐ <60°F 3. ☐ 60-140°F 4. ☐ >140°F

For DHEC Use Only:

Date Received        /        /       

(42-47)

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# AUTHORIZATION REQUEST FORM (con't)

Proper DOT Shipping Name/Hazard Class/DOT ID # NONE - NOT CLASSIFIED AS A DOT HAZARDOUS WASTE OR SUBSTANCE

Process Producing Waste CONVERSION OF URANIUM HEXAFLUORIDE TO URANIUM DIOXIDE Line:     

Packaging for Shipment:      in Drums (size)      ☒ in Bulk      Other     

Method of Transportation :      Railroad tanker ☒ truck      Other      Specific Gravity: 1.5

Viscosity @ 70°F:      Low      Medium N/A High Layering: ☒ None      Bilayered      Multilayered

Suspended Solids: % by weight or volume, Specify exact % N/A Dissolved Solids: by % weight, Specify exact % N/A

Thousands of Btu's/lb, Specify : N/A Organically Bound Sulfur (wt %): N/A Organically Bound Chloride: N/A

Organically Bound Nitrogen (Wt %) N/A Toxicity:      High ☒ Medium      Low      Unknown Ash %: N/A

Affinity for Water: ☒ Hydrophilic      Lipophilic pH (if hydrophilic): 8-12.4

Visual Description of waste: GRAY SLUDGE

Constituents: List specific constituents by name and corresponding percentage in waste stream.

Volatile Organics	%	Non Volatile Organics	%	Acid or Alkalis	%	Salts & Inorganics*	%	RANGE
						CALCIUM FLUORIDE	45	40-50
						CALCIUM CARBONATE	2.5	2-5
						CALCIUM HYDROXIDE	2.5	2-5
						COMBINED AMMONIA AND NITRATES	0.3	0.1-0.5
						WATER	50	40-60
						TOTAL (VOLUME %)	100	100

Water: 40 - 60 %

\*EXAMPLE OF A TYPICAL COMPOSITION  
IN WEIGHT PERCENT. RANGES ARE  
AT 50% WATER CONTENT.

### SPECIFIC INSTRUCTIONS

13. DOT Proper Shipping Name/Hazard Class/DOT ID #: names and codes as found in Code of Federal Regulations (Transportation) Title 49. Ex. Hazardous Waste Liquid, N.O.S., ORME, NA9189.
14. Process Producing Waste: briefly describe the process by which the waste is produced. Be Specific.
15. Packing for shipment: check one. Indicate the size of the drum. If (other), specify in blank space to the right of item.
16. Method of Transportation: check one. Please specify if (other).
17. Specific Gravity: list the appropriate value.
18. Viscosity: check one.
19. Layering: check one.
20. Suspended solids: list exact value if known and circle correct indicator parameter either weight or volume.
21. Dissolved solids by weight: list exact value if known.
22. Thousands of BTU's/lb: list exact value if known.
23. Organically bound sulfur: list exact value if known.
24. Organically bound chlorine: list exact value if known.
25. Organically bound nitrogen: list exact value if known.
26. Toxicity: check appropriate toxicity for waste stream based on values found in various chemical references. If no value can be found use reasonable judgement.
27. Ash %: give a value in percentage.
28. Affinity for Water: check one. hydrophilic refers to having a strong affinity for bindings or absorbing water. Lipophilic refers to a strong affinity to fats.
29. pH: If hydrophilic was checked previously, give exact value. If lipophilic was checked previously, print N/A.
30. Visual Description of Waste: Give brief visual description of waste stream, include parameters, such as color, physical state, and similarities with commonly known substances. Ex. Light-green dry pellets.
31. Constituents: List specific constituents by name and corresponding percentage in waste stream. Values in percent must be listed for the following categories: "Volatile Organics", "Non Volatile Organics", "Acid or Alkalis", "Salts and Inorganics", and "Water". Values in ppm must be listed for the following categories found on page 3: "Metallic" and "Toxics". Blank space is provided for those metals not listed on this form but found in the waste stream. If there is not a suitable category for a specific item other than metallics, found in the waste stream, list the item and the appropriate value (Percentage or ppm) under "Other Information" found on page 3. Ex. Crushed Steel Drums 60% List any categories of chemical compounds that the referenced waste stream will react with under "Other Information". Specific values listed for constituents, must total to plus or minus 4% of the total volume. Constituent values may also be listed in a small range; in this case the minimum and maximum values as totalled are not required to be within plus or minus 4% of total volume.

# AUTHORIZATION REQUEST FORM (con't)

**Metallic:** (total metals not EP Toxicity Test) (SAME BASIS AS EXAMPLE ON PG 2)

**Toxics:**

As <u>&lt;25</u> ppm	Cr <sup>+3</sup> <u>&lt;5</u> ppm	Ag <u>&lt;5</u> ppm	Fe <u>300</u> ppm
Ba <u>25</u> ppm	Cr <sup>+6</sup> <u>&lt;5</u> ppm	Ni <u>8</u> ppm	Sb <u>---</u> ppm
Cd <u>&lt;5</u> ppm	Hd <u>---</u> ppm	Cu <u>&lt;5</u> ppm	Mn <u>&lt;10</u> ppm
Pb <u>&lt;5</u> ppm	Se <u>---</u> ppm	Ti <u>31</u> ppm	Co <u>&lt;5</u> ppm
Zn <u>&lt;50</u> ppm	Al <u>500</u> ppm	Hg <u>2000</u> ppm	* <u>---</u> ppm

Cyanide	<u>None</u>	ppm
Pesticides	<u>None</u>	ppm
Carcinogens	<u>None</u>	ppm
Other Toxics	<u>None</u>	ppm

\*Low Enriched Uranium (<6 w/o U235) activity not to exceed 250 pCi/gram

**Other Information :** \_\_\_\_\_

## **Certification :**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature : \_\_\_\_\_

Date Submitted : \_\_\_\_\_

Print Name : \_\_\_\_\_

Title : \_\_\_\_\_

## **TSD Facility Certification :**

I certify that based on the information presented in this document this facility is permitted to accept the waste stream described hereon, and do hereby inform the generator listed hereon of acceptance of the waste for treatment, storage, and/or disposal in the manner designated, and in compliance with the TSD Facility's standard terms and conditions.

Signature : \_\_\_\_\_

Date Submitted : \_\_\_\_\_

Print Name : \_\_\_\_\_

Title : \_\_\_\_\_

### SPECIFIC INSTRUCTIONS

32. See page 2 under ("Constituents") for instructions on the listing of "Metallic", "Toxics", and "Other Information" values.
33. Certification: Must be signed by appropriate managers and personnel representing the company generating the waste stream referenced on this Form.
34. TSD Facility Certification: Must be signed by appropriate managerial personnel representing the facility to treat, dispose, or store waste stream as referenced on this Form.
35. Normally once this Form is completed and signed by the correct parties, it may be submitted to The Department of Health and Environmental Control thru the facility. Please check with the facility on specific instructions concerning disposal procedures.



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EXHIBIT 3

GENSTAR ANNUAL REPORT - 1984

REFERENCE PAGES 11-13

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ATTACHMENT 2

REVISED CHAPTER 1 OF PART I  
DATED 7/01/85  
OF APPLICATION TO RENEW SNM-1097  
WITH APPLICABLE INDEX PAGES

CHANGES ARE NOTED BY A ASTERISK IN THE RIGHT MARGIN

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REVISIONS BY PAGE

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Date

TABLE OF CONTENTS

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2	"	
3	"	
4	"	
5	"	
6	"	
7	7/01/85	*
8	"	*
9	"	*
10	"	*
11	"	*
12	"	*

PART I

CHAPTER 1

I-1.1	7/01/85	*
I-1.2	"	*
I-1.3	"	*
I-1.4	"	*
I-1.5	"	*
I-1.6	"	*
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I-1.18	"	*
I-1.19	"	*
I-1.20	"	*
I-1.21	"	*

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CHAPTER 2

I-2.1	5/14/84
I-2.2	"
I-2.3	"
I-2.4	"
I-2.5	"
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I-2.21	"
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I-2.23	"
I-2.24	"

CHAPTER 3

I-3.1	5/14/84
I-3.2	"
I-3.3	"
I-3.4	"
I-3.5	6/20/84
I-3.6	5/14/84
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I-3.12	"
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CHAPTER 4

I-4.1	10/23/84
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CHAPTER 1  
STANDARD CONDITIONS AND SPECIAL AUTHORIZATIONS

1.1      CORPORATE & FINANCIAL INFORMATION

This licensing information document is filed by the Nuclear Fuel Manufacturing Department of the General Electric Company, a New York corporation with a principal place of business at Schenectady, New York.

1.2      LOCATION & GENERAL DESCRIPTION OF WILMINGTON PLANT

The General Electric Company, Nuclear Fuel Manufacturing Department (NFMD) operates a nuclear fuel fabrication plant in Wilmington, North Carolina. At this site, NFMD occupies buildings for administrative, laboratory and manufacturing activities. Fuel manufacturing activities are conducted within the Fuel Manufacturing area.

The full address is as follows: General Electric Company, Nuclear Fuel Manufacturing Department, (name of person and mail code), P. O. Box 780, Wilmington, NC 28402.

1.3      LICENSE NUMBER

The General Electric Company Nuclear Fuel Manufacturing Department NRC license number is SNM-1097 (Docket 70-1113).

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In accordance with the GE timely renewal request dated 4/28/81 and subsequent, related submittals, General Electric hereby requests license renewal for a five year period commencing from the time that the Nuclear Regulatory Commission completes final action on this matter.

1.4 POSSESSION LIMITS

The following types, quantities, and forms of special nuclear materials are authorized:

1.4.1 Uranium-235, 50,000 kgs total

Contained in uranium to a maximum, nominal enrichment of 6% in the form of  $UF_6$ ,  $UO_2$ ,  $U_3O_8$  and other solid and liquid process intermediates and products characteristic of LEU fuel fabrication and fuel fabrication development activities.

1.4.2 Uranium-235, 350 grams total

In any form contained in uranium at any enrichment, for use in measurements, detection, research or development.

1.4.3 Uranium-235, 500 kgs Total

In any form, contained in uranium at a maximum nominal enrichment of 15% for use in laboratory and process technology development operations.

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1.4.4 Plutonium

1 milligram in samples for analytical purposes

1 milligram as standards for checking the alpha radiation response of radiation detection to instrumentation.

20 grams as sealed neutron sources

In nuclear fuel rods containing not more than  $10^{-6}$  grams of plutonium per gram of  $U^{235}$ .

1.5 MATERIAL USE LOCATIONS

Uranium normally will be used at the Wilmington site in the Fuel Manufacturing Area only. Conversion and fabrication of SNM is conducted within the Fuel Manufacturing building.

Small quantities (i.e., less than one safe batch of uranium in a non-dispersable form) may be temporarily moved to other buildings or site locations for special tests.

1.6 DEFINITIONS

Definitions as used in the license conditions are set forth below.

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- 1.6.1 Area Manager - The manager designated by the Department General Manager who is responsible for implementation of nuclear safety requirements in the area assigned. The general title "Area Manager" does not necessarily refer to the title of any specific position in the General Electric system of organization and position nomenclature.
- 1.6.2 Array - means two or more interacting accumulations of fissile material.
- 1.6.3 Criticality Control - means the administrative and technical requirements established to minimize the possibility of achieving inadvertent criticality in the environment analyzed.
- 1.6.4 Full Reflection - means the degree of reflection equivalent to a tight fitting shell of 12 inches or more of water.
- 1.6.5 Minimal Reflection - means the degree of reflection equivalent to a close-fitting shell of water, steel, aluminum, nickel or copper not greater than 1/8 inch in thickness.
- 1.6.6 Minimum Critical Dimension - means the smallest dimension which constitutes a critical system for a given geometry under conditions of full reflection and optimum moderation.
- 1.6.7 Nominal U<sup>235</sup> Enrichment - means the value of enrichment assigned to a quantity of material for convenience

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because the precise value is not known due to process or measurement uncertainties.

1.6.8 Nuclear Safety - means both criticality and radiation safety.

1.6.9 Safe Batch - means an accumulation of special nuclear material which is 45% of the critical accumulation for  $U^{235}$  enrichments less than or equal to 6% and 33 1/3% of the critical accumulation for  $U^{235}$  enrichments greater than 6%, considering enrichment, full reflection, and optimum water moderation for the specific material form.

1.7 AUTHORIZED ACTIVITIES

This application requests authorization to receive, possess, use, store and ship authorized special nuclear materials pursuant to 10 CFR Parts 70, 71 and 73.

1.7.1 Product Processing Operations

1.7.1.1  $UF_6$  Conversion - Conversion of uranium hexafluoride to uranium oxides.

1.7.1.2 Fuel Manufacture - Fabrication of nuclear reactor fuels containing uranium.

1.7.1.3 Scrap Recovery - Reprocessing of unirradiated scrap from NFMD and from other sources with nuclear safety characteristics identical to NFMD in-process materials.

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1.7.2     Process Technology Operations

- 1.7.2.1   Development and fabrication of reactor fuel, fuel elements and fuel assemblies in small amounts or of advanced design.
- 1.7.2.2   Development of scrap recovery processes
- 1.7.2.3   Determination of interaction between fuel additives and fuel materials.
- 1.7.2.4   Chemical analysis and material testing, including physical and chemical testing and analysis, metallurgical examination and radiography of uranium compounds, alloys and mixtures.
- 1.7.2.5   Instrument research and calibration, including development, calibration and functional testing of nuclear instrumentation and measuring devices.
- 1.7.2.6   Other process technology development activities related to, but not limited by, the above.

1.7.3     Laboratory Operations

Chemical, physical or metallurgical analysis and testing of uranium compounds and mixtures, including but not limited to, preparation of laboratory standards.

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1.7.4 General Services Operations

1.7.4.1 Storage of unirradiated fuel assemblies, uranium compounds and mixtures in areas arranged specifically for maintenance of criticality and radiological safety.

1.7.4.2 Design, fabrication and testing of uranium prototype processing equipment.

1.7.4.3 Maintenance and repair of uranium processing equipment and auxiliary systems.

1.7.4.4 Storage and nondestructive testing of fuel rods containing small amounts of plutonium.

1.7.5 Waste Treatment and Disposal

1.7.5.1 Treatment, storage and disposal and/or shipment of liquid and solid wastes whose discharges are regulated.

1.7.5.2 Decontamination of non-combustible contaminated wastes to reduce uranium contamination levels, and subsequent shipment of such low-level radioactive wastes to licensed burial sites for disposal.

1.7.5.3 Treatment or disposal of combustible waste and scrap material by incineration pursuant to 10 CFR 20.302(a) and 10 CFR 20.305.

1.7.6 Offsite Activities

Non-destructive modification, testing, demonstration and storage of materials and devices containing unirradiated

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uranium, provided that such materials and devices shall be in General Electric control at all times.

1.8 EXEMPTIONS & SPECIAL AUTHORIZATIONS

1.8.1 Requirements for Prior Authorization of Activities by License Amendment

Prior authorization by license amendment shall be required for the following activities:

- 1.8.1.1 Major changes or additions to existing processes which may involve a significant increase in potential or actual environmental impact resulting from utilizing such changes or additions.
- 1.8.1.2 Major process changes or additions which involve a new process technology for which a criticality safety demonstration has not been previously submitted to the Commission. In determining whether a new process technology requires such prior authorization by license amendment, the following factors will be considered: (1) type of equipment utilized, (2) chemical reactions involved and (3) potential and/or actual environmental impact.
- 1.8.1.3 Proposed activities for which specific application and prior approval are required by Commission regulations.

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1.8.2 Contamination-Free Articles

See "Annex A, Guidelines for Decontamination of Facilities & Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," US NRC, 12/30/82, pages I-1.18 through I-1.21.

1.8.3 Disposal of Contamination-Free Liquids

1.8.3.1 Hydrogen Fluoride Solutions

Authorization, pursuant to 10 CFR 70.42(b)(3), to transfer liquid hydrofluoric acid to Brush Wellman, Elmore, Ohio, through the chemical supplier, Consolidated Chemical Company, Kansas City, Missouri, without either company possessing a NRC or Agreement State license for special nuclear material, provided that the concentration of uranium does not exceed three parts per million by weight of the liquid and the nominal enrichment does not exceed 6%.

The hydrofluoric acid is transferred and used in such a manner that the minute quantity of uranium does not enter into any food, beverage, cosmetic, drug or other commodity designated for ingestion or inhalation by, or application to, a human being such that the uranium concentration in these items would exceed that which naturally exists. Additionally, the acid is used in a process which will not release the low levels of radioactivity to the atmosphere as airborne material and whose residues will remain in a lagoon system.

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Prior to shipment, each transfer is sampled and measured to assure that the concentration does not exceed three parts per million of uranium.

General Electric shall maintain records under this condition of license including, as a minimum, the date, uranium concentration and quantity of all hydrofluoric acid transferred.

1.8.3.2 Nitrate-Bearing Liquids

Authorization, pursuant to 10 CFR 20.302(a), to dispose of nitrate-bearing liquids, provided that the uranium concentration does not exceed a 30-day average of 5 parts per million by weight of the liquids and the nominal enrichment does not exceed 6 weight percent  $U^{235}$ , by transport to an offsite liquid treatment system located at Federal Paper Board Corporation, Riegelwood, North Carolina, in which decomposition of the nitrates will occur and from which the denitrified liquids will be discharged in the effluent from the system.

The environmental monitoring program as described in Section 5.1.4.2 is used to control these activities.

1.8.4 Use of Materials at Off-Site Locations

1.8.4.1 Authorization to use up to 15 grams of  $U^{235}$  at other sites within the limits of the United States except where the material is subject to licensing by an Agreement State as defined in 10 CFR 150.

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The manager of the radiation safety function shall establish the safety criteria for material being used at offsite locations. It is also his responsibility to designate the individual who will be responsible to carry out these criteria.

- 1.8.4.2 Authorization to store, at the storage warehouse located in Greenville, S. C., and at nuclear reactor sites, uranium fully packaged as for transport in any Fissile Class I package, in accordance with the conditions of a license authorizing delivery of such containers to a carrier for Fissile Class I transport, at locations in the United States providing such locations are controlled by the General Electric Company, with provision to minimize the severity of potential accident conditions to be no greater than those in the design bases for the containers during transportation.

Provisions for compliance with applicable 10 CFR 73 requirements are described in the NRC-approved General Electric Company, Nuclear Fuel Manufacturing Department, Wilmington, N. C., Physical Security Plan dated October 26, 1981, as currently revised in accordance with regulatory provisions.

Storage at nuclear reactor sites is subject to the financial protection and indemnity provision of 10 CFR 140 and is limited to possession for purposes of delivery to a carrier for transport. The requirements of 10 CFR 70.24 are waived insofar as this section applies to the materials contained in Fissile Class I packages.

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1.8.4.3 Authorization to store, at the storage warehouse located at Greenville, S. C., and at nuclear reactor sites, arrays of finished reactor fuel rods and/or assemblies in any of the inner metal containers of the RA-series shipping package described in package certificate USA/4986/AF, at locations in the United States providing such locations are controlled by the General Electric Company with provision to minimize the severity of potential accident conditions to be no greater than those in the design bases for the containers during transportation.

Arrays can be constructed without limit to the number of containers so stored, except that each array shall be stacked to a height of no more than 4 containers high with each container separated by nominal 2 inch wooden studs, and with the width and length for each array and separation between arrays determined only by container handling requirements.

Provisions for compliance with applicable 10 CFR 73 requirements are described in the NRC-approved GE-NFMD Physical Security Plan dated October 26, 1981, as currently revised in accordance with regulatory provisions.

Storage at nuclear reactor sites is subject to the financial protection and indemnity provision of 10 CFR 140 and is limited to possession for purposes of delivery to a carrier for transport. The requirements of 10 CFR 70.24 are waived insofar as this section applies to the materials contained in any of the inner

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metal containers of the RA-series shipping package.  
(Reference Section 1.8.7).

1.8.4.4 Authorization to transfer, possess, use and store unirradiated reactor fuel of General Electric Company manufacture at nuclear reactor sites, for purposes of inspection, fuel bundle disassembly and assembly, including fuel rod replacement, provided that the following conditions are met.

1.8.4.4.1 A valid NRC license has been issued to the reactor licensee, which authorizes receipt, possession and storage of the fuel at the reactor site, and that General Electric Company possesses the fuel only within the indemnified location.

1.8.4.4.2 Not more than one fuel assembly and 30 unassembled fuel rods of the types described in NRC Certificate of Compliance USA/4986/AF, are possessed by General Electric Company at any one reactor site at any one time, except when the fuel has been packaged for transport.

1.8.4.4.3 All operations involving the fuel are conducted by or under the direct supervision of a member of the General Electric staff who shall be responsible for all work on the fuel element assembly. The person shall be knowledgeable and shall have access to all applicable procedures and license conditions at the reactor site and the appropriate actions that are to be taken in the event of emergencies at the site.

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- 1.8.4.4.4 All operations involving the fuel are conducted in locations that have been selected to preclude mechanical damage and flooding.
- 1.8.4.4.5 Loose rods are stored only in RA-series inner metal containers.
- 1.8.4.4.6 Fuel is handled in accordance with pertinent provisions of the reactor license and in accordance with written and approved General Electric Company procedures. The procedures shall define the radiation and contamination surveys that are to be performed and the frequency of the surveys.
- 1.8.4.4.7 Written administrative procedures are jointly prepared and approved by General Electric and the reactor licensee, to provide for the nuclear and radiation safety of the operations to be performed.
- 1.8.4.4.8 Records of the operation, including evaluations, procedures used, audits performed, and performance reports are maintained at the Wilmington, North Carolina, plant.

1.8.5 Disposal of Industrial Waste Treatment Products

Notwithstanding any requirements for state or local government agency disposal permits, General Electric is authorized to dispose of industrial waste treatment products without continuing NRC controls provided that either of the two following conditions are met:

\*  
\*

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- 1.8.5.1 All freestanding liquid shall be removed prior to shipment. \*

The uranium concentration in the material shipped for disposal shall not exceed 30 pCi per gram after all freestanding liquid has been removed.

The licensee shall possess authorization from appropriate state officials prior to disposing of the waste material delineated in this amendment. The authorization shall be available for inspection at the Wilmington facility.

- 1.8.5.2 The uranium concentration in the material shipped for disposal shall not exceed 250 pCi per gram of uranium activity, of which no more than 100 pCi per gram shall be soluble. The minimum burial depth shall be at least four feet below the surface. \*

1.8.6 Dilution Factor for Airborne Effluents

Authorization to utilize a dilution factor to the measured stack discharges for the purpose of evaluating the airborne radioactivity at the closest site boundary of stack discharges from the uranium processing facilities. For purposes of control, this dilution factor shall be no greater than 100. For other purposes, specific dilution factors, which consider dispersion model parameters, may be calculated and used.

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Monitor System Exemption

Authorization for exemption from the requirements of 10 CFR 70.24 for each area in which there is not more than:

A quantity of finished reactor fuel rods equal to or less than 45% of a minimum critical number under conditions in which double batching is credible, or equal to or less than 75% of a minimum critical number under conditions in which double batching is not credible, or

The number and type of finished reactor fuel rods and/or assemblies authorized for delivery to a carrier for transport as a Fissile Class I shipment in the model RA-series shipping package described in package certificate USA/4986/AF, without limit on the number of such stored containers, provided the storage locations preclude mechanical damage and flooding, or

The quantity of uranium authorized for delivery to a carrier for transport as a Fissile Class I package when fully packaged as for transport according to a valid NRC authorization for such packages without limit on the number of such packages, provided storage locations preclude mechanical damage and flooding, or

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Arrays of finished reactor fuel rods and/or assemblies in any of the inner metal containers of the RA-series shipping package described in package certificate USA/4986/AF, under storage conditions described in Chapter 1.8.4.3.

1.8.8 Incinerator Operation

Authorization, pursuant to 10 CFR 20.302(a) and 10 CFR 20.305, to treat or dispose of waste and scrap material containing special nuclear material by incineration.

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ANNEX A  
GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT  
PRIOR TO RELEASE FOR UNRESTRICTED USE  
OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE,  
OR SPECIAL NUCLEAR MATERIAL

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

July 1982

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The instructions in this guide, in conjunction with Table 1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.
2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.
3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.
4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:
  - a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.
  - b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

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5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the Division of Fuel Cycle and Material Safety, USNRC, Washington, D.C. 20555, and also the Administrator of the NRC Regional Office having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

- a. Identify the premises.
- b. Show that reasonable effort has been made to eliminate residual contamination.
- c. Describe the scope of the survey and general procedures followed.
- d. State the findings of the survey in units specified in the instruction.

Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

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TABLE 1

## ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES <sup>a</sup>	AVERAGE <sup>b c f</sup>	MAXIMUM <sup>b d f</sup>	REMOVABLE <sup>b e f</sup>
U-nat, U-235, U-238, and associated decay products	5,000 dpm $\alpha$ /100 cm <sup>2</sup>	15,000 dpm $\alpha$ /100 cm <sup>2</sup>	1,000 dpm $\alpha$ /100 cm <sup>2</sup>
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm <sup>2</sup>	300 dpm/100 cm <sup>2</sup>	20 dpm/100 cm <sup>2</sup>
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm <sup>2</sup>	3000 dpm/100 cm <sup>2</sup>	200 dpm/100 cm <sup>2</sup>
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm $\beta\gamma$ /100 cm <sup>2</sup>	15,000 dpm $\beta\gamma$ /100 cm <sup>2</sup>	1000 dpm $\beta\gamma$ /100 cm <sup>2</sup>

<sup>a</sup>Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

<sup>b</sup>As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

<sup>c</sup>Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

<sup>d</sup>The maximum contamination level applies to an area of not more than 100 cm<sup>2</sup>.

<sup>e</sup>The amount of removable radioactive material per 100 cm<sup>2</sup> of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

<sup>f</sup>The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.