UNC RECOVERY SYSTEMS

GOA 81-01

Division of United Nuclear Corporation
A UNC RESOURCES Company

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Telephone 401/364-7701

February 6, 1981

U. S. Nuclear Regulatory Commission
Mr. Boyce H. Grier
Director, Region I
631 Park Avenue
King of Prussia, PA 19406

Subject: USNRC Inspection 70-820/80-14

Reference: Letter on Subject, Boyce H. Grier
to G. O. Amy, dated January 14, 1981

Gentlemen:

Attached is UNC Recovery Systems' response to the subject inspection report which was transmitted to us via the referenced letter. We trust that this response will satisfactorily resolve the item delineated in Appendix A of your letter. If you desire further information, we will be pleased to discuss the matter with you.

Very truly yours,

G. O. Amy
General Manager

cc: R. J. Gregg
J. L'Heureux
K. Helgeson

ATTACHMENT TO LETTER GOA 81-01

G. O. AMY TO BOYCE H. GRIER DATED FEBRUARY 6, 1981

USNRC INSPECTION 70-820/80-20

USNRC COMMENT

Contrary to the requirements of Subsection 103 to License No. SNM-777, during the years of 1977 through 1980, the licensee handled and processed without authorization various types of irradiated nuclear fuel scrap in order to reclaim approximately 390 kilograms of uranium-235 for recycling.

UNC RESPONSE

UNC acknowledges that the material described in the body of the inspection report was in fact processed at our facility. Since this facility ceased uranium recovery operations in August, 1980, no further actions are necessary to assure that similar materials are not processed in the future.

We do not, however, agree that the processing of this material constitutes an item of UNC non-compliance with NRC regulations, for the following reasons:

1. The material involved was clearly identified, in both the paperwork which was the basis for our contract bid to the DOE, and in the DOE shipping papers, as being unirradiated. This identification was by use of the ANSI material identification code for Unirradiated Uranium Scrap (applicable sections are attached). As pointed out in an attachment to the NRC inspection report, this characterization was made using internal DOE criteria (ERDA Appendix 7452). This was done despite the availability of an NRC/DOE material code for "Irradiate Recyclable Fuel" in the Nuclear Material Transaction Report Instructions (Forms DOE/NRC 741 and 741A).

2. The NRC has stated that they consider the material in question to be slightly irradiated, and UNC technically agrees with that statement. However, it must be pointed out that, to our knowledge, Chapter I to Title 10 of the Code of Federal Regulations does not define irradiated material. Therefore, it appears that the only such Federal definition is the one in use by the DOE.

3. The DOE in their correspondence with the NRC, stated that they considered this material as being unirradiated. Also, they stated that "DOE's contracts with UNC required the contractor to have all necessary licenses to possess and process the material." Based on the material information provided to us by the DOE (i.e., it was declared as "unirradiated"), UNC did have the required licenses.

4. 10CFR 70.42(c) states that, "Before transferring special nuclear material to a specific licensee of the Commission or an Agreement State or to a general licensee who is required to register with the Commission or with an Agreement State prior to receipt of the special nuclear material, the licensee transferring the material shall verify that the transferee's license authorizes receipt of the type, form, and quantity of special nuclear material to be transferred."

   While the DOE is not subject to this regulation, it is clear that the intent is to place the burden of assurance on the shipper as they are the only party having the knowledge of the material which is necessary to make this determination.

   It is highly improbable that the DOE would have shipped commercial reactor scrap or byproduct material to UNC without identifying it as such and assuring that we were licensed to receive it. The fact that they made no such effort for the material in question is fully consistent with their definition and declaration of the material as being unirradiated.

5. We cannot locate any documentation to fully clarify the basis for the 1976 license change which deleted specific reference to processing of slightly irradiated scrap. The best recollection of the then responsible individual (who is no longer employed by UNC) is that we were not being sent any slightly irradiated material at that time, and that we would be notified of any such potential shipments so that the licensing could be handled on a case basis. We can find no records of such notifications from DOE.

6. All of the materials in question were receipt inspected by UNC and found to be within the acceptance limits for surface radiation, with no indications of abnormality or differences from other scrap. In addition, standard Health Physics monitoring during material recovery operations, showed no abnormal situations which would have indicated the presence of irradiated material.

7. The processing of this material was done in full compliance with all applicable requirements, involved no adverse exposures of personnel, and resulted in no improper releases to the environment. In fact, as pointed out in the NRC inspection report, it is probable that the low level of fission products currently found in some of our monitoring wells is associated with pre-1976 processing, at a time when it was specifically authorized by the license.

While we realize that the above response is quite lengthy, the objective is to show that:

a.) UNC has, at no time, knowingly processed irradiated material when not permitted to do so by our license;

b.) our lack of specific knowledge regarding the DOE material involved was not due to a failure on our part to exercise normal and prudent care;

c.) no conditions have arisen as a result of processing this material which pose any hazard to the public or our employees; and

d.) there are differences which currently exist between NRC and DOE interpretations and methods which should be addressed, in order to help assure that other licensees are not faced with similar problems in the future.

USNRC NUCLEAR MATERIAL TRANSACTION REPORT INSTRUCTIONS

(Forms DOE/NRC - 741 and 741A)

CODE	CATEGORY AND DESCRIPTION IF WARRANTED)
701	Unalloyed Metal Product
702	Alloyed Metal Product
771	Samples and Standards
637	Sintered Products
Scrap - for recovery*+	
A00	Unalloyed metal
B00	Alloyed metal
C00	Compunds
D00	Combustibles
E00	Noncombustibles
F00	Solutions
G00	Process residues
375	Irradiate Recyclable Fuel

Waste - for disposal: Waste material should be described by an appropriate scrap category.

ENCAPSULATED

291	Fabricated Fuel Elements - pins, rods, plates
309	Fuel assemblies (Assembled Items Product)
481	Sealed sources (Fabricated Sources Product)

OTHER

776	Other Products

*American National Standard Institute codes for unirradiated uranium or plutonium scrap may be used in lieu of these codes.

+Where a number of dissimilar items of scrap are put into the same container, use the composition code describing the predominant scrap category.

15. TRANSFER AUTHORITY

DOE Owned Material - If the material is DOE-owned, enter such transfer authority as may be appropriate, e.g., DOE Contract Number, Lease Agreement Number, Nuclear Material (NM) order number, purchase order number, etc. If the transfer is being made as a result of the NM Draft (Form DOE-437), enter the draft number.

Privately Owned Material - Make no entry in this block for non-DOE-owned material.

16. EXPORT OR IMPORT TRANSFERS -

A. For all export or import transfers, enter the NRC export or import license number, respectively under which special nuclear material, source material, or tritium is being transferred. Does not apply for imports of source material or tritium, where authorized by a general license.

B. For all export or import transfers, enter the U.S. Port of Exit/Entry code designating where the shipment exited or entered the United States. Appendix I to these instructions contains a listing of all United States Customs Ports and their assigned four digit codes.

17. MATERIAL TYPE AND DESCRIPTION - Enter the precise type of special nuclear material (Pu, Pu-238, U-233, or uranium enriched in the isotope U-235), source material (depleted

uranium, natural uranium, thorium), or tritium, together with its physical and chemical form. Enter whether material being transferred is irradiated.

18. TRANSPORTATION PROFILE - A full transportation profile, including identification of transportation carriers and transfer points for up to five different trip segments, is required to be reported on all shipments involving quantities of material subject to the requirements for the physical protection of special nuclear material in-transit specified in 10 CFR Part 73.

NOTE: For transfers of material subject to the above physical protection requirements, Form DOE/NRC-741 must be dispatched by "registered or certified-return receipt requested" mail service.

A. TRIP SEGMENT - No entry required.

B. CARRIER IDENTIFICATION - Enter the transportation carrier identification code for each trip segment. Appendix II to these instructions contains a listing of the most frequently used carriers and their assigned four character codes. Carrier codes not found in Appendix II should be obtained from the carrier or by consulting the complete list of transportation carriers and their codes, which is contained in the "Continental Directory NMF-101 of Standard Carrier Alpha Codes and Standard Tariff Agent Codes," available from the National Motor Freight

American National Standard Classification of Unirradiated Uranium Scrap

1. Scope and Purpose

This standard of classification applies to the area of "cold" uranium scrap. The purpose of this standard is to provide a classification system with inherent flexibility which will provide a means for facilitating activities in the nuclear industry relevant to the classifications set forth in this standard.

2. Classification System

2.1 Basic Identification Code. The classification system for unirradiated scrap identifies material by degree of ^{235}U enrichment, major grade, and subgrade. The basic identification code consists of five characters as follows:

Isotopic Enrichment	Major Grade	Subgrade
XX	X	XX

Listed and described in the classification categories are seven major grades and seventy-three subgrades of scrap with their associated identification codes. Scrap not properly covered by any of the subgrades listed in this guide should be identified with respect to its major grade and isotopic enrichment codes and described in detail.

2.2 Identification Codes for Isotopic Enrichment Ranges. The identification codes for the isotopic enrichment ranges are identified numerically for all scrap categories by the first and second characters as shown in Table 1.

Table 1
Identification Codes for Isotopic Enrichment Ranges

Type Code	Type Description Percent	Type Code	Type Description Percent
10XXX Depleted U Total			
11XXX	< 0.21	24XXX	1.60 to < 2.20
12XXX	> 0.21 to 0.24	25XXX	2.20 to < 2.60
13XXX	> 0.24 to < 0.26	26XXX	2.60 to < 2.90
14XXX	0.26 to < 0.28	27XXX	2.90 to < 3.10
15XXX	0.28 to < 0.30	28XXX	3.10 to < 3.40
16XXX	0.30 to < 0.50	29XXX	3.40 to < 3.90
17XXX	0.50 to < 0.60	30XXX	3.90 to < 4.10
18XXX	0.60 to < Normal (0.711)	31XXX	4.10 to < 4.50
		32XXX	4.50 to < 8.00
81XXX Normal U Total (0.711)		33XXX	8.00 to < 25.00
		34XXX	25.00 to < 35.00
20XXX Enriched U Total		35XXX	35.00 to < 45.00
21XXX	> Normal (0.711) to < 0.90	36XXX	45.00 to < 80.00
22XXX	0.90 to < 1.15	37XXX	80.00 to < 92.00
23XXX	1.15 to < 1.60	38XXX	92.00 to < 94.00
		39XXX	94.00 and above

2.3 Major Grades. The major grades are identified alphabetically by the third character as follows:

XXAXX	Unalloyed Metal
XXBXX	Alloyed Metal
XXCXX	Compounds
XXDXX	Combustibles
XXEXX	Noncombustibles
XXFXX	Solutions
XXGXX	Process Residues

An example of the classification system for pure recastable metal, enriched to 5 percent ^{235}U, would be 32A10.

3. Classification Outline

3.1 Unalloyed Metal — XXAXX. This material is defined as scrap since it is in excess of the current needs of the generating site, or is not usable in its present form, or has become contaminated with impurities to the extent that it is not acceptable for fabrication programs. Every effort should be made to keep XXAXX material separated from other grades of scrap.

Grade	Title	Description
XXA10	Recastable Metal (pure)	This is a general category for metal in this class such as massive pieces, foil, plates, chips in oil, and so forth, which are acceptable for recasting. A further subdivision follows for use when a more specific category for pure recastable metal is desired.
XXA11	Recastable Metal	Metal and metal plates in sizes suitable for remelt and not requiring pickling.
XXA12	Recastable Metal	Briquettable chips which are acceptable for recasting.
XXA13	Recastable Metal	Solid metal requiring pickling prior to recasting.
XXA14	Recastable Metal	Massive metal requiring sawing prior to recasting.
XXA15	Recastable Metal	Massive metal requiring sawing and pickling prior to recasting.
XXA16	Recastable Metal	Solid metal which may be recast after double melting.
XXA17	Recastable Metal	Partially clad metal recastable after nitric pickling.
XXA18	Recastable Metal	Clad metal recastable after hydrofluoric and nitric acid pickling, for example, zirconium-clad metal.
XXA20	Recastable Metal	Metal clad with material other than zirconium and aluminum, for example, stainless steel
XXA30	Metal (relatively pure)	Massive metal, foil, plates, chips, and so forth, which may be burned to an oxide similar to the specifications set forth in Table 2.
XXA40	Metal (impure)	Massive metal, foil, plates, chips, and so forth, which cannot be converted to an oxide meeting the specifications similar to those in Table 2 without chemical purification.

3.2 Alloyed Metal — XXBXX. This material is alloyed metal in which uranium is a major constituent (one percent U or more) and in which the other major constituents are known. This category also includes mixtures that have physical properties similar to alloys, such as uranium oxides and metallic powders combined in pressing operations.

Grade	Title	Description
XXB10	Uranium-Aluminum Alloy Massive Metal	Alloy billets or other massive pieces which require physical treatment (for example, chopping) before chemical treatment. Individual fuel plates are Grade XXB11, but assemblies of fuel plates belong in this grade.
XXB11	Uranium-Aluminum Alloy	Fillers, plates, strips, or chips and turnings meeting the general specification for Grade XXBXX. NOTE: Some of the items included in this grade may require chopping or other physical treatment, depending on the nature of the processor's equipment.
XXB12	Uranium-Aluminum Alloy Solids and Residues	Casting skull, dross, and similar residues. This grade must contain at least one percent uranium.
XXB13	U-Al_3 Pressed Powders	Fillers, plates, strips, and scrap.
XXB14	U-Al_x	Fillers, and so forth, clad in aluminum.
XXB15	Uranium Oxide in Aluminum	Uranium oxide coated with or dispersed in aluminum or both.
XXB20	Uranium-Zirconium Alloy Massive Metal	Alloy billets containing uranium and zirconium or zircalloy, or other massive pieces which require physical treatment (for example, chopping) before chemical treatment. Individual fuel plates are Grade XXB21, but assemblies of fuel plates belong in this grade.
XXB21	Uranium-Zirconium Alloy	Fillers, plates, strips, chop stock, or chips and turnings meeting the general specifications for Grade XXBXX. (See Note to Grade XXB11.)
XXB22	Uranium-Zirconium Alloy Solids and Residues	Casting residues, melt stubs, grinding sludge, and similar residues, but not vapor blast grit. This grade must contain at least one percent uranium.
XXB23	Uranium Oxide in Zirconium	Uranium oxide coated with or dispersed in zirconium or both. This grade includes UO_2-ZrO_2 only if coated or clad with zirconium.
XXB24	Uranium Oxide in Zirconium	Uranium oxide coated with or dispersed in zirconium or both. This grade includes UO_2-ZrO_2 if coated or clad with material other than zirconium.
XXB30	Uranium-Molybdenum Alloy Massive Metal	Alloy billets or other massive pieces which require physical treatment (for example, chopping) before chemical treatment. Individual fuel plates are Grade XXB31, but assemblies of fuel plates belong in this grade.
XXB31	Uranium-Molybdenum Alloy	Fillers, plates, rods, strips, turnings, chips, and the like.
XXB32	Uranium-Molybdenum Alloy Solids and Residues	Casting residues, melt stubs, grinding sludge, and similar residues, but not vapor blast grit. This grade must contain at least one percent uranium.
XXB40	Other Alloys — Massive Metal	Alloy billets, or other massive pieces containing uranium and metals other than aluminum, molybdenum, or zirconium, which require physical treatment (for example, chopping) before chemical treatment. Individual fuel plates are Grade XXB41, but assemblies of fuel plates belong in this grade.

Grade	Title	Description
XXB41	Other Alloys	Fillers, plates, strips, chop stock, chips, turnings, and similar materials, meeting the general specifications for Grade XXBXX. This grade includes alloys containing significant amounts of any third element. (See Note to Grade XXB11.)
XXB42	Other Alloy Solids and Residues	Uranium alloyed with or canned in elements other than aluminum, molybdenum, or zirconium. This grade includes massive pieces, fillers, plates, chips and turnings, and solid residues such as those listed for aluminum, molybdenum, and zirconium.
XXB50	Uranium Oxide with Stainless Steel	Uranium oxide coated with or dispersed in stainless steel or both. This grade includes all of the various stainless steel formulations, but does not include ternary mixtures. It must contain at least one percent uranium.
XXB60	Uranium Oxide with Other Metallic Elements	Uranium oxide coated with or dispersed in any metallic element (other than zirconium, aluminum, or stainless steel) or both. This grade also includes all ternary dispersions. It must contain at least one percent uranium.

3.3 Compounds — XXCXX. This material is composed of mixed oxides and compounds of uranium, or oxides and compounds mixed with non-fissile materials.

Grade	Title	Description
XXC01	Oxides (relatively pure)	UO_2, UO_3, or mixture thereof, which can be calcined directly to a product meeting specifications similar to those in Table 2.
XXC04	Oxides (impure)	UO_2, UO_3, U_3O_8, or mixtures thereof, which cannot be calcined directly to acceptable product. This grade includes UO_2 ZrO_2 (not metallic clad) and similar mixed oxides which contain at least one percent uranium.
XXC05	Oxides with CaO	UO_2ZrO_2 or other uranium oxides mixed with calcium oxide. This grade must be at least one percent uranium.
XXC07	Oxides with ThO_2	UO_2 ThO_2 or other uranium oxides mixed with thorium oxide. This grade must be at least one percent uranium.
XXC08	Oxides with BeO	UO_2 BeO or other uranium oxides mixed with beryllium oxide. This grade must be at least one percent uranium.
XXC10	UF_6	Uranium hexafluoride
XXC11	UF_4 (relatively pure)	Meeting the specifications similar to those in Table 2.
XXC12	Miscellaneous Uranium Fluorides	Fluoride compounds other than UF_6 and UF_4.
XXC13	Uranium Halide Compounds	Includes dry compounds of uranium halides other than fluorides.
XXC21	Crystalline uranyl nitrate (relatively pure)	Uranyl nitrate hexahydrate which can be calcined directly according to the specifications in Table 2.
XXC24	Crystalline uranyl nitrate (impure)	Uranyl nitrate crystals containing sufficient impurities such that direct calcination would not yield a product meeting the specifications similar to those in Table 2.