# U. S. NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT

REGION I

Report No70-820/80-13		
Docket No70-820 License NoSNM-777	Safeguards	Group 1
Licensee: United Nuclear Corporation	_	
Wood River Junction,		
Rhode Island 02894		
Facility Name: UNC Recovery Systems	_	
Inspection At: Wood River Junction, Rhode Island	1.110	
Inspection Conducted: August 12-15, 1980		
Date of Last Material Control and Accounting Inspection:	August	15, 1980
Type of Inspection: Material Control and Accounting		
Inspectors: E. Walther		12/22/80
E. Woltner, Safeguards Auditor		date
		date
	-	date
Approved by: James A Journer		12/22/20
Support Section, Safeguards Branch	01	date
Inspection Summary:	20/20-12)	
Areas Inspected: Review of records related to processin	g of slight	tly irradiated
The inspection involved 30 inspector hours onsite by one	NRC inspec	ctor and was

begun during the regular hours. Results: The licensee was found to be in compliance in the area inspected.

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Region I Form 167 (August 1979)



### REPORT DETAILS

## 1. Key Persons Contacted

- \*C. Bowers, President, UNC Recovery Systems
- \*J. L'Heureux, Manager, Nuclear Material Control
- S. Pennacchini, Manager, New Products
- K. Helgeson, Manager, Nuclear and Industrial Safety
- D. Schultz, Manager of Compliance

"denotes those present at the exit interview.

## 2. Licensee Action on Previous Inspection Findings

Previous inspection findings were not reviewed during this inspection.

#### 3. Exit Interview

The inspector met with licensee representatives (denoted in paragraph 1) on August 15, 1980. The inspector summarized the scope and the findings of the inspection and noted that additional information would be required to complete the inspection.

#### Unresolved Items

There are no unresolved items resulting from the inspection.

## 5. MC 92713B - Independent Inspection Effort

No items of noncompliance were noted. This inspection was conducted to review documentation associated with the processing of enriched uranium scrap. An attempt was made to identify, from the documentation, scrap which may have been slightly irradiated in a nuclear reactor before being shipped to the licensee for recovery of the contained uranium. This review was initiated as the result of discovery of the fission product Sr-90 in ground water near the UNC-RS facility. Since Sr-90 does not occur naturally, process by UNC-RS of slightly irradiated reactor fuel scrap was considered a likely source of the ground water contamination.

The main sources of scrap material received by UNC-RS had been UNC-Naval Products (UNC-NP) and the Department of Energy (DOE) facility at Oak Ridge, Tennessee. Since UNC-NP had never handled irradiated material, the inspection effort was directed to the material received from Oak Ridge under DOE contract. Oak Ridge's procedure in awarding a contract for the recovery of scrap was to assign a scrap lot number to each contract, with each lot number covering approximately 6 to 12 sublots. The sublots identified the generating facility and type of scrap. Oak Ridge's specification for recovery of uranium scrap by commercial processors included seven scrap grade classifications (metal chips, cladded metal, oxide, etc.). The classifications provided no indication of any irradiation history. However, discussions with DOE personnel at Oak Ridge revealed that scrap with radiation levels <100 mr/hr was considered unirradiated, regardless of its history.

The review of available UNC-RS records covered the period from late 1968 (Lot 99) through March, 1980 (Lot 139), the final operations involving DOE contract scrap.

The back-up documentation to the UNC-RS processing records indicated that a portion of the scrap could have been slightly irradiated in low power. critical facilities.

In order to obtain confirmatory documentation, a request was made to two Department of Energy Offices (Oak Ridge Operations and Schenectady Naval Reactors Office) for additional information on the irradiation history of scrap shipped to UNC-RS. The information was furnished to the NRC and is shown in Appendices I and II of this report. The history on the material does indicate that slightly irradiated scrap was shipped to UNC-RS at various times between 1967 and 1980.

In addition to the scrap shown in Appendices I and II, it was determined that Lot Number 133, shipped to UNC-RS during November 1977, also included slightly irradiated scrap. Sub Lot No. 133-G from Michigan Technological University consisted of five Argonaut Reactor fuel plates containing 108 grams U-235. The balance of scrap received by UNC-RS consisted of unirradiated production scrap from various facilities.

In conjunction with this review, Office of Inspection and Enforcement Inspection Report No. 70-820/80-14 covers other aspects on the processing of slightly irradiated scrap material by UNC-RS.

## APPENDIX 1

#### REVIEW OF MATERIAL SHIPPED TO UNC RECOVERY SYSTEMS FACILITY

During the period December 1964 to April 1980 a total of approximately 1579 kilograms of U-235 scrap was shipped from Knolls Atomic Power Laboratory (KAPL) and Bettis Atomic Power Laboratory (BAPL) to United Nuclear Corporation, Wood River Junction, RI, facility. The material shipped consisted of fuel and element sections, critical assembly fuel, and oxidized material. The critical assembly fuel amounts to 797,065 grams U-235 which was slightly irradiated. The balance, 781,499 grams U-235, was used in various core development programs and was not irradiated.

The following tabulation is a breakdown for KAPL and BAPL by year and quantity shipped. This information was obtained from the Nuclear Material Transaction Reports (Form DOE 741) issued since 1964.

	KAPL		BAPL			
Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
	Critical	Development	Critical	Development	Upper Limit for	Sr-90 Content
Year	Facility	Fue1	Facility	Fuel	KAPL Fuel	BAPL Fuel
	Fuel	(Not Irrad.)	Fuel	(Not Irrad.)	(millicuries)	(millicuries)
1964	-0-	-0-	-0-	30742		1.
1965	-0-	-0-	-0-	-0-		
1966	-0-	-0-	-0-	1262		
1967	68173	55790	-0-	-0-	1.8	
1968	-0-	68238	-0-	96343		
1969	-0-	-0-	-0-	-0-		
1970	-0-	-0-	-0-	-0-		
1971	-0-	-0-	-0-	210654		
1972	98067	17639	145920	18597	2.6	2.1
1973	17894	45566	606	2447	0.5	<0.1
1974	-0-	38095	35781	1020		0.5
1975	-0-	70505	37044	8772		0.5
1976	-0-	5573	-0-	31075		
1977	-0-	17838	-0-	4868		
1978	20352	42840	12474	26	0.6	0.2
1979	486	5178	9176	-0-	<0.1	0.1
1980	351092	8431	-0-	-0-	9.4	
				1. <del></del>		
Total	556064	375693	241001	405806	14.9	3.4

CDAME IL 225

(Grams U-235)

		GRAMS U-235
TOTAL	KAPL SHIPMENTS	931757
TOTAL	BAPL SHIPMENTS	646807
TOTAL	KAPL/BAPL CRITICAL	
	FACILITY FUEL	797065
TOTAL	KAPL/BAPL DEVELOPMENT F	UEL 781499

# APPENDIX 2

# CRITICAL FACILITY MATERIAL SHIPPED TO UNC RECOVERY SYSTEMS (FBY) SINCE JANUARY 1976\*

DOE 741 NUMBER	OAK RIDGE LOT NUMBER	SCRAP DECLARATION	GRAMS U-235	DATE SHIPPED	PWR HISTORY (Kw-Hrs)	Sr-90 CONTENT BEST ESTIMATE	(millicuries UPPER LIMIT
KZA-FBY-29	136D	SNR 418	10675	12/12/78	0.6	0.06	0.3
KZA-FBY-30	136G	SNR 414	4486	12/12/78	0.2	0.02	0.1
KZA-FBY-32	136H	SNR 415 (REV)	5191	12/01/78	0.3	0.03	0.2
KZA-FBY-34	137B	SNR 421	486	07/24/79	<0.1	<0.01	<0.1
KZA-FBY-35	1390	SNR 429	70686	01/14/80	4.1	0.41	2.0
KZA-FBY-37	1390	SNR 429	88533	03/03/80	4.8	0.48	2.4
KZA-FBY-38	1390	SNR 430	5783	03/03/80	0.3	0.03	0.2
KZA-FBY-39	1390	SNR 430	22878	03/12/80	1.2	0.12	0.6
KZA-FBY-41	139D	SNR 430,431	158212	04/01/80	8.5	0.85	4.2
		BETTIS	ATOMIC POWER	LABORATORY (PZA)	<u>)</u>		
PZA-FZB-24(1)	1370	HESE 283	12474	12/78	<1.3		0.2
PZA-FZB-25(2)	139F	HESE 286	9176	06/79 TO	<0.9		$-\frac{0.1}{10.3}$

#### KNOLLS ATOMIC POWER LABORATORY (KZA)

\* No irradiated fuel was shipped in 1976 or 1977.

 PZA-FZB-24 - scrap material shipped from BAPL to Oak Ridge for storage, subsequently shipped to UNC-RS on DOE 741 FZB-FBY-60 on 7-23-79.

(2) PZA-FZB-25 - Scrap material shipped from BAPL to Oak Ridge for storage, subsequently shipped to UNC-RS on DOE 741 FZB-FBY-65 on 2-26-80.