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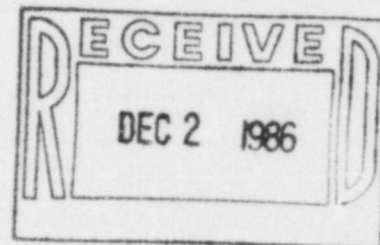
DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING

November 25, 1986

U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

Attn: Mr. Richard L. Bangart

Re: Enforcement Conference,
NRC Inspection Report 50-148/86-01



Dear Mr. Bangart:

Some of the material which we have prepared in response to questions regarding our application for a Possession-Only amendment to our license may be of interest to you. The following documents are enclosed:

1. Summary of Disassembly Activities and Inventory of Remaining Activated Materials
2. Processing and Disposal of Activated and Contaminated Reactor Components (RSS-1 Project 1)
3. Exposure ALARA Considerations for RSS-1 Project 1
4. Radiation Safety Service Permit Application, Permit no. RSS-1.

The disassembly activities described in Item 1 were performed on March 21 and 24, 1986. Thus Item 2 represents an apparant contradiction to statements made at the enforcement conference and to the next to last sentence in Item 3 of my letter to you of November 7. What I was thinking of was approval by the Nuclear Reactor Committee (which did not consider the issue) and to be honest, I had forgotten about the approval by the Radiation Sources Committee.

I hope this additional information is helpful.

Sincerely,

Harold F. Rosson
Reactor Director

Enclosures: As stated

IC-291/86

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SUMMARY OF DISASSEMBLY ACTIVITIES
AND
INVENTORY OF REMAINING ACTIVATED MATERIALS

November, 1986

All nuclear fuel has been removed and shipped to DOE facilities. The fission chamber has been transferred to Kansas State University.

The neutron detection chambers, control rod drive motors, magnets, armatures, rod drive extension rods, and guide tubes have been removed. This material is not activated and presently is being stored on top of the reactor catwalk.

The following activated components have been removed from the tank and are stored in a shielded vault in the hot lab:

<u>Description</u>	<u>Activity (mCi)</u>	<u>Weight (lbs)</u>
Control rods and sheaths (3 ea)	negligible	22
Grid plate assembly (2 plates)	0.06	18
Aluminum angles (2) and stainless steel bolts (20)	<u>0.90</u>	<u>5</u>
Total	0.96 (Co-60)	45

Disassembly of all components was accomplished by removal of bolts or threaded studs. Nothing was cut or sawed.

The balance of the activated material is contained within the reactor shielding which includes the aluminum tank, the graphite thermal column, the beam port plugs, and the concrete biological shield. The specific activity of this material has not been determined.

All natural uranium plates, rods, and scrap has been shipped to ADCO Services, Inc. for disposal. This material is not part of the reactor, but is covered under our facility license.

No other material has been removed or shipped off site.

PROCESSING AND DISPOSAL
OF ACTIVATED AND CONTAMINATED REACTOR COMPONENTS

RSS-1 Project 1
Approved by majority vote of Radiation Sources Committee
March 17, 1986

I. Introduction

It is proposed that all remaining contaminated components of the reactor, exclusive of the structural shielding, be appropriately processed for efficient packaging and disposal as radioactive waste under our usual procedures.

II. Procedures

The general procedures described under permit RSS-1 will be followed. Specifically, it has already been determined that radiation fields at 12 inches from any surface are less than 30 mR/hr.

Protective clothing will be worn in disassembling the components. Radiation monitoring will be carried out continuously by a second person. Pocket chambers will be worn.

Exposure in any one week will be kept well below 25 mrems by calculation. Smears of components will be made before any cutting or sawing is accomplished.

If components need to be cut or sawed, drop cloths will be used and work will be carried out in a draft-free environment. Face masks with particulate filters will be used with eyes protected. All filings and other materials will be disposed of as radioactive.

Comprehensive smear tests will be performed at the end of any given operation to verify the absence of any contamination.

Estimates of activity will be made from radiation levels. Analysis of spectra may be used, as appropriate, for identification of products.

EXPOSURE ALARA CONSIDERATIONS FOR

RSS-1 PROJECT 1

The potential for a total dose of 25 mrems was deemed acceptable for the benefit obtained in reducing the potential continuous doses from distributed but easily removable sources within the reactor tank. Furthermore, a check for potentially removable activity was also important for future planning for further reductions in radiation sources.

A total time of 45 minutes in the tank would yield a dose less than 25 mR and was used as the maximum time that would be required.

Permit No.	RSS-1
Effective Date	
completed by RSS	

**Radiation Safety Service
Permit Application**

PA-RLap

1. (a) Name and Department Address Home and University Phone No.	Alternate's Name, Department Home and University Phone No.
Radiation Safety Service	Michael Lemon
Benjamin S. Friesen	Assistant RSO
Director and Radiation Safety Officer	home phone 841-8260
office - 217 Nuclear Reactor Center	Judith deChamplain
office phone 864-4089	Radiation Protection Specialist
home phone 843-4373	home phone 842-3180

(b) Rooms where radioactive materials will be used or stored.

NRC - rooms 207, 210A, 203, 218, 111, 112, 132, 126, 125, 142
Haworth 904, 906, 10-1
Nichols 142

(all other approved laboratories)

2. Type of Request

(Initial) (Renewal) (Amendment) to replace all
Circle designation which applies. previous approvals

Previous Permit number _____
(Applicable only if renewal or amendment request.)

3. Isotopes

(a) Radioactive Isotope	(b) Compound(s) and/or Form	(c) Stock Storage Location	(d) Requested Possession Limit	(e) Possession Limit (completed by RSS)
Any listed in Radioactive Materials License 38-C019-01 (copy attached) (appropriate portions)	In forms listed in 38-C019-01.	203, 111 NRC Waste and Sealed Sources 111, 112, 132, 207, 210A, NRC 904, 906, 10-1 Haworth 142 Nichols	At levels listed in 38-C019-01.	At levels listed in 38-C019-01.

4. Class of Laboratory (Circle appropriate class.)

Type D Type C Type B
(Variable through all three)

5. Training of Laboratory Supervisor		where	duration of training	on the job	formal course
Type of training					
(a) Principles and practices of radiation protection,	See enclosed vitae.			yes no	yes no
(b) Radioactivity measurements, monitoring techniques, instrument capabilities, standardizations,				yes no	yes no
(c) Mathematics and calculations basic to the use and measurement of radioactivity,				yes no	yes no
(d) Biological effects of radiation including estimates of risk.				yes no	yes no

6. Experience of Laboratory Supervisor

isotope	maximum amount	where experience was gained	duration of experience	type of use
See enclosed vitae.				

7. Radiation Detection Instruments (Include RSS instruments only if on a semi-permanent loan.)

type of instrument	radiation detected	efficiency (average) or sensitivity	use monitoring, surveying measuring
See appropriate portions of License Number 38-C019-01.			

8. Method, frequency, and standards (sources) used in calibrating and checking proper operation of instruments listed above.

9. The TR-TD1 is enclosed.

10. Bioassays

Staff members handling quantities of radioactive materials at levels requiring bioassays will process them. (Handling of unopened shipments is a "gray" area. Staff members handling shipments will have bioassays performed at least once each quarter.)

11. Laboratories and Facilities

Room 111 is a hot lab and contains a radiological hood, concrete storage vaults and remote handling equipment. Lead bricks are available for temporary shielding. Rooms 203 and 207 have hoods. Haworth 906 has a new filtered radiological hood. Haworth 10-1 has the holdup-dilution tanks for controlling sewer disposal. Room 203 is our instrumentation room and contains supplies for all types of work with radioactive materials including emergency equipment.

12. Radiation Protection Program

a. General:

The representations and commitments made in our broad license 38-C019-01 and the referenced "Radiation Safety Standard Procedures" are followed. (These have been reviewed at various times and are available to any Committee members for additional review.)

The procedures covered are summarized below:

- I. Calibrations
Air monitors, direct reading dosimeters, radiation survey instruments, & TLD's
- II. Actions and Responses to Permit Violations
- III. Emergency Procedures
- IV. Exposure Records (including bioassays)
- V. Inventories
- VI. Directives
- VII. Permit Authorizations
- VIII. Purchasing Procedures
- IX. Shipment Inspections
- X. Surveys and Sampling (including leak tests)
- XI. Training
- XII. Waste Disposal

b. Specific Items

1. Possession:

The intent of the possession limits requested on the cover page should be clarified. The RSS does not anticipate that it will possess all such materials at any one time. However, since all shipments come through our labs, the possession must cover all materials that may come to the university. We also have custody of several irradiators and store various

materials either in stock form or in waste form for users for variable lengths of time. The RSS, for itself, may need reference sources, classroom materials, and calibrations sources. All items are so stored that unrestricted areas will not exceed applicable 10CFR20 regulations.

2. Approach to non-routine projects:

By its very nature, the RSS needs to have approval to handle, manipulate, and appropriately process all radiation sources which the University possesses. The general procedure by which new situations are approached is described below.

- I. All documented information available for defining the situation is gathered first. (In cases of emergency, only immediately available information would be utilized.)
 - II. In addition to documentation, "approach" surveys and measurements are made to avoid unnecessary exposure and to provide information for making decisions about required protective procedures. (In unknown situations, step I is not possible.) An "approach" survey is one in which the radiation fields or concentration, of radioactive materials are measured or estimated starting with a position far from the potential source of radiation. In general, fields in excess of 30 mR/hr at 12 inches are totally avoided except for the possibility of quick assessment (fractions of minutes). Between 2.5 and 30 mR/hr, time limitations are established.
 - III. Dry runs are performed for unfamiliar operations whenever possible.
 - IV. From analysis of operations to be accomplished, necessary shielding arrangements are calculated and installed.
 - V. All appropriate safety precautions are followed:
 1. Protective clothing-includes lab coats and gloves as a minimum. May include respirators, hooded garments, and booties.
 2. Protective drop cloths are used if radioactive materials might be spread.
 3. Hoods or dry boxes are used as required.
 4. "Second person present" rule is applied if appreciable fields or materials are involved.
 5. Film badges are worn.
 - VI. Accident Analysis

These are performed as required for planned procedures. If they have been performed under specific permits to users, they need not be performed again because the RSS has already reviewed them.
3. Procedures for Contaminated Facilities and Equipment
- I. The discussion under Section 12.b.2. above applies.
 - II. The nature and level of radiation fields are established. If

appropriate, wipes are made to establish the level of removable activity.

- III. Materials are isolated and segregated by levels and types of materials to the extent possible.
 - IV. For removable activity and chemicals, the levels are established by direct assessment of activity. For fixed radioactive materials, the levels are estimated on the basis of measuring radiation fields at a specified distance.
 - V. If components need to be disassembled or cut into smaller segments, procedures are designed to contain the materials during processing.
4. Any major project will be submitted for review and approval on a one time basis.