

CAL:RFB

DIVISION OF W. R. GRACE & CO.
BALTIMORE 3, MARYLAND

OCT 31 1956

Davison Chemical Company
Division of W. R. Grace & Co.
Baltimore 3, Maryland

Attention: Mr. T. C. Runion
Reactor Materials

Delivered by
hand 10/31
by LR

Gentlemen:

This is in reply to your October 15, 1956, letter to Mr. Eber Price, which has been referred to this office for reply. In your letter you requested advice on what concentration of thorium might be considered permissible for discharge into a stream.

The AEC published in July, 1955, as a notice of proposed rule-making, a proposed regulation establishing standards for protection of personnel and the public against radiation hazards. This proposed regulation is entitled "Standards for Protection Against Radiation". A copy is attached. While this proposed Regulation is not presently generally applicable to all licenses it is probable that it will be promulgated, with some modifications, as an effective regulation in the reasonably near future.

Please note Sec. 20.14(a) of the proposed Regulation which provides that, except as specifically authorized by the Commission in writing, no licensee shall possess, use or transfer licensed material in such manner as to release, discharge, or dispose of, into air or water (excluding public sewers, disposal of which is covered by Sec. 20.33) beyond the effective control of the licensee, radioactive material in any concentration (measured at the point where the licensee loses effective control over the material) in excess of the limits established in Appendix B, Table II.

Appendix B, Table II, in the enclosed copy of the proposed regulation, does not include a maximum permissible average concentration in air and water for thorium 232. At the present time it is anticipated that the concentration that will be established for thorium 232 will be 5×10^{-8} microcuries per milliliter of water for non-occupational exposure. This concentration, converted into the units you requested, is about 0.45 parts per million of thorium 232 in water, for non-occupational exposure.

Th-232 figures obtained from Dr. Western. Very truly yours,
Which is available in Stetina's files. Dr. Western showed, in detail, how to convert
uCi/ml figure to ppm. This calculation in Borsh's files RFB 10/29/56

OFFICE	CAL	CAL	Lyall Johnson	CAL
SURNAME	RFBorsh	CTEdwards	Chief, Licensing Branch	LJohnson
Enclosure	10 CFR 20		Division of Civilian Application	
DATE	10/24/56	10/16/56		

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16-62761-3

EXPORT LICENSE

FORM AEC-250
(8-55)

AEC LICENSE NO.

THIS LICENSE EXPIRES May 31, 1957

United States of America
Atomic Energy Commission

S - **3656-A**

Pursuant to the Atomic Energy Act of 1954 and the regulations of the U. S. Atomic Energy Commission issued pursuant thereto, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued to the licensee authorizing the export of the materials and/or production or utilization facilities listed below, subject to the terms and provisions herein. The license to export extends to the licensee's duly authorized shipping agent.

LICENSEE

NAME **Rare Earths, Inc.**
Box 488
ADDRESS **Pompton Plains, New Jersey**

PURCHASER OR ULTIMATE CONSIGNEE IN FOREIGN COUNTRY

NAME **Dominion Magnesium Ltd.**
Haley, Ontario,
ADDRESS **CANADA**

APPLICANT'S REF. NO.

COUNTRY OF ULTIMATE DESTINATION

INTERMEDIATE CONSIGNEE IN FOREIGN COUNTRY

CANADA

NAME **SAME**
ADDRESS

AUTHORIZED EXPORTER, IF OTHER THAN LICENSEE NAMED ABOVE

NAME **NONE**

ADDRESS

QUANTITY

DESCRIPTION OF FACILITIES OR MATERIALS

UNIT PRICE

TOTAL PRICE

2000-lbs.

Thorium Oxide.

END

Not valid unless signed by licensee on the REVERSE

ITEM #

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Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license is subject to the right of recapture or control reserved by Section 108 of the Atomic Energy Act of 1954, and to all of the other provisions of said Act, now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission.

THIS LICENSE IS INVALID UNLESS SIGNED BELOW
BY AUTHORIZED AEC REPRESENTATIVE

FOR THE U.S. ATOMIC ENERGY COMMISSION
[Signature]
AUTHORIZED REPRESENTATIVE

EXPORT LICENSE

NOV 16 1956

Rare Earths, Inc.

AN AFFILIATE OF DAVISON CHEMICAL COMPANY, DIVISION OF W. R. GRACE & CO.

THORIUM, CERIUM AND RARE EARTHS

BOX 488 POMPTON PLAINS, N. J. • TERHUNE 5-3060

November 29, 1956

Mr. Lyall Johnson
Chief, Licensing Branch
United States Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D. C.

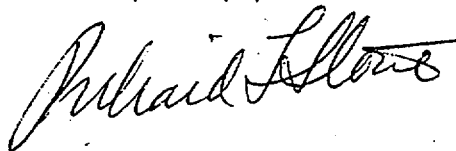
Dear Mr. Johnson:

Rare Earths, Inc., in conjunction with its affiliate, Davison Chemical Co., is planning the submission of a proposal to purchase from the Atomic Energy Commission uranium-magnesium fluoride slag for recovery of the contained uranium. Several persons will attend the Classified Technical Meeting in St. Louis on December 6, 1956, to aid in the formulation of our proposal.

To assist in our preparation, a 50 lb. sample of the uranium-magnesium fluoride slag is required and we hereby apply for a license to receive same and instructions for obtaining the sample.

Thank you for your assistance.

Very truly yours,



Richard L. Stone

RLS:MCB

ITEM # 137

B/136

W. R. GRACE & CO.

GRACE

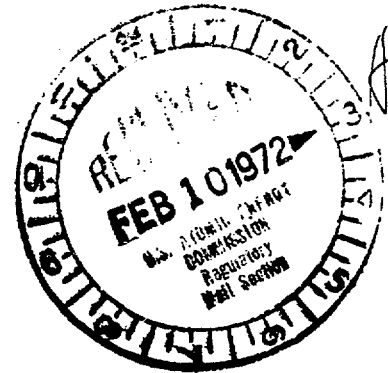
RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

February 9, 1972

FOR DIV of Compliance
WLB

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation
Branch
Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D.C. 20545



Dear Mr. Nussbaumer:

Enclosed are seven copies of the "Emergency Control Organization Standard Operating Procedures" for the W. R. Grace & Co., Washington Research Center, including the "Radiation Emergency Procedures".

The enclosed copies are submitted as a part of the information under the provisions of Special Nuclear Material-840.

If there are any questions, or additional copies are required, please advise.

Sincerely yours,

Donato R. Telesca
Plant Manager
Nuclear Facility

DR1:jk
Enclosures (7)

ITEM #

224

B/223

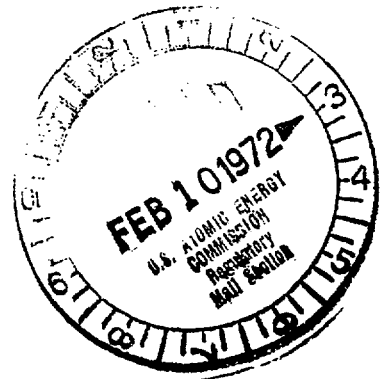
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EMERGENCY CONTROL
ORGANIZATION

STANDARD OPERATION PROCEDURES

Copy No. 3-3

Assigned to: Atomic Energy Comm.



ISSUE DATE

February 7, 1972

AUTHORIZED BY

W. R. GRACE & CO.

Washington Research Center Divisions

EMERGENCY CONTROL ORGANIZATION

GENERAL EMERGENCY

NUMBER INDEX -

General
Emergency

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SUPERSEDES

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May 10, 1971

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May 10, 1971

W. R. GRACE & CO.

Washington Research Center Divisions

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EMERGENCY CONTROL ORGANIZATION
GENERAL EMERGENCY

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SUBJECT

EMERGENCY CONTROLLER'S RESPONSIBILITIES

In the event of an emergency such as explosion, fire, escape of toxic gas, etc., the normal line organization of the Washington Research Center will be superseded by an Emergency Organization. (See attached chart) The Emergency Controller has the authority and responsibility for correcting, controlling or eliminating the emergency condition with due regard for safety of personnel and protection of Company property.

In discharging the responsibilities of this office, the Emergency Controller will be guided by the following policies:

1. During the period of emergency, the Emergency Controller will have
 - (a) complete responsibility and authority for conduct of operations to control or eliminate the emergency; and
 - (b) complete responsibility and authority for supervision of all personnel comprising the Emergency Organization regardless of the normal line of supervision.
2. The start of an emergency period will normally be signaled by the fire or emergency alarm systems. Only the Emergency Controller will be authorized to signal an "all clear".
3. In the event that the emergency is of such nature that county or state authorities (police or fire) are called or come to WRC, it will be the responsibility of the Emergency Controller to coordinate his activities with theirs and to subordinate his authority to theirs as provided by law.
4. It shall be the responsibility of the Emergency Controller to maintain adequate liaison with local authorities (fire and police) during non-emergency periods so as to insure maximum cooperation during periods of emergency.
5. It shall be the responsibility of the Emergency Controller to insure through the Project Engineer that contractors working at WRC are cognizant of our safety rules and emergency procedures.

Issu Date: May 10, 1971

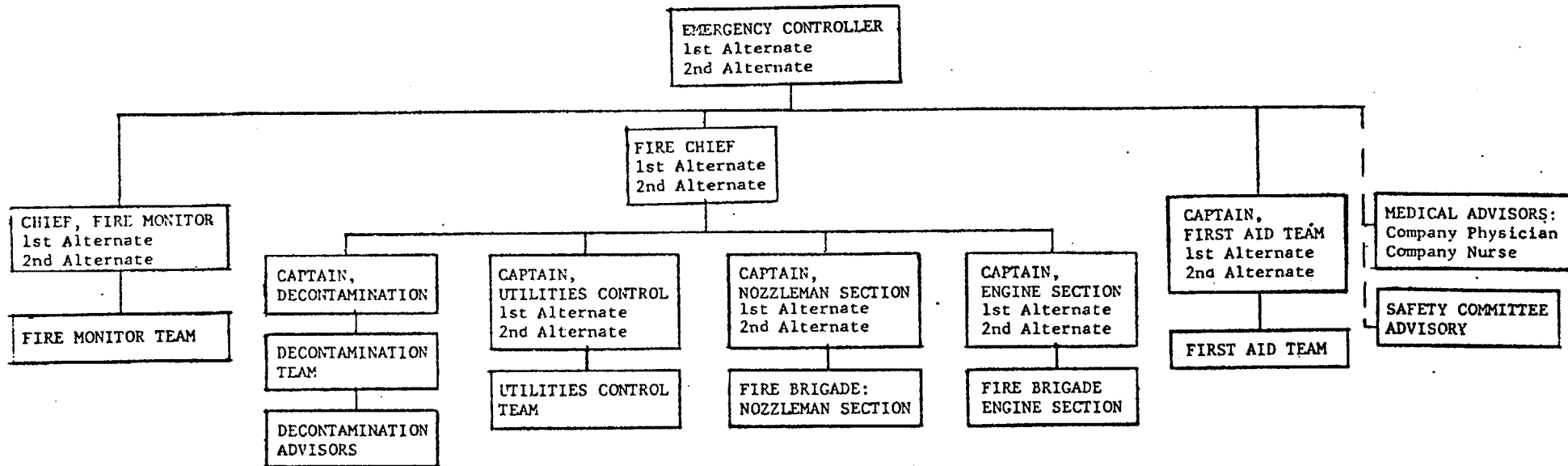
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Authorized By:

[Signature]

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EMERGENCY CONTROL ORGANIZATION



COLOR DESIGNATIONS FOR HATS	
EMERGENCY CONTROLLER	BLUE
FIRE CHIEF	
CHIEF, FIRE MONITOR	
CHIEF, FIRST AID TEAM	
FIRE MONITORS-----	YELLOW
FIRE BRIGADE-----	RED
FIRST AID TEAM-----	WHITE

ISSUE DATE

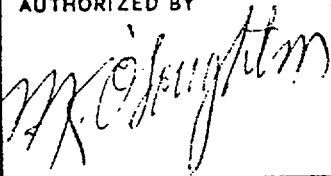
May 10, 1971

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Washington Research Center Divisions

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EMERGENCY CONTROL ORGANIZATION
GENERAL EMERGENCY

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WRC EMERGENCY PLAN COMMUNICATIONS

An emergency telephone network (internal) is provided for the purpose of notifying personnel assigned to the emergency organization. All employees are familiarized with this system during employment indoctrination. These emergency telephones are located in the immediate work area of the Emergency Controller and all emergency organization section chiefs as well as other strategic locations; i.e., PBX Operator, Maintenance Building, Nurse, all boiler rooms, and in each hallway of all buildings. In noisy areas, loud signals are installed.

Notification of local, state, and Federal agencies will be made by telephone or, in the event telephones are inoperative, by means of a battery operated two-way radio. This emergency radio is installed, operative, and preset to contact the Howard County Office of Civil Defense and the Howard County Central Alarm.

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May 10, 1971

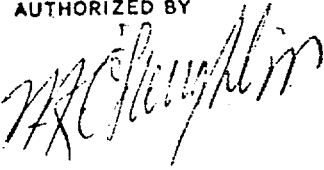
W. R. GRACE & CO.

Washington Research Center Divisions

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EMERGENCY CONTROL ORGANIZATION
GENERAL EMERGENCY

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SUBJECT

REVISIONS TO THE EMERGENCY PLAN

The Emergency Controller will be responsible for the periodic review and revision of the Emergency Plan.

1. The organizational structure and emergency procedure will be reviewed and revised whenever a change in operation or a physical change in the facility occurs.
2. Personnel assignment lists will be updated by review of administrative force reports.
3. The above reviews and revisions will be made no less than once per year.

ISSUE DATE May 10, 1971	W. R. GRACE & CO. Washington Research Center Divisions	NUMBER 2.10
AUTHORIZED BY <i>W. R. Grace</i>	EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	PAGE 1 OF 3
SUBJECT FIRE PLAN		SUPERSEDES

WRC FIRE BRIGADE - ASSIGNMENTS AND RESPONSIBILITIES

Fire Chief:
1st Alternate:
2nd Alternate:

1. To determine a rapid diagnosis as to the extent of fire and relay this information to the Howard County Central Alarm.
2. To coordinate the action of the inside and outside sections so that fire can be contained as quickly as possible.
3. To maintain a training program for Brigade members and to maintain an effective inspection schedule to insure that all emergency equipment will be available and workable.

*Nozzleman Section - Nozzleman Fire Captain:
1st Alternate:
2nd Alternate:

1. To deploy nozzlemen at the scene with the best available equipment to control the particular fire.
2. To maintain close communication with the Fire Chief (by runner if necessary) of any changes in the situation that may affect overall fire fighting strategy.

Nozzlemen: To go immediately to the scene of the fire with assigned equipment. Fire fighting tactics to be under the direction of the Nozzleman Fire Captain.

- Nozzleman #1 Don "Turn-Out" gear as quickly as practical. If one
#2 of these men is not present, an alternate is to be
#3 appointed by the Nozzleman Captain.
- #2 & #3 Take a Scott air breathing apparatus to scene of fire
- #4 Take a 30 lb. dry chemical extinguisher to scene of fire.

Nozzleman #5 Go to hose cabinet near scene of fire and unfold hose so that it will be ready for use.

#6 Man water valve at hose cabinet.

#7 & #8 Each take a 15 lb. CO₂ extinguisher to scene of fire.

#9 Take a Scott air breathing apparatus to scene of fire.

*Engine Section - Engine Fire Captain:

1st Alternate:

2nd Alternate:

1. To assemble all available members of the engine section at the fire shed.
2. To expedite hooking up of all emergency equipment and proceed to scene of fire.
3. To insure that all emergency equipment is in running condition upon arriving at scene of fire.
4. To insure that one man is sent to the head of the driveway to direct any fire fighting equipment to scene of fire.

Firemen: To go immediately to the fire shed and assist in the hooking up of the equipment. (If hooking up has been completed when you arrive at the shed and equipment has already started to the fire, you are then to go directly to the scene of fire as quickly as possible.) Fire fighting tactics are to be under the direction of the Engine Fire Captain.

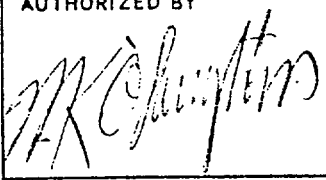
Fireman #1 Emergency equipment truck drivers. (The first
#2 driver at the fire shed will be designated as the
#3 driver.)

- #1 Hook up hose from fire hydrant to foam pumper tank. If fire hydrant is quickly available, the foam pumper may be by-passed in situations of one and two-story fire.
- #2 Hook up hose from the discharge of foam pumper to scene of fire.
- #3 Emergency foam pumper operator - to start up emergency foam and proceed to make up connections for ready use of foam. (Fireman #5 helps with this.)

- Fireman #4 Emergency generator operator - to start up the emergency generator and proceed to lay an extension cord service for exhaust blowers and/or emergency lights.
- #5 Emergency foam pumper operator - to start up emergency foam and proceed to make up connections for ready use of foam. (Fireman #3 helps with this.)
- #6 & #7 Each take portable exhaust fan to scene of fire.
- #8 Take foam nozzle and one 5 gal. container of foam concentrate to scene of fire.
- #9 Take up position at driveway intersection to direct Fire Department equipment.
- #10 To hook up hose from the discharge of the foam pumper to the scene of the fire.
- * The above listed duties for the Nozzleman Section and Engine Section are designated as initial primary duty of each member. Additional duties will be assigned by the Section Captains in order to contain or control a fire in any situation.

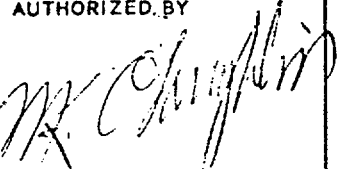
NOTE: Buildings 16-A and 20

In case of a fire in either of the above buildings, extinguishing agent should be limited to carbon dioxide or dry chemical extinguishing agents. Water is not to be used to extinguish fires in these buildings without authorization from the Fire Chief.

ISSUE DATE May 10, 1971	W. R. GRACE & CO. Washington Research Center Divisions	NUMBER 2.307
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SUBJECT WRC FIRE BRIGADE - PERSONNEL SELECTION AND TRAINING		SUPERSEDES .

Personnel selections for service on the fire brigade are made primarily from the Maintenance Group. These personnel are selected on the basis of their knowledge of the various buildings, locations of emergency and operating equipment, emotional stability, and ability to receive and implement instructions.

Personnel selected to serve on the nozzleman section of the fire brigade attend the Fire Fighters Qualification Course conducted annually at the University of Maryland. Periodic training sessions are conducted to review the operating techniques of emergency equipment. Full scale drills for each building are conducted annually to review and observe brigade proficiency in accomplishing assigned responsibilities as specified in the Fire Plan.

ISSUE DATE May 10, 1971 AUTHORIZED BY 	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	NUMBER 3.10 PAGE 1 OF 3 SUPERSEDES
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SUBJECT

EVACUATION PLAN - ASSIGNMENTS & RESPONSIBILITIES

Chief, Emergency Monitor
 1st Alternate, Bldg. 1
2nd Alternate, Bldg. 2

Responsibilities

1. To insure that all personnel has been evacuated from building concerned during an emergency evacuation condition.
2. To insure that all building areas have been checked by assigned monitors.
3. To insure that a status report is made to the Emergency Controller immediately after evacuation results are determined.
4. To maintain an effective training program for all fire monitors.

Monitor Captain, Bldg. 1
 Alternate Monitor Captain, Bldg. 1

Monitor Captain, Bldg. 2
Alternate Monitor Captain, Bldg. 2

Responsibilities

1. To immediately proceed, upon alarm, to main entrance of respective buildings to receive evacuation report from all monitors assigned to the building concerned and insure that this information is delivered to the Chief Emergency Monitor. Monitor Captains will send information via two monitors to Chief Monitor.
2. To insure that all monitors assigned to the respective buildings are accounted for.
3. To insure that all monitor assignments are covered.
4. To utilize any excess monitors as runners in receiving the reports from the various entrance assignments.

Fire Monitors - All Buildings

Responsibilities

1. When an evacuation alarm sounds, monitors in that building will immediately begin the physical check of their assigned area. All monitors will wear their yellow hard hat and carry their assigned breathing apparatus for ready use, if required.
2. All areas on the assigned floor will be checked to insure that the evacuation is complete.
3. After ascertaining that their assigned area is clear, all monitors will evacuate the building via the nearest exit and proceed to their entrance assignment.
4. All monitors will report to their Monitor Captain that their assigned area has been checked and is clear--reports may be made via one runner.
5. All monitors will take up positions at building entrances of their building as outlined below, to insure that no persons other than emergency personnel re-enter the building.

Monitor Assignment

Entrance Assignment

Bldg. #1, Basement

Personnel Door . . . North

Loading Dock Door . . North

Bldg. #1, 1st Floor

Personnel Door . . . East

Bldg. #1, 2nd Floor

Cafeteria Door . . . West

Bldg. #1, 3rd Floor

Main Entrance . . . South

Bldg. #1-A, Basement

Personnel Door . . . East

Bldg. #1-A, 1st Floor

Personnel Door . . . West

Bldg. #1-A, 2nd Floor

Main Entrance . . . South

Bldg. #2, 1st Floor

Personnel Door . . . North

Personnel Door . . . East Center

Bldg. #2, 2nd Floor

Personnel Door . . . East

Loading Area . . . West

Main Entrance . . . South

Bldgs. No. 3, 4, 11,
16, 16-A, 20, & 22

To be assigned by Chief Fire Monitor

6. All monitors will direct personnel to a wait area as designated below regardless of weather or duration of emergency.

(a) Evacuation involving Bldgs. 2, 3, 4, or 22:

Personnel to go to the Cafeteria, Bldg. 1 and/or the Library, Bldg. 1-A.

(b) Evacuation involving Bldgs. 1, 1-A, 11, 16, 16-A, or 20:

Personnel to go to the Lobby, Conference Rooms and corridors of Bldg. 2

ISSUE DATE
May 10, 1971

W. R. GRACE & CO.
Washington Research Center Divisions

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EMERGENCY CONTROL ORGANIZATION
GENERAL EMERGENCY

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SUPERSEDES

SUBJECT

WRC EVACUATION MONITORS - PERSONNEL SELECTION AND TRAINING

Building monitors are chosen by interview. They must be physically fit, emotionally stable, able to receive instructions and relay messages clearly and accurately. They are trained by class instruction and through periodic evacuation drills. The duties and responsibilities of each man are reviewed with him periodically to keep him abreast of any new developments or changes in procedure.

ISSUE DATE Oct. 9, 1971	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	NUMBER 3.40
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		SUPERSEDES #3.40 5/10/71

SUBJECT

DESIGNATED ASSEMBLY LOCATIONS FOR DEPARTMENTS (By Bldg. Occupancy)

EVACUATION OF BLDGS. NO. 1 and 1-A.*

Dept. Assembly Location

901 Lobby Conference Room, Bldg. 2

907	}	1st Floor - North Hall - North End - Bldg. 2
916		
917		
919		
929		
940		
942		

926 1st Floor - North Hall - South End - Bldg. 2

902 2nd Floor - North Hall - North End - Bldg. 2

903 2nd Floor - North Hall - South End - Bldg. 2

911 1st Floor - East Hall - West End - Bldg. 2

927 & 972 1st Floor - East Hall - East End - Bldg. 2

914 & 923 2nd Floor - East Hall - West End - Bldg. 2

905	}	2nd Floor - East Hall - East End - Bldg. 2
906		
909		
910		
913		

Other personnel housed in Bldgs. 1 & 1-A but not listed above	}	1st Floor - North Hall - North End - Bldg. 2

* Any person with direct information on the emergency should proceed immediately to 1st Floor - North Hall - North End - Bldg. 2, so the emergency crews and management may reach them promptly.

EVACUATION OF BLDG. NO. 2 *Dept. Assembly Location

922 Nuclear Conference Room - Basement - Bldg. 1-A

905, 908, 972 Library, Bldg. 1-A

904, 906, 921, 923 &
other personnel housed
in Bldg. 2 but not

listed above - - - - Assembly Location: Cafeteria, Bldg. 1

* Any person with direct information on the emergency should
proceed immediately to Library, Bldg. 1-A, so the emergency
crews and management may reach them promptly.

EVACUATION OF BLDGS. NO. 3 and 4

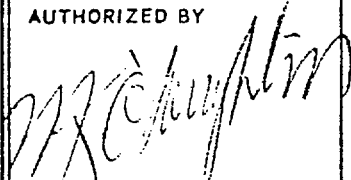
All occupying depts. - Assembly Location: Cafeteria, Bldg. 1

EVACUATION OF BLDGS. NO. 11, 16, 16-A and 20

All occupying depts. - Assembly Location: Lobby, Bldg. 2

EVACUATION OF BLDG. NO. 22

All occupying departments - Assembly Location: Cafeteria, Bldg. 1

ISSUE DATE May 10, 1971	W. R. GRACE & CO. Washington Research Center Divisions	NUMBER 4.10
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SUBJECT WRC FIRST AID TEAM - ASSIGNMENTS AND RESPONSIBILITIES		SUPERSEDES

First Aid Team Officers:

Captain
1st Alternate
2nd Alternate

Medical Advisors:

Company Doctor
Company Nurse

Responsibilities

1. To deploy First Aid Squads with their equipment within visual distance of all normal exits of the evacuated building.
2. To report location and state of readiness of First Aid Squads and their equipment to Emergency Controller.
3. To stand by with First Aid Squads, prepared to move in and render first aid assistance as may be required.
4. To maintain a vigorous, continuing program of First Aid and Safety Instruction for the First Aid Team members.

First Aid Squad Leaders (3)

Responsibilities

1. Proceed to assigned muster area with first aid kit.
2. Select appropriate area for First Aid Station which will permit coverage of building exits assigned.
3. Muster squad, check equipment and report to First Aid Captain via alternate assigned.
4. Maintain constant vigilance of assigned exits.
5. Maintain visual and voice contact with adjacent First Aid Squads. (Assign runner for intercommunication if radio equipment is not available.)

6. If a casualty is brought into area of responsibility:
 - (a) Advise First Aid Captain via radio or runner.
 - (b) Move in to render lifesaving first aid. (Stop bleeding; restore & maintain respiration; minimize shock; other emergency procedure as indicated.)
 - (c) In cases of imminent danger only, transfer patient to stretch and move to a place of safety.
 - (d) Further care and treatment of the patient will be carried out under the supervision and direction of the Senior Medical Advisor present or, in his absence, the Senior First Aid Team Officer present.
7. First Aid Squads or individual team members will not enter the evacuated building unless specifically requested by the Emergency Controller. Entry upon request shall be purely volunteer basis.

First Aid Team Members

1. When evacuation alarm sounds, First Aid Team members will proceed to designated muster area, taking such first aid equipment as time and hazard permits. Under no condition will a First Aid Team member place himself in a hazardous position to salvage equipment.
2. Each member will place himself under the direction and instruction of the Squad Leader or Team Officer present. In the absence of Squad Leader or Officer, the Senior First Aid Team member will assume responsibility. First Aid Captain will be notified.
3. In the presence of a casualty, the First Aid Team member will maintain calm and efficient composure while rendering such assistance as his prior training makes possible.

Special Functions

Telephone Guard: A telephone guard will be maintained in a safe location to provide internal telephone contact to call out First Aid Team members not alerted by emergency signal.

- (a) In evacuation of Bldgs. 2, 3, and 4, the telephone guard will be maintained at extension 314 in Bldg. 1.
- (b) During evacuation of Bldgs. 1, 1-A, 16, 16A, and 22, the telephone guard will be kept at extension 201 in Bldg. 2.

* Deployment of First Aid Squads: While the exact location of the First Aid Squads is to be decided by the Squad Leader and the Team Officer, the three squads will normally locate as follows with respect to the evacuated building:

Squad No. 1 on the south side

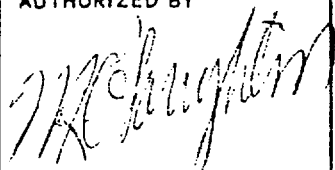
Squad No. 2 on the east end

Squad No. 3 on the north side

The First Aid Squads shall be deployed by the Squad Leader in such a manner that:

- (a) Visual coverage of all assigned exits is maintained.
- (b) Stations are sufficiently removed from exits to avoid impence of fire and rescue personnel--yet close enough to render prompt aid.
- (c) Stations are not in places of imminent or potential danger.
- (d) Stations are upwind from smoke, fire or gas hazard.

* Nurse reports with Squad No. 1 at south side of building involved.

ISSUE DATE May 10, 1971	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	NUMBER 4.30
AUTHORIZED BY 		PAGE 1 OF 1
SUBJECT WRC FIRST AID TEAM - PERSONNEL SELECTION AND TRAINING		

First Aid Team members are recruited from employees with previous experience as Army Medics, Navy Corpsmen, Red Cross First Aid Trainees, Volunteer Rescue Squad Members, and Police First Aid Trainees. Members are selected on the basis of previous training, emotional stability, ability to receive and execute instructions, and physical capability to handle patient and equipment.

Training is continued in monthly in-plant training sessions devoted to specific first aid techniques and problems. W. R. Grace & Co. sends one or more team members to The Industrial Safety and First Aid Institute each year for a one-week training course. The Institute is sponsored by the Red Cross, the Safety Council, and the American Society of Safety Engineers. Graduates qualify as Red Cross First Aid Instructors, and serve the WRC First Aid Team as team officers and squad leaders. Instructor training is reviewed at Red Cross First Aid Clinic sessions every two years. All team members stand ready to give aid and assistance to their fellow employees at all times. All team members are trained in first aid techniques of resuscitation, control of bleeding, treatment for burns and shock, splinting, dressing and bandaging wounds, lifting and carrying the injured. Training includes the use of first aid equipment which is strategically located at various locations throughout the plant site. Inspection and maintenance of the equipment is the responsibility of the First Aid Team officers.

Nine team members have received training in cardiopulmonary resuscitation technique and are authorized to use this method within the confines of the company property. Training and certification was received from the Baltimore Chapter of the Heart Association. Certification is to be renewed by participating in a training session at least once a year.

The First Aid Team responds to fire or evacuation alarm as a unit, or individually to other emergency calls as requested. A telephone call system is used to back up the general alarm or to call out individual team members. A telephone watch is maintained during a general emergency as described in the Evacuation Plan. The First Aid Team Captain has an emergency "300" phone at his desk, from which location he initiates the telephone back-up call system.

DATE 11/11/64

R INDICATES: PRIVATE HYDRANT
(FROSTPROOF)

EXTENSIVE HOSE CONNECTION

pump house and river

Water Treatment Bldg
one story, Block

New Warehouse
Bldg, 1-story, steel

#20

Storage Area, (Barn)
one story, steel

#11

Existing Sewage Treatment Facility Area.

Addition to Sewage treatment Facility.

LAKE

2-STORY, BRICK

#22

Dynamometer Bldg, one story brick

GENERATOR BLDG.
TWO STORY BLOCK.

paved roads

Water Tower

BLDG #16
ADDITION

#16

Bldg 16, one story, brick

Alky Storage
1 story, Transite

Cooling Tower

Cylinder Storage
one story, open

#2

Bldg 4, Maintenance Shop
1-story, Block

#4

Greenhouse, one story, Block

Solvent Storage, 1-story Block

Grounds Garage, 1 story, 8

Octane Lab, one story, Bl.

Cooling Tower

Bldg 1, 3 story, Brick

Bldg 2, Two story, Brick

#17

#1

To Route 32
(300 feet)

ISSUE DATE February 7, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	NUMBER 11.20
AUTHORIZED BY		PAGE 1 OF 1
		SUPERSEDES 11.20 dated May 10, 1971

SUBJECT

DISTRIBUTION

1. Vice President - Inorganic/Nuclear Research
2. Emergency Controller
3. Vice President - Davison Division
4. Emergency Controller - 1st Alternate
5. Company Doctor/Company Nurse
6. WRC Managers Office
7. Director - Process Development/Engineering
8. Emergency Controller - 2nd Alternate
9. Patent Office
10. Vice President - Chemical Group
11. Director - Public Relations
12. Vice President, Polyfibron Division
13. First Aid Team Captain
14. Captain, Nozzleman Section
15. Captain, Engine Section
16. Chief Monitor
17. 1st Alternate Chief Monitor, Bldg. 1
18. 2nd Alternate Chief Monitor, Bldg. 2
19. Utilities Control Captain
20. Safety Committee Chairman
21. Alternate Monitor Captain, Bldg. 1
22. Alternate Monitor Captain, Bldg. 2
23. First Aid Team Officer, Squad No. 2
24. First Aid Team Officer, Squad No. 3
25. Plant Manager - Nuclear Facility
26. Radiological Protection Officer - WRC
27. Supervisor - Nuclear Facility
28. Emergency Cache, Bldg. 2
29. Marsh & McLennan, Inc. - Transferred to Factory Ins. Assoc.
- 30 thru 37 U.S. Atomic Energy Commission, Material Licensing
38. Nuclear Safety Associates
39. Nuclear Facility
40. Nuclear Facility
41. Nuclear Facility

EMERGENCY CONTROL
ORGANIZATION

RADIATION EMERGENCY PROCEDURES

Copy No. 33

Assigned to: Atomic Energy Comm.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER INDEX - Radiation Emergency
AUTHORIZED BY <i>Victor S. Hawk</i>		PAGE 1 OF 1
		SUPERSEDES

SUBJECT

INDEX - RADIATION EMERGENCY

Deviations to the General Emergency Plan	5.10
General Info. & Emergency Control Organization Chart	5.20
Specific Responsibilities	
Emergency Controller	6.10
Radiological Protection Officer	6.20
Company Physician	6.30
Plant Manager - Nuclear Facility	6.40
Health Physics Technician	6.50
Company Nurse	6.60
Radiation Survey Team	6.70
Plant Security Personnel	6.80
Decontamination Team	6.90
Supplemental Emergency Personnel	8.10
Requirement of Code of Federal Regulations	10.10
Map of Plant Facilities	12.10
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ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 5.10
AUTHORIZED BY <i>Victor S Frank</i>		PAGE 1 OF 1
		SUPERSEDES

SUBJECT

DEVIATIONS TO THE GENERAL EMERGENCY PLAN

The foregoing procedures DO NOT APPLY TO ANY EMERGENCY IN BUILDING 16 COMPLEX* OR BUILDING 20.

In the event that the exterior Radiation alarms are activated, Emergency Monitors (in buildings other than 16 complex and 20) will place conspicuous signs on the inside of their assigned exterior doors to warn personnel that a radiation incident has occurred and that occupants must remain inside the building.

In addition, the Radiation Survey Team, under the direction of the Radiological Protection Officer, will cordon off the contaminated area. Personnel will not be allowed to enter the contaminated area without the express permission of the Radiological Protection Officer.

The Emergency Controller will inform personnel when the emergency is over.

*Building 16 complex = Bldgs. 16, 16-A, 16-B, and the Dynamometer Bldg.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 5.20
AUTHORIZED BY <i>Victor S. Frank</i>		PAGE 1 OF 3
		SUPERSEDES

SUBJECT

RADIATION EMERGENCY - GENERAL

A Radiation Emergency is defined as an incident in which the exterior Nuclear Alarms located on the premises and the interior alarm in the involved building only will be activated. The exterior Nuclear Alarms have a distinctive modulating siren sound to differentiate from the interior General Emergency alarm system. In the event that the Nuclear Alarms are activated:

1. All personnel will seek immediately the closest cover available away from the Building 16 complex* and Building 20. Personnel in the affected building, however, will quickly evacuate to the Lobby Conference Room of Building 2. The evacuation route for an incident involving Building 16 complex and Building 20 will be via the nearest outside exit and the most direct outside route to the south (main) entrance to Building 2.

2. All evacuees will be surveyed by the Health Physics Technician, Radiological Protection Officer or other personnel skilled in the operation of the survey equipment. A cache of supplies and equipment, including portable survey equipment to be used in the event of an emergency, is located in the closet at the back of the Lobby Conference Room in Building 2.

3. First-aid will be administered to affected personnel requiring medical attention. Contaminated persons requiring first-aid will be decontaminated to levels consistent with their need for medical attention.

4. Injured personnel requiring further medical attention will be evacuated to medical centers specially qualified to administer their injuries.

5. Uncontaminated and decontaminated personnel will be released by the Radiological Protection Officer and instructed to proceed to the secondary emergency assembly area at the East end of the East-West corridor of Building 2. No one will be permitted to leave this area until the Emergency Controller determines that no further hazard exists.

*Building 16 complex = Bldgs. 16, 16-A and 16-B and the Dynamometer Bldg.

6. When all personnel decontamination is complete, the Radiological Protection Officer will assemble the Radiation Survey Team.

7. The Radiation Survey Team will delineate and clearly identify all contaminated areas on the WRC site. They will also determine the location and clearly identify isodose lines circumscribing the actual point of occurrence of any nuclear incident.

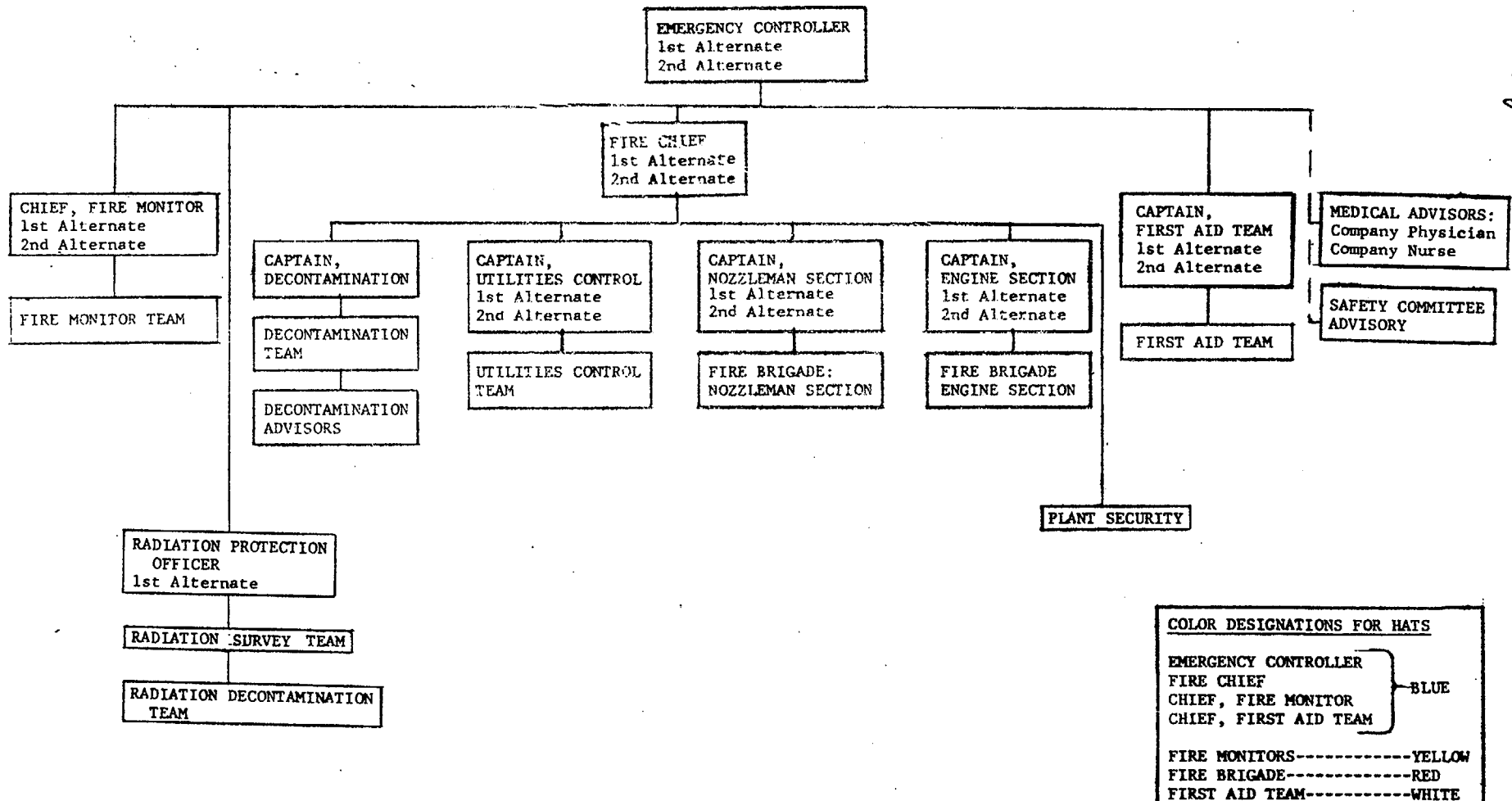
8. At the conclusion of the radiation survey of the WRC site, persons unaffected by any continuing hazard will be instructed by emergency personnel to return to their usual work locations and to resume their assignments.

9. Personnel assigned to work locations in areas affected by any continuing radiation hazard resulting from any nuclear incident will be reassigned to other locations or enlisted to aid in decontamination procedures.

10. The Radiation Emergency shall be deemed to be over by the Emergency Controller when the Radiation Survey Team has completed their assessment of any continuing hazard and the risk of exposure for the majority of site personnel is determined by the Radiological Protection Officer and Emergency Controller to be negligible.

11. Decontamination of the site and facilities will be undertaken by the Decontamination Team after delineation of the isodose lines by the Survey Team and when unaffected facilities and operations have been returned to normal.

EMERGENCY CONTROL ORGANIZATION



ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 6.10
AUTHORIZED BY <i>Victor S. Frank</i>		PAGE 1 OF 1
		SUPERSEDES
SUBJECT EMERGENCY CONTROLLER		

Responsibilities

In the event of a Radiation Emergency during normal working hours, the Emergency Controller will:

1. proceed to the Lobby Conference Room in Building 2 and assume responsibility for coordinating the efforts of Radiation Safety and Medical personnel.
2. summon any outside aid required and coordinate this assistance.
3. determine the end of any site-wide emergency and detailed procedures to be followed to return personnel and facilities to normal operation, based on the assessment of the Radiation Survey Team and in cooperation with the Radiological Protection Officer, Plant Manager-Nuclear Facility, and other qualified personnel or consultants.

In the event that a Radiation Emergency occurs during other than normal business hours, the Emergency Controller will summon the Radiological Protection Officer, Company Physician, Company Nurse, Plant Manager-Nuclear Facility, Director of Public Relations, and Vice President of Research.

ISSUE DATE

January 25, 1972

AUTHORIZED BY

Victor S. Frank

W. R. GRACE & CO.

Washington Research Center Divisions

EMERGENCY CONTROL ORGANIZATION

RADIATION EMERGENCY

NUMBER

6.20

PAGE

1 OF 1

SUPERSEDES

SUBJECT

RADIOLOGICAL PROTECTION OFFICER

Responsibilities

In the event that the radiation alarms are activated or upon notification from the Emergency Controller that a Radiation Emergency exists, the Radiological Protection Officer will proceed to the Lobby Conference Room in Building 2 and:

1. supervise and assist the Health Physics Technician in determining the extent of radiation exposure and contamination and in decontaminating all affected personnel,
2. authorize release of uncontaminated personnel to the secondary assembly area,
3. supervise the Radiation Survey Team in determining the extent of contamination of the WRC site and locating isodose lines,
4. limit the exposure of Survey Team members,
5. in cooperation with the Emergency Controller and Plant Manager determine the conclusion of the site-wide emergency and the extent of any limited continuing emergency, and
6. in concert with the Emergency Controller, Plant Manager and other qualified personnel or consultants, determine detailed procedures and action to be taken to decontaminate and return affected areas and facilities to normal operations.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 6.30
AUTHORIZED BY <i>Victor S Frank</i>		PAGE 1 OF 1
		SUPERSEDES

SUBJECT

COMPANY PHYSICIAN

Responsibilities

Upon notification that a Radiation Emergency exists, the company physician will proceed to the site and take the following actions:

- Provide emergency medical treatment for non-contaminated injured personnel.
- Provide emergency medical treatment for injured personnel who may have been contaminated, after the decontamination process has reduced the contamination to a safe level.
- Contact the local medical facility which will be used and alert them to prepare to receive contaminated or injured personnel.
- Arrange for the admittance of the injured personnel at the medical facility.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 6.40
AUTHORIZED BY <i>Viter S Frank</i>		PAGE 1 OF 1 SUPERSEDES

SUBJECT

PLANT MANAGER - NUCLEAR FACILITY

Responsibilities

In the event of a Radiation Emergency during normal business hours or upon notification by the Emergency Controller that such a condition exists, the Plant Manager - Nuclear Facility will:

1. proceed to the Lobby Conference Room in Building 2 and confer with the Radiological Protection Officer in determining the extent of any radiation hazard,
2. notify the highest responsible Corporate officer at the WRC site as to the nature and magnitude of the emergency and
3. assist the Radiological Protection officer in the decontamination of affected personnel and facilities.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 6.50
AUTHORIZED BY <i>Victor S Frank</i>		PAGE 1 OF 1
		SUPERSEDES

SUBJECT

HEALTH PHYSICS TECHNICIAN

Responsibilities

In the event of a Radiation Emergency, the Health Physics Technician will go immediately to the Lobby Conference Room in Building 2 and assist the Radiological Protection Officer in determining the extent and magnitude of the exposure and contamination of personnel and facilities. He will assist in the decontamination of affected personnel and in the supervision of the Radiation Survey Team. He will:

1. do survey measures of affected personnel in the order of established priorities,
2. assist in the decontamination of any injured and non-ambulatory personnel,
3. instruct ambulatory, injured and uninjured personnel in correct decontamination procedures, and
4. assist the Radiological Protection Officer in the supervision of the Radiation Survey Team and in limiting exposure of the team members.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions	NUMBER 6.60
AUTHORIZED BY <i>Victor S. Frank</i>	EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	PAGE 1 OF 2
		SUPERSEDES

SUBJECT

COMPANY NURSE

Responsibilities

In the event that the radiation alarms are activated, the Nurse, Health Physics Technician, and First Aid Team in Bldg. 2 only, will proceed immediately to the assembly area in Bldg. 2, don protective clothing, close off corridor door, and prepare to receive evacuated personnel into the Lobby Conference Room. Evacuated personnel will enter the assembly area through the lobby exterior door and proceed into the Lobby Conference Room where the following action will be taken:

1. Each evacuee will be monitored for radiation contamination by the Health Physics Technician and assistants.
2. Uninjured evacuees who are not contaminated will be assembled in the east lobby of Bldg. 2 (First Floor).
3. Injured evacuees who are not contaminated will be given appropriate first aid treatment and assembled in the east lobby of Bldg. 2 (First Floor).
4. Ambulatory and uninjured evacuees who are contaminated will be sent to the shower room under the direction of the Radiological Protection Officer. Evacuees will be provided with a plastic package containing soap, towel, and clean clothing. Contaminated clothing will be removed and placed in the plastic bag for collection and disposal. After showering, evacuees will again be monitored for radiation contamination. If the survey is negative, appropriate first aid treatment will be given if necessary and evacuees will don clean clothing and report to the assembly area in the east lobby of Bldg. 2, (First Floor). If the survey indicates that radiation contamination is still present, the decontamination process will be repeated.
5. Nonambulatory evacuees who are contaminated will be decontaminated under the direction of the Radiological Protection Officer to minimum levels consistent with their requirement for medical aid. Injured personnel requiring no further medical attention will be released by the Company Physician or Nurse and the Radiological Protection Officer and instructed to proceed to the secondary, emergency assembly area

6.60

COMPANY NURSE

2 OF 2

at the East end of the East-West corridor on the first floor of Building 2. Injured personnel requiring further medical attention will be evacuated to centers specially qualified to administer to their injuries.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 6.70
AUTHORIZED BY <i>Victor S Frank</i>		PAGE 1 OF 1
		SUPERSEDES

SUBJECT

RADIATION SURVEY TEAM

Responsibilities

At the conclusion of all personnel decontamination, the Radiological Protection Officer will assemble a Radiation Survey Team comprised of four members chosen from experienced nuclear personnel. The Radiation Survey Team will be responsible for determining the magnitude and extent of any continuing hazard. In this regard team members will:

1. don the protective clothing and dosimeters included in the emergency cache,
2. use suitable survey instrument under the direction of the Radiological Protection Officer and Health Physics Technician to determine the location of a 2.5 mrem/hr isodose line circumscribing the point of occurrence of any nuclear incident,
3. with the aid of the rope and signs included in the emergency cache clearly identify the location of the 2.5 mrem/hr isodose line as follows:

CAUTION RADIATION AREA - ACCESS
LIMITED TO AUTHORIZED PERSONNEL

4. determine the location of a second isodose line at 100 mrem/hr and clearly identify its location with rope and the signs saying:

DANGER HIGH RADIATION AREA - ACCESS BY
PERMISSION OF RADIOLOGICAL PROTECTION
OFFICER AND PLANT MANAGER ONLY

The Radiological Protection Officer will assure that the radiation exposure of team members is limited to no more than 3 rem.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 6.80
AUTHORIZED BY <i>Victor S Frank</i>		PAGE 1 OF 1
		SUPERSEDES

SUBJECT

PLANT SECURITY PERSONNEL

In the event the radiation alarms are actuated after normal working hours, the watchman on duty will notify the Emergency Controller or his alternates. In addition, the watchman will cordon off the main driveway to prevent individuals, other than emergency personnel, from entering the premises.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions	NUMBER 6.90
AUTHORIZED BY <i>Victor S Frank</i>	EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	PAGE 1 OF 1
		SUPERSEDES

SUBJECT

DECONTAMINATION TEAM

Responsibilities

At the conclusion of any Radiation Emergency, a Decontamination Team will be formed to decontaminate all affected areas and facilities. The Decontamination Team will be chosen as needed from the entire work force at the WRC site. The Decontamination Team will execute detailed decontamination procedures which will be developed jointly by the Radiological Protection Officer, Plant Manager-Nuclear Facility, Manager-Engineering & Maintenance, and other qualified personnel or consultants as the circumstances dictate.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 8.10
AUTHORIZED BY <i>Victor S Frank</i>		PAGE 1 OF 1
SUPERSEDES		

SUBJECT

SUPPLEMENTAL RADIATION EMERGENCY PERSONNEL

There are other employees in the Nuclear Research Department with special qualifications and extensive experience in handling radioactive materials--they are trained in radiation survey techniques and are familiar with the radiological hazards of these materials and with decontamination techniques. These people will be called upon by the Emergency Controller and/or Radiological Protection Officer as required.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 10.10
AUTHORIZED BY <i>Victor S. Furch</i>		PAGE 1 OF 1
		SUPERSEDES

SUBJECT

REQUIREMENT OF CODE OF FEDERAL REGULATIONS

In the event of a radiation emergency, the Vice President of Research will notify the Director, Region 1, Division of Compliance, 970 Broad Street, Newark, N.J., pursuant to the Code of Federal Regulations under:

- Par. 20.403(a), requiring immediate notification, OR
- Par. 20.403(b), requiring 24-hour notification.

The day time phone number of the Region Director is 201-645-3960; nights and holidays call 212-989-1000.

CHKD. BY-----DATE-----

Building Layout

Scale 1" = 200 ft.

DATE 11/13/64

4-11-1962 4054 229247

12-12-12

β -INDICATES : PRESENT HYDRANT
(PNEUMATIC)

prop. house and river;

PRICE INCREASE 213
C.C. 577, Block 11

New Warehouse
Bldg. 1 - 1000 y. 5744

7-20

11

Storage Area, (East)
one story, steel

Existing Sewage Treatment Facility Area.

Addition to Sewage treatment Facility.

LAKE

2-STORY, BRICK

4422

Dynamometer. 1 lb. 9 oz. 15 gr.

GENERATOR BLDG.
TWO STORY BLOCK.

paved roads

Water Tower

BLDG #14!
ADDITION

16	
----	--

Bldg 16, on story, ERICK

Bldg 4, Maintenance Shop
- 15117, Block

Greenhouse, one story, Block

Solvent Storage, 1st story Bldg

Grounds Garage, 1 story,

Octane Lab. and Spec. St.

Cooling Tower

Bibb, 3 step, 8/28/88

154

*i*Blg 2, Two story, Brick

Allyl Storage
1944, Transire

eling Tower

1000 Stages

17

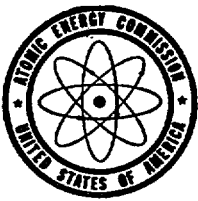
✓ To Page 32

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 12.20
AUTHORIZED BY <i>Viter S Frank</i>		PAGE 1 OF 1
		SUPERSEDES

SUBJECT

DISTRIBUTION

1. Vice President - Inorganic/Nuclear Research
2. Emergency Controller
3. Not assigned
4. Emergency Controller, 1st Alternate
5. Company Doctor/Company Nurse
6. WRC Managers Office
7. Director - Process Development/Engineering
8. Emergency Controller, 2nd Alternate
9. Not assigned
10. Vice President - Chemical Group
11. Director - Public Relations
- 12 thru 24 - Not assigned
25. Plant Manager - Nuclear Facility
26. Radiological Protection Officer - WRC
27. Supervisor - Nuclear Facility
28. Emergency Cache, Bldg. 2
29. Marsh & McLennan, Inc. - Transferred to Factory Ins. Assoc.
- 30 thru 37 - U.S. Atomic Energy Commission, Material Licensing
38. Nuclear Safety Associates
39. Nuclear Facility
40. Nuclear Facility
41. Nuclear Facility



UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION I
970 BROAD STREET
NEWARK, NEW JERSEY 07102

201 645.

HWC
H. W. Crocker, Senior Fuel Facilities Inspector

RE: RECEIPT OF SNM UNDER LICENSE NO. SNM-840

Mr. D. R. Telesca of W. R. Grace, Clarksville, Maryland, said in a telephone conversation on March 3, 1972 (9:30 a.m.) that no SNM had been received at the site yet. He said that he would notify CO:I when the SNM is received.

The schedule for the start of processing SNM in the new equipment, has slipped about a week, according to Mr. Telesca, but all of the depleted uranium runs have been completed and the equipment has been thoroughly flushed. Mr. Telesca estimated that the processing of SNM would probably start about March 20, 1972.

W. G. Browne
W. G. Browne
Fuel Facilities Inspector

hp → SNM-840 file

*3/9/72: D.R. Telesca notified CO:I that
SNM was received @ 9¹⁵ AM on 3/9/72.
Processing to start 3/13/72 - Full Line
in operation on 3/20/72 - Complete order 3/24/72.
W.G. Browne*

ITEM # 225

3/22/72

W. R. GRACE & CO.
RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

March 10, 1972

Mr. W. Browne
Region I
Division of Compliance
USAEC
970 Broad Street
Newark, N. J. 07102

Dear Mr. Browne:

This is confirming our telephone conversation of March 9. This is to advise that we have received the enriched uranium at the Bldg. 16-A Nuclear Facility of the W. R. Grace & Co. Washington Research Center.

Samples of this material are being forwarded to Avco, Tulsa, Oklahoma Laboratories for isotopic analysis. We anticipate analyses results by Tuesday, March 14. The processing of this material should begin on Wednesday, March 15.

At present, we are planning to process only one batch of enriched material. Instructions concerning the second batch will be issued later this month.

Very truly yours,

Donato R. Telesca
Plant Manager

DRT:jk

cc: G. E. Ashby

ITEM # 226

B/225

POCKET NO. 70-456

W. R. GRACE & CO.
RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

March 10, 1972

For Div of Compliance

[Handwritten signature]
[Handwritten initials]

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D.C. 20545

Dear Mr. Nussbaumer:

This is to advise that the enriched uranium was received at the W. R. Grace & Co., Washington Research Center, Bldg. 16-A Nuclear Facility on Thursday, March 9.

The material is in storage awaiting isotopic analysis. We anticipate the beginning of the processing of this material on Wednesday, March 15.

If there are any questions, please advise.

Very truly yours,

[Handwritten signature: Donato R. Telesca]

Donato R. Telesca
Plant Manager

DRT:jk

cc: G. E. Ashby

U.S. ATOMIC ENERGY COMM.
MAIL & RECORDS SECTION

APR 12 1972

RECEIVED

[Handwritten: B/226]

ITEM # 227

A N N O U N C E M E N T

As of April 1, 1972, we are establishing a Nuclear Task Force under the direction of George E. Ashby, Vice President-Research Division, reporting to me.

The objective of the Nuclear Task Force is to administer the Grace Nuclear activity on a business basis. It will be responsible for generation of income through contracts and material development and sales. The Nuclear Facility will report to George.

At the same time L. V. Triggiani will become Director of Inorganic Research, reporting to me. In this position Len will be responsible for the Inorganic Research Department and will continue to provide nuclear research as required to meet the objectives of the Nuclear Task Force.


T. G. Gibian

March 16, 1972

ITEM # 228

1/22/9

1. 1. 1. 1. 1. 1.

For Div of Compliance

W. R. GRACE & CO.
RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

April 28, 1972

Mr. S. H. Smiley, Director
Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D.C. 20545

Re: Docket No. 70-456

Dear Mr. Smiley:

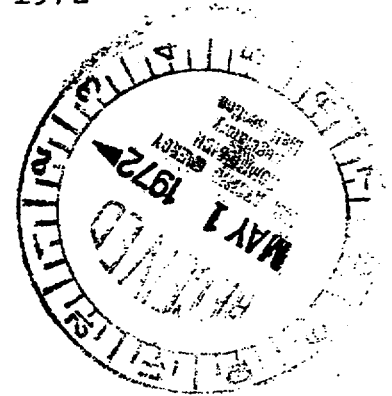
In reply to your letter of April 1, 1972 pertaining to the use of Effluent Treatment Systems.

We concur with the condition added therein, and we believe that the Nuclear Facility of the Washington Research Center of W. R. Grace & Co. is in full compliance with the provisions thereof. We will make the addition of these conditions to our license.

Sincerely,

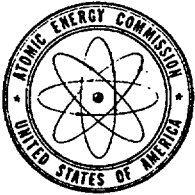
D. R. Telesca
Plant Manager

DRT:jk



ITEM # 229

B/2-28
REC



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

MAY 3 1972

Gen W. Roy, Chief
Materials and Fuel Facilities Branch
Division of Compliance

CO INSPECTION REPORT NO. 72-01, W. R. GRACE AND COMPANY

In the subject report Section II.2.c. concludes with the clause "... Mr. S. L. Reese of Nuclear Safety Associates who acts as a consultant for nuclear safety problems on an 'as needed' basis."

The implication seems to be that plant management has the discretion of determining whether or not the services of a consultant are required. This is not the case. The license specifies when the services of the consultant must be used. For example, Mr. Reese is the criticality member of the plant Nuclear Safety Committee and must participate in the reviews made by that committee. Mr. Reese also must prepare and present the basic instructions dealing with nuclear criticality in the plant training program. Further, the committee is required to inspect the operations and the health and safety records for compliance with approved procedures and AEC regulations at least once in each month that operations involving special nuclear material are being performed.

You may wish to bring the above information to the attention of the inspectors.

DN
Donald A. Nussbaumer, Chief
Fuel Fabrication and
Transportation Branch
Division of Materials Licensing

B/229

ITEM # 230

MEMO ROUTE SLIP Form AEC-93 (Rev. May 14, 1947) AECM 0240		See me about this. Note and return.	For concurrence. For signature.	For action. For information.
TO (Name and unit) H. W. Crocker, RO:I	INITIALS <i>[Signature]</i> DATE	REMARKS RE: W. R. GRACE AND COMPANY re: NEED OF CONSULTANT		
TO (Name and unit) P. R. Nelson, RO:I	INITIALS DATE	REMARKS For your information, enclosed is a copy of a letter from D. A. Nussbaumer concerning W. R. Grace and Company with respect to the use of consultants. Enclosure: As stated		
TO (Name and unit) <i>Loring</i>	INITIALS <i>[Signature]</i> DATE	REMARKS		
FROM (Name and unit) J. R. Metzger, RO:HQ	REMARKS			
PHONE NO. 7347	DATE 5/5/72			

USE OTHER SIDE FOR ADDITIONAL REMARKS

GPO : 1971 O - 445-469

Ap → SNM-840

B/230

ITEM # 231

file 70-456

MEMO ROUTE SLIP Form AEC-93 (Rev. May 14, 1947) AECM 0240		See me about this. Note and return.	For conference. For signature.	For action. For information.
TO (Name and unit)	INITIALS	REMARKS		
	DATE			
H. W. Crocker, RO:II <i>Hoce</i>		RE: W. R. GRACE AND COMPANY re: NEED OF CONSULTANT		
TO (Name and unit)	INITIALS	REMARKS		
	DATE			
P. R. Nelson, RO:I		For your information, enclosed is a copy of a letter from D. A. Nussbaumer concerning W. R. Grace and Company with respect to the use of consultants.		
		Enclosure:		
TO (Name and unit)	INITIALS	REMARKS		
	DATE			
		As stated		
FROM (Name and unit)	REMARKS			
J. R. Metzger, RO:HQ	Our inspectors are and were aware of this. The statement in the report was not properly expressed.			
PHONE NO. 7347	DATE 5/5/72	USE OTHER SIDE FOR ADDITIONAL REMARKS		

GPO : 1971 O - 445-469

ITEM # 232

6/23/

9 MAY 1972

W. R. Grace and Company, Research Division
Attention: Mr. G. E. Ashby
Vice President of Research
Washington Research Center
Clarksville, Maryland 21029

References: Your letter dated April 27, 1972
In response to our letter dated April 10, 1972

Gentlemen:

Thank you for your letter informing us of the action you have taken to correct the item of noncompliance which we brought to your attention following our recent inspection of your licensed program. Your corrective action will be verified during our next inspection of your program.

Your cooperation with us is appreciated.

Very truly yours,

James P. O'Reilly
Director

bcc: L. Kornblith, CO
R. H. Engelken, CO
G. W. Roy, CO (3)
NSIC
CO Files
PDR

ITEM # 233

BP232 (6)

OFFICE ▶	RQ				
SURNAME ▶	W.H.B. Browne/dg	Huc Crocker	O'Reilly		
DATE ▶	5/8/72				

PLEASE EXPEDITE HANDLING

EVALUATION OF LICENSEE'S RESPONSE
AND
ISSUANCE OF ACKNOWLEDGEMENT LETTER
(REGION I WORK FORM)

Instructions to Clerk:

Response, dated 4/27/72, to CO:I letter dated 4/10/72,
Responsible Inspector Browne.

Enclose with this form: (a) Response letter, (b) CO:I letter w/enclosure, and
(c) The two forms AEC-766 (Statistical Data Form) from the suspense file.

Instructions to Inspector:

1. If the reply is adequate instruct the typist to prepare the appropriate acknowledgment letter in final.
2. If the reply is inadequate, due to a minor omission or inexact phrasing that can be clarified by telephone discussion with the licensee, clarify the matter. Include your telephone discussion in a draft acknowledgment letter. Submit the draft letter to your Senior for approval.
3. If all these conditions exist: (a) Reply is inadequate but not seriously so (b) Clarification of the reply requires licensee to submit a new or supplemental letter, and (c) You anticipate no objection by the licensee to your recommendation that he resubmit a corrected reply; telephone the licensee, inform him of the deficiencies of his letter, and suggest to him how he may achieve an adequate reply.
4. If you are uncertain about the degree of adequacy of the reply or if the reply cannot be handled in accordance with Instructions 2 or 3, present your verbal evaluation of the reply to your Senior.

Inspector's Instruction to Typist:

- | | | |
|--|---|--|
| <input type="checkbox"/> Draft | <input checked="" type="checkbox"/> Final | <input checked="" type="checkbox"/> Standard Letter |
| <input type="checkbox"/> Same address as CO:I letter | | <input type="checkbox"/> Other text as shown on attachment |
| <input type="checkbox"/> Address thus: (or added copies to:) | | <input type="checkbox"/> Complete Paragraphs P and R on
Forms AEC-766 |

The following information is provided for the selection of the appropriate Standard Acknowledgment Letter:*

- ☒ (a) We are acknowledging receipt of one letter.
- ☐ (b) We are acknowledging receipt of more than one letter.
- ☒ (c) One item of noncompliance was identified in our letter to the licensee.
- ☐ (d) More than one item of noncompliance was identified in our letter to the licensee.
- ☐ (e) There is a local PDR established at this licensee's facility.
- ☒ (f) There is no local PDR established at this licensee's facility.
- ☒ (g) Licensee indicated that corrective action had been taken.
- ☐ (h) Licensee indicated that corrective action would be taken.

*Text of Standard Letter

"Thank you for your letter(~~s~~) informing us of the action you have taken (~~will take~~) to correct the item(~~s~~) of noncompliance which we brought to your attention following our recent inspection of your licensed program. Your corrective action will be verified during our next inspection of your program.

Your cooperation with us is appreciated."

W.H. Brown

Inspector

May 3, 1972
Date

Approved for final type of attached drafts

W.H. Brown
Senior Inspector

5/4/72
Date

W. R. GRACE & CO.

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029



April 27, 1972

U. S. Atomic Energy Commission
Division of Compliance
Region 1
970 Broad Street
Newark, New Jersey 07102

Attn: James P. O'Reilly
Director

Gentlemen:

Upon being informed by Mr. Browne, the writer placed an order for the proper colored tapes on March 23, 1972 (copy enclosed).

The tapes were received on April 12, and technicians were assigned to properly label all containers in the Bldg. 16-A Nuclear Facility. The identification was completed by Friday, April 14.

At present, there are a number of containers in our storage area (Bldg. 20) which contain depleted material. This material is scheduled for shipment by April 28. Any container remaining in the Bldg. 20 warehouse will be properly identified by that date.

To avoid this non-compliance in the future, the following action will be taken:

1. Reinstruct each and every technician about the necessity of properly labeling all containers, larger than 125 ml, in the building.
2. Make available properly colored tape in the process areas and the laboratory at all times.
3. Periodic checks will be made by the Plant Manager and the supervisors to make sure the proper procedures are being followed.

April 27, 1972

If there are any further questions, please advise.

Very truly yours,



D. R. Telesca
Plant Manager

DRT:jk

Attachment

cc: G. E. Ashby (w/attachments)

W. R. GRACE & CO.
RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

July 6, 1972

R.O.

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D.C. 20545

Dear Mr. Nussbaumer:

Re: Docket No. 70-456

W. R. Grace & Co. requests that License No. SNM 840 as approved August 10, 1970, be further amended to include the process changes described on the following pages which are enclosed herewith and, if approved, supersede or added to the present pages:

<u>Page No.</u>	<u>Rev. No.</u>	<u>Date</u>
22	1	7/1/72 Company Proprietary
23	1	" " "
23A	0	" " "
25	3	" " "
25A	2	" " "
25C	0	" " "
26	5	" " "
26A	5	" " "
28	3	" " "
29	2	" " "
33	2	" " "
35	3	" " "
36	3	" " "
36A	3	" " "
37	3	" " "
38	3	" " "
39	3	" " "
43	2	" " "
43A	2	" " "
59	6	" " "
59A	4	" " "
59B	0	" " "

RECEIVED
JUL 10 1972
B/233

ITEM # 234

②
1

July 6, 1972

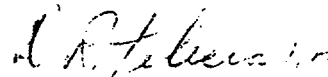
In addition, we are enclosing the following pages, which have been changed for clarity and to update organizational and personnel changes:

<u>Page No.</u>	<u>Rev. No.</u>	<u>Date</u>
Table of Contents	1	7/1/72
1	1	"
2	1	"
3	1	"
4	1	"
5	1	"
6	1	"
7	1	"
8	1	"
9	3	"
10	3	"
11	1	"
12	1	"
13	1	"
14	1	"
15	1	"
16	1	"
16A	0	"
17	1	"
18	1	"
19	1	"
20	1	"
21	1	"

Since the proposed process changes do not depart significantly from current practice, we hope that these changes will be approved for use in our next campaign which is scheduled to begin the week of July 24th.

If there are any questions, please call. Our local number is 924-4206.

Very truly yours,



D. R. Telesca
Plant Manager

DRT:jk
Enclosures



UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION I
970 BROAD STREET
NEWARK, NEW JERSEY 07102

201 645-

JUL 6 1972

Memo to Files

THRU: *HWC/wgb* H. W. Crocker, Sr. Fuel Facilities Inspector

W. R. GRACE & CO. CHANGE IN PRODUCTION PLANS

In a telecon at 9:00 a.m. on June 28, 1972, Mr. Telesca, Plant Manager, informed Mr. Browne, RO:I, of a change in production plans for W. R. Grace & Co. at Clarksville, Md. He stated that instead of shutting down in July as planned, their expected receipt of an order for 140 Kgs of product material will keep the plant in continuous operation.

The process is being changed slightly to decrease reject product and to re-dissolve the unsatisfactory product before the "green" product goes to the sintering furnace. This will require that the present standard and temporary operating procedures be re-written. Since changes in the process are expected to refine the operation and make it more efficient, Mr. Telesca intends to use maximum or minimum safe limits for the procedure and then vary actual values in the safe range to meet the changing process requirements.

He also stated that there were some organization changes which he would submit to licensing. The biggest change is in setting the facility up as if it were a production plant and the naming of an, as yet un-announced, quality control man.

Mr. Telesca said he expects to be on vacation for the next two weeks, so we can contact Mr. Bluoin if we need additional information.

W. G. Browne

W. G. Browne
Fuel Facilities Inspector

ITEM # 235

6/234

APR 10 1972

W. R. Grace and Company, Research Division
Attention: Mr. C. E. Ashby
Vice President of Research
Washington Research Center
Clarksville, Maryland 21029

Gentlemen:

This refers to the inspection conducted by Mr. Browne of this office on March 20 through 23, 1972, of operations authorized by AEC License No. SRM-840 and to the discussion of our findings held by Mr. Browne with Mr. Ashby and Mr. Telasco of your staff at the conclusion of the inspection.

Areas examined during the inspection included standard operating procedures, license conditions, functions and responsibilities of the nuclear safety committee, nuclear safety drills, process equipment, nuclear safety controls, posting and labeling, production schedules and organization. Within these areas, the inspection consisted of selective examination of procedures and representative records, interviews with plant personnel and observations by our inspector.

During this inspection, it was found that one of your activities appeared to be in noncompliance with an AEC requirement. The item and reference to the pertinent requirement are listed in the enclosure to this letter. Please provide us within 20 days, in writing, with your comments concerning this item and any steps which have been or will be taken to correct it, any steps that have been or will be taken to prevent recurrence, and the date all corrective actions or preventive measures were or will be completed.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Very truly yours,

James P. O'Reilly
Director

B233

Enclosure:

OF Description of Noncompliance Item

bcc:

L. Kornblith, CO PDR
R. H. Engelken, CO NSIC
G. W. Roy, CO (3) CO Files
District Office, NMS

SURNAME ▶

Browne/dg

Crocker

O'Reilly

DATE ▶

4/10/72

ITEM # 236

ENCLOSURE

DESCRIPTION OF NONCOMPLIANCE ITEM

W. R. Grace and Company, Research Division
Washington Research Center
Clarksville, Maryland
License No. SNM-840

One activity under your license appears to be in noncompliance with AEC requirements as indicated below:

1. License No. SNM-840, Condition 8, Section 8,11 of your April 8, 1970 application states that in lieu of labeling each package as required by 10 CFR 20.203(f), containers of radioactive material that are not to leave the area are labeled with the type of material, contents and U-235 enrichment. Each container is also identified by color coded label or tape, as recommended by the institute for Nuclear Materials Management, as follows:

Uranium enriched above 5% in U-235 - - Yellow
Uranium enriched below 5% in U-235 - - Green
Natural Uranium - - - Purple
Depleted Uranium - - - Gray

Contrary to the above, it was observed that there were no green, purple or gray colored tapes at the plant and that there were unlabeled containers of depleted uranium in the processing area.

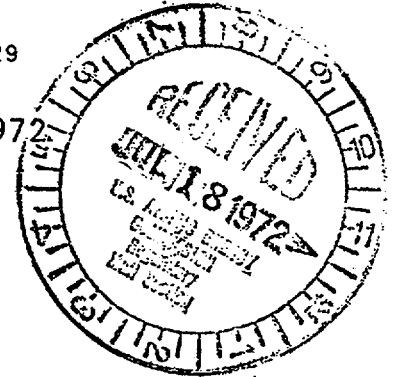
KEY NO. 70-456

R.O

W. R. GRACE & CO.
RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

July 14, 1972



Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D.C. 20545

Dear Mr. Nussbaumer:

Re: Docket No. 70-456

In our application for an amendment to Special Nuclear Materials License 840, dated April 9, 1970, we requested that paragraphs 7.1 through 7.21 be withheld from public inspection pursuant to the provisions of 10 CFR Part 2.790(b).

On July 6, 1972, we forwarded revisions for pages 22, 23, 23A, 25, 25A, 25C, 26, 26A and 28, which are a part of this "Company Proprietary" section.

The W. R. Grace & Co. Washington Research Center is requesting that these revisions be withheld from public inspection pursuant to the provisions of 10 CFR Part 2.790(b).

These revisions disclose unpublished information regarding processes and equipment of competitive value which has been generated at private expense, and information regarding processes and equipment under development at the Research Center. This information is thus of the nature described in 10 CFR 9.5(4) as being exempt from disclosure to the public. Public inspection of this information will adversely affect the interests of W. R. Grace, since it will destroy the competitive value of such information.

We believe that withholding this information from public inspection is not contrary to the public interest and that sufficient information is furnished for public inspection, such that, any person directly concerned may determine whether inspection of the withheld revisions is essential to the public interest.

B/236

ITEM # 237

3922

(2)

Donald A. Nussbaumer

-2-

July 14, 1972

We would appreciate your early review and approval of the requested amendment.

Very truly yours,



D. R. Telesca
Plant Manager

DRT:jk

3923

EMERGENCY CONTROL
ORGANIZATION

STANDARD OPERATION PROCEDURES

Copy No. #37

Assigned to: USAEC

ITEM # 238

B/237


H/C

ISSUE DATE July 19, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	NUMBER INDEX - General Emergency
AUTHORIZED BY		PAGE 1 OF 1
		SUPERSEDES Index dated 2/7/72

SUBJECT

INDEX - GENERAL EMERGENCY

Emergency Controller, Responsibilities	1.10
Emergency Control Organization Chart	1.20
Emergency Communications	1.30
WRC Telephone Operator Responsibilities	1.31
Revisions to the Emergency Plan	1.40
Fire Brigade - Assignments & Responsibilities	2.10
- Personnel Selection & Training	2.30
Emergency Monitors - Assignments & Responsibilities	3.10
- Personnel Selection & Training	3.30
Designated Assembly Locations for Departments	3.40
First Aid Team - Assignments & Responsibilities	4.10
- Telephone Guard	4.10
- Personnel Selection & Training	4.30
Personnel Assignments (Internal distribution only)	11.00
Map of Plant Facilities	11.10
Distribution	11.20

ISSUE DATE May 10, 1971	W. R. GRACE & CO. Washington Research Center Divisions	NUMBER 1.10
AUTHORIZED BY 	EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	PAGE 1 OF 1
SUBJECT EMERGENCY CONTROLLER'S RESPONSIBILITIES		SUPERSEDES

In the event of an emergency such as explosion, fire, escape of toxic gas, etc., the normal line organization of the Washington Research Center will be superseded by an Emergency Organization. (See attached chart) The Emergency Controller has the authority and responsibility for correcting, controlling or eliminating the emergency condition with due regard for safety of personnel and protection of Company property.

In discharging the responsibilities of this office, the Emergency Controller will be guided by the following policies:

1. During the period of emergency, the Emergency Controller will have
 - (a) complete responsibility and authority for conduct of operations to control or eliminate the emergency; and
 - (b) complete responsibility and authority for supervision of all personnel comprising the Emergency Organization regardless of the normal line of supervision.
2. The start of an emergency period will normally be signaled by the fire or emergency alarm systems. Only the Emergency Controller will be authorized to signal an "all clear".
3. In the event that the emergency is of such nature that county or state authorities (police or fire) are called or come to WRC, it will be the responsibility of the Emergency Controller to coordinate his activities with theirs and to subordinate his authority to theirs as provided by law.
4. It shall be the responsibility of the Emergency Controller to maintain adequate liaison with local authorities (fire and police) during non-emergency periods so as to insure maximum cooperation during periods of emergency.
5. It shall be the responsibility of the Emergency Controller to insure through the Project Engineer that contractors working at WRC are cognizant of our safety rules and emergency procedures.

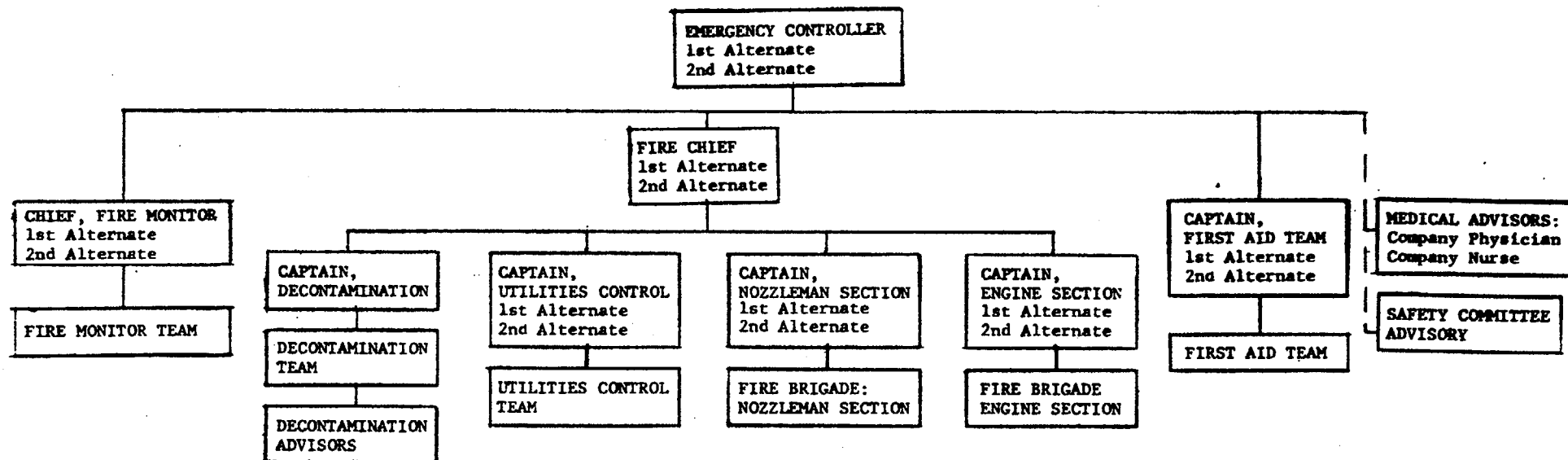
Issue Date: May 10, 1971

Authorized By: *M. C. Thompson*

No. 1.20

Page 1 of 1

EMERGENCY CONTROL ORGANIZATION




COLOR DESIGNATIONS FOR HATS

EMERGENCY CONTROLLER
FIRE CHIEF
CHIEF, FIRE MONITOR
CHIEF, FIRST AID TEAM

BLUE

FIRE MONITORS-----YELLOW
FIRE BRIGADE-----RED
FIRST AID TEAM-----WHITE

ISSUE DATE May 10, 1971	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	NUMBER 1.30
AUTHORIZED BY 		PAGE 1 OF 1
SUPERSEDES		

SUBJECT

WRC EMERGENCY PLAN COMMUNICATIONS

An emergency telephone network (internal) is provided for the purpose of notifying personnel assigned to the emergency organization. All employees are familiarized with this system during employment indoctrination. These emergency telephones are located in the immediate work area of the Emergency Controller and all emergency organization section chiefs as well as other strategic locations; i.e., PBX Operator, Maintenance Building, Nurse, all boiler rooms, and in each hallway of all buildings. In noisy areas, loud signals are installed.

Notification of local, state, and Federal agencies will be made by telephone or, in the event telephones are inoperative, by means of a battery operated two-way radio. This emergency radio is installed, operative, and preset to contact the Howard County Office of Civil Defense and the Howard County Central Alarm.

ISSUE DATE July 19, 1972	W. R. GRACE & CO. Washington Research Center Divisions	NUMBER 1.31
AUTHORIZED BY <i>US Frank</i>	EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	PAGE 1 OF 1
		SUPERSEDES

SUBJECT

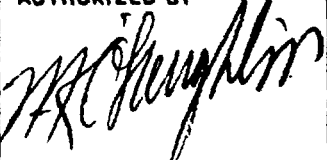
WRC TELEPHONE OPERATOR RESPONSIBILITIES

When the Emergency 300 Telephone System is activated, a distinctive audible alarm is energized at the switchboard. The PBX operator on duty is responsible for the following response procedure:

- A. Silence the audible alarm by pushing up on the reset button which is located on the bottom of the alarm device.
- B. Plug into the 300 station and identify your response "Emergency Operator".
- C. Determine the nature of the emergency from the calling party, including room number and building number.
- D. Relay the nature of the emergency to any personnel who may be late in responding to the 300 network.
- E. Emergency situations are classified into two general types:
 1. Emergency involving company property,
 2. Emergency involving personal injury.

The operator will execute specific instructions given by the Emergency Controller or the Alternate Emergency Controller in both situations. The company nurse is authorized to issue specific instructions in situations involving personal injury.

- F. The operator will be informed of the cessation of the emergency by the Emergency Controller or his alternate.

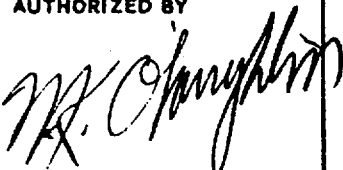
ISSUE DATE May 10, 1971	W. R. GRACE & CO. Washington Research Center Divisions	NUMBER 1.40
AUTHORIZED BY 	EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	PAGE 1 OF 1
SUPERSEDES		

SUBJECT

REVISIONS TO THE EMERGENCY PLAN

The Emergency Controller will be responsible for the periodic review and revision of the Emergency Plan.

1. The organizational structure and emergency procedure will be reviewed and revised whenever a change in operation or a physical change in the facility occurs.
2. Personnel assignment lists will be updated by review of administrative force reports.
3. The above reviews and revisions will be made no less than once per year.

ISSUE DATE May 10, 1971	W. R. GRACE & CO. Washington Research Center Divisions	NUMBER 2.10										
AUTHORIZED BY 	EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	PAGE 1 OF 3 SUPERSEDES										
SUBJECT FIRE PLAN												
<u>WRC FIRE BRIGADE - ASSIGNMENTS AND RESPONSIBILITIES</u>												
Fire Chief: 1st Alternate: 2nd Alternate:												
<ol style="list-style-type: none"> 1. To determine a rapid diagnosis as to the extent of fire and relay this information to the Howard County Central Alarm. 2. To coordinate the action of the inside and outside sections so that fire can be contained as quickly as possible. 3. To maintain a training program for Brigade members and to maintain an effective inspection schedule to insure that <u>all</u> emergency equipment will be available and workable. 												
*Nozzleman Section - Nozzleman Fire Captain: 1st Alternate: 2nd Alternate:												
<ol style="list-style-type: none"> 1. To deploy nozzlemen at the scene with the best available equipment to control the particular fire. 2. To maintain close communication with the Fire Chief (by runner if necessary) of any changes in the situation that may affect overall fire fighting strategy. 												
Nozzlemen: To go immediately to the scene of the fire with assigned equipment. Fire fighting tactics to be under the direction of the Nozzleman Fire Captain.												
<table> <tr> <td>Nozzleman #1</td> <td>Don "Turn-Out" gear as quickly as practical. If one</td> </tr> <tr> <td>#2</td> <td>of these men is not present, an alternate is to be</td> </tr> <tr> <td>#3</td> <td>appointed by the Nozzleman Captain.</td> </tr> <tr> <td>#2 & #3</td> <td>Take a Scott air breathing apparatus to scene of fire.</td> </tr> <tr> <td>#4</td> <td>Take a 30 lb. dry chemical extinguisher to scene of fire.</td> </tr> </table>			Nozzleman #1	Don "Turn-Out" gear as quickly as practical. If one	#2	of these men is not present, an alternate is to be	#3	appointed by the Nozzleman Captain.	#2 & #3	Take a Scott air breathing apparatus to scene of fire.	#4	Take a 30 lb. dry chemical extinguisher to scene of fire.
Nozzleman #1	Don "Turn-Out" gear as quickly as practical. If one											
#2	of these men is not present, an alternate is to be											
#3	appointed by the Nozzleman Captain.											
#2 & #3	Take a Scott air breathing apparatus to scene of fire.											
#4	Take a 30 lb. dry chemical extinguisher to scene of fire.											

Nozzleman #5 Go to hose cabinet near scene of fire and unfold hose so that it will be ready for use.

#6 Man water valve at hose cabinet.

#7 & #8 Each take a 15 lb. CO₂ extinguisher to scene of fire.

#9 Take a Scott air breathing apparatus to scene of fire

*Engine Section - Engine Fire Captain:

1st Alternate:

2nd Alternate:

1. To assemble all available members of the engine section at the fire shed.
2. To expedite hooking up of all emergency equipment and proceed to scene of fire.
3. To insure that all emergency equipment is in running condition upon arriving at scene of fire.
4. To insure that one man is sent to the head of the driveway to direct any fire fighting equipment to scene of fire.

Firemen: To go immediately to the fire shed and assist in the hooking up of the equipment. (If hooking up has been completed when you arrive at the shed and equipment has already started to the fire, you are then to go directly to the scene of fire as quickly as possible.) Fire fighting tactics are to be under the direction of the Engine Fire Captain.

Fireman #1 Emergency equipment truck drivers. (The first
#2 driver at the fire shed will be designated as the
#3 driver.)

#1 Hook up hose from fire hydrant to foam pumper tank. If fire hydrant is quickly available, the foam pumper may be by-passed in situations of one and two-story fire.

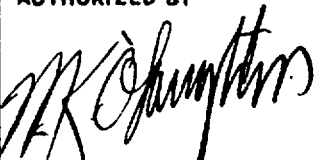
#2 Hook up hose from the discharge of foam pumper to scene of fire.

#3 Emergency foam pumper operator - to start up emergency foam and proceed to make up connections for ready use of foam. (Fireman #5 helps with this.)

- Fireman #4 Emergency generator operator - to start up the emergency generator and proceed to lay an extension cord service for exhaust blowers and/or emergency lights.
- #5 Emergency foam pumper operator - to start up emergency foam and proceed to make up connections for ready use of foam. (Fireman #3 helps with this.)
- #6 & #7 Each take portable exhaust fan to scene of fire.
- #8 Take foam nozzle and one 5 gal. container of foam concentrate to scene of fire.
- #9 Take up position at driveway intersection to direct Fire Department equipment.
- #10 To hook up hose from the discharge of the foam pumper to the scene of the fire.
- * The above listed duties for the Nozzleman Section and Engine Section are designated as initial primary duty of each member. Additional duties will be assigned by the Section Captains in order to contain or control a fire in any situation.

NOTE: Buildings 16-A and 20

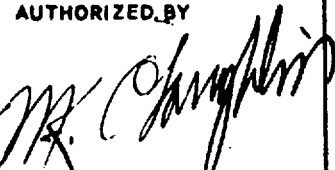
In case of a fire in either of the above buildings, extinguishing agent should be limited to carbon dioxide or dry chemical extinguishing agents. Water is not to be used to extinguish fires in these buildings without authorization from the Fire Chief.

ISSUE DATE May 10, 1971	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION GENERAL EMERGENCY	NUMBER 2.30
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SUBJECT
 WRC FIRE BRIGADE - PERSONNEL SELECTION AND TRAINING

Personnel selections for service on the fire brigade are made primarily from the Maintenance Group. These personnel are selected on the basis of their knowledge of the various buildings, locations of emergency and operating equipment, emotional stability, and ability to receive and implement instructions.

Personnel selected to serve on the nozzleman section of the fire brigade attend the Fire Fighters Qualification Course conducted annually at the University of Maryland. Periodic training sessions are conducted to review the operating techniques of emergency equipment. Full scale drills for each building are conducted annually to review and observe brigade proficiency in accomplishing assigned responsibilities as specified in the Fire Plan.

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SUBJECT

EVACUATION PLAN - ASSIGNMENTS & RESPONSIBILITIES

Chief, Emergency Monitor
 1st Alternate, Bldg. 1
2nd Alternate, Bldg. 2

Responsibilities

1. To insure that all personnel has been evacuated from building concerned during an emergency evacuation condition.
2. To insure that all building areas have been checked by assigned monitors.
3. To insure that a status report is made to the Emergency Controller immediately after evacuation results are determined.
4. To maintain an effective training program for all fire monitors.

Monitor Captain, Bldg. 1
 Alternate Monitor Captain, Bldg. 1

Monitor Captain, Bldg. 2
Alternate Monitor Captain, Bldg. 2

Responsibilities

1. To immediately proceed, upon alarm, to main entrance of respective buildings to receive evacuation report from all monitors assigned to the building concerned and insure that this information is delivered to the Chief Emergency Monitor. Monitor Captains will send information via two monitors to Chief Monitor.
2. To insure that all monitors assigned to the respective buildings are accounted for.
3. To insure that all monitor assignments are covered.
4. To utilize any excess monitors as runners in receiving the reports from the various entrance assignments.

Fire Monitors - All Buildings

Responsibilities

1. When an evacuation alarm sounds, monitors in that building will immediately begin the physical check of their assigned area. All monitors will wear their yellow hard hat and carry their assigned breathing apparatus for ready use, if required.
2. All areas on the assigned floor will be checked to insure that the evacuation is complete.
3. After ascertaining that their assigned area is clear, all monitors will evacuate the building via the nearest exit and proceed to their entrance assignment.
4. All monitors will report to their Monitor Captain that their assigned area has been checked and is clear--reports may be made via one runner.
5. All monitors will take up positions at building entrances of their building as outlined below, to insure that no persons other than emergency personnel re-enter the building.

Monitor Assignment

Entrance Assignment

Bldg. #1, Basement

Personnel Door . . . North

Bldg. #1, 1st Floor

Loading Dock Door . . North

Bldg. #1, 2nd Floor

Personnel Door . . . East

Bldg. #1, 3rd Floor

Cafeteria Door . . . West

Main Entrance . . . South

Bldg. #1-A, Basement

Personnel Door . . . East

Bldg. #1-A, 1st Floor

Personnel Door . . . West

Bldg. #1-A, 2nd Floor

Main Entrance . . . South

Bldg. #2, 1st Floor

Personnel Door . . . North

Personnel Door . . . East Center

Bldg. #2, 2nd Floor

Personnel Door . . . East

Loading Area . . . West

Maint Entrance . . . South

Bldgs. No. 3, 4, 11,
16, 16-A, 20, & 22

To be assigned by Chief Fire Monitor


6. All monitors will direct personnel to a wait area as designated below regardless of weather or duration of emergency.

(a) Evacuation involving Bldgs. 2, 3, 4, or 22:

Personnel to go to the Cafeteria, Bldg. 1 and/or the Library, Bldg. 1-A.

(b) Evacuation involving Bldgs. 1, 1-A, 11, 16, 16-A, or 20:

Personnel to go to the Lobby, Conference Rooms and corridors of Bldg. 2

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SUBJECT

WRC EVACUATION MONITORS - PERSONNEL SELECTION AND TRAINING

Building monitors are chosen by interview. They must be physically fit, emotionally stable, able to receive instructions and relay messages clearly and accurately. They are trained by class instruction and through periodic evacuation drills. The duties and responsibilities of each man are reviewed with him periodically to keep him abreast of any new developments or changes in procedure.

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SUBJECT

DESIGNATED ASSEMBLY LOCATIONS FOR DEPARTMENTS (By Bldg. Occupancy)

EVACUATION OF BLDGS. NO. 1 and 1-A *

Dept. Assembly Location

901 Lobby Conference Room, Bldg. 2

907	}	1st Floor - North Hall - North End - Bldg. 2
916		
917		
919		
929		
940		
942		

926 1st Floor - North Hall - South End - Bldg. 2

902 2nd Floor - North Hall - North End - Bldg. 2

903 2nd Floor - North Hall - South End - Bldg. 2

911 1st Floor - East Hall - West End - Bldg. 2

927 & 972 1st Floor - East Hall - East End - Bldg. 2

914 & 923 2nd Floor - East Hall - West End - Bldg. 2

905	}	2nd Floor - East Hall - East End - Bldg. 2
906		
909		
910		
913		

Other personnel housed in Bldgs. 1 & 1-A but not listed above	}	1st Floor - North Hall - North End - Bldg. 2

* Any person with direct information on the emergency should proceed immediately to 1st Floor - North Hall - North End - Bldg. 2, so the emergency crews and management may reach them promptly.

EVACUATION OF BLDG. NO. 2 *

<u>Dept.</u>	<u>Assembly Location</u>
--------------	--------------------------

922	Nuclear Conference Room - Basement - Bldg. 1-A
-----	--

905, 908, 972	Library, Bldg. 1-A
---------------	--------------------

904, 906, 921, 923 &
other personnel housed
in Bldg. 2 but not
listed above - - - - Assembly Location: Cafeteria, Bldg. 1

* Any person with direct information on the emergency should
proceed immediately to Library, Bldg. 1-A, so the emergency
crews and management may reach them promptly.

EVACUATION OF BLDGS. NO. 3 and 4

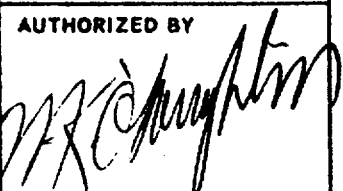
All occupying depts. - Assembly Location: Cafeteria, Bldg. 1

EVACUATION OF BLDGS. NO. 11, 16, 16-A and 20

All occupying depts. - Assembly Location: Lobby, Bldg. 2

EVACUATION OF BLDG. NO. 22

All occupying departments - Assembly Location: Cafeteria, Bldg. 1

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SUBJECT

WRC FIRST AID TEAM - ASSIGNMENTS AND RESPONSIBILITIES

First Aid Team Officers:

Captain
1st Alternate
2nd Alternate

Medical Advisors:

Company Doctor
Company Nurse

Responsibilities

1. To deploy First Aid Squads with their equipment within visual distance of all normal exits of the evacuated building.
2. To report location and state of readiness of First Aid Squads and their equipment to Emergency Controller.
3. To stand by with First Aid Squads, prepared to move in and render first aid assistance as may be required.
4. To maintain a vigorous, continuing program of First Aid and Safety Instruction for the First Aid Team members.

First Aid Squad Leaders (3)

Responsibilities

1. Proceed to assigned muster area with first aid kit.
2. Select appropriate area for First Aid Station which will permit coverage of building exits assigned.
3. Muster squad, check equipment and report to First Aid Captain via alternate assigned.
4. Maintain constant vigilance of assigned exits.
5. Maintain visual and voice contact with adjacent First Aid Squads. (Assign runner for intercommunication if radio equipment is not available.)

6. If a casualty is brought into area of responsibility:
 - (a) Advise First Aid Captain via radio or runner.
 - (b) Move in to render lifesaving first aid. (Stop bleeding; restore & maintain respiration; minimize shock; other emergency procedure as indicated.)
 - (c) In cases of imminent danger only, transfer patient to stretcher and move to a place of safety.
 - (d) Further care and treatment of the patient will be carried out under the supervision and direction of the Senior Medical Advisor present or, in his absence, the Senior First Aid Team Officer present.
7. First Aid Squads or individual team members will not enter the evacuated building unless specifically requested by the Emergency Controller. Entry upon request shall be purely volunteer basis.

First Aid Team Members

1. When evacuation alarm sounds, First Aid Team members will proceed to designated muster area, taking such first aid equipment as time and hazard permits. Under no condition will a First Aid Team member place himself in a hazardous position to salvage equipment.
2. Each member will place himself under the direction and instruction of the Squad Leader or Team Officer present. In the absence of Squad Leader or Officer, the Senior First Aid Team member will assume responsibility. First Aid Captain will be notified.
3. In the presence of a casualty, the First Aid Team member will maintain calm and efficient composure while rendering such assistance as his prior training makes possible.

Special Functions

Telephone Guard: A telephone guard will be maintained in a safe location to provide internal telephone contact to call out First Aid Team members not alerted by emergency signal.

- (a) In evacuation of Bldgs. 2, 3, and 4, the telephone guard will be maintained at extension 314 in Bldg. 1.
- (b) During evacuation of Bldgs. 1, 1-A, 16, 16A, and 22, the telephone guard will be kept at extension 201 in Bldg. 2.

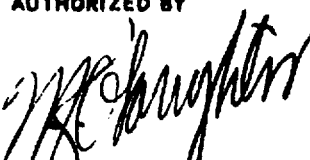
* Deployment of First Aid Squads: While the exact location of the First Aid Squads is to be decided by the Squad Leader and the Team Officer, the three squads will normally locate as follows with respect to the evacuated building:

Squad No. 1 on the south side
Squad No. 2 on the east end
Squad No. 3 on the north side

The First Aid Squads shall be deployed by the Squad Leader in such a manner that:

- (a) Visual coverage of all assigned exits is maintained.
- (b) Stations are sufficiently removed from exits to avoid impence of fire and rescue personnel--yet close enough to render prompt aid.
- (c) Stations are not in places of imminent or potential danger.
- (d) Stations are upwind from smoke, fire or gas hazard.

* Nurse reports with Squad No. 1 at south side of building involved.

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SUBJECT

WRC FIRST AID TEAM - PERSONNEL SELECTION AND TRAINING

First Aid Team members are recruited from employees with previous experience as Army Medics, Navy Corpsmen, Red Cross First Aid Trainees, Volunteer Rescue Squad Members, and Police First Aid Trainees. Members are selected on the basis of previous training, emotional stability, ability to receive and execute instructions, and physical capability to handle patient and equipment.

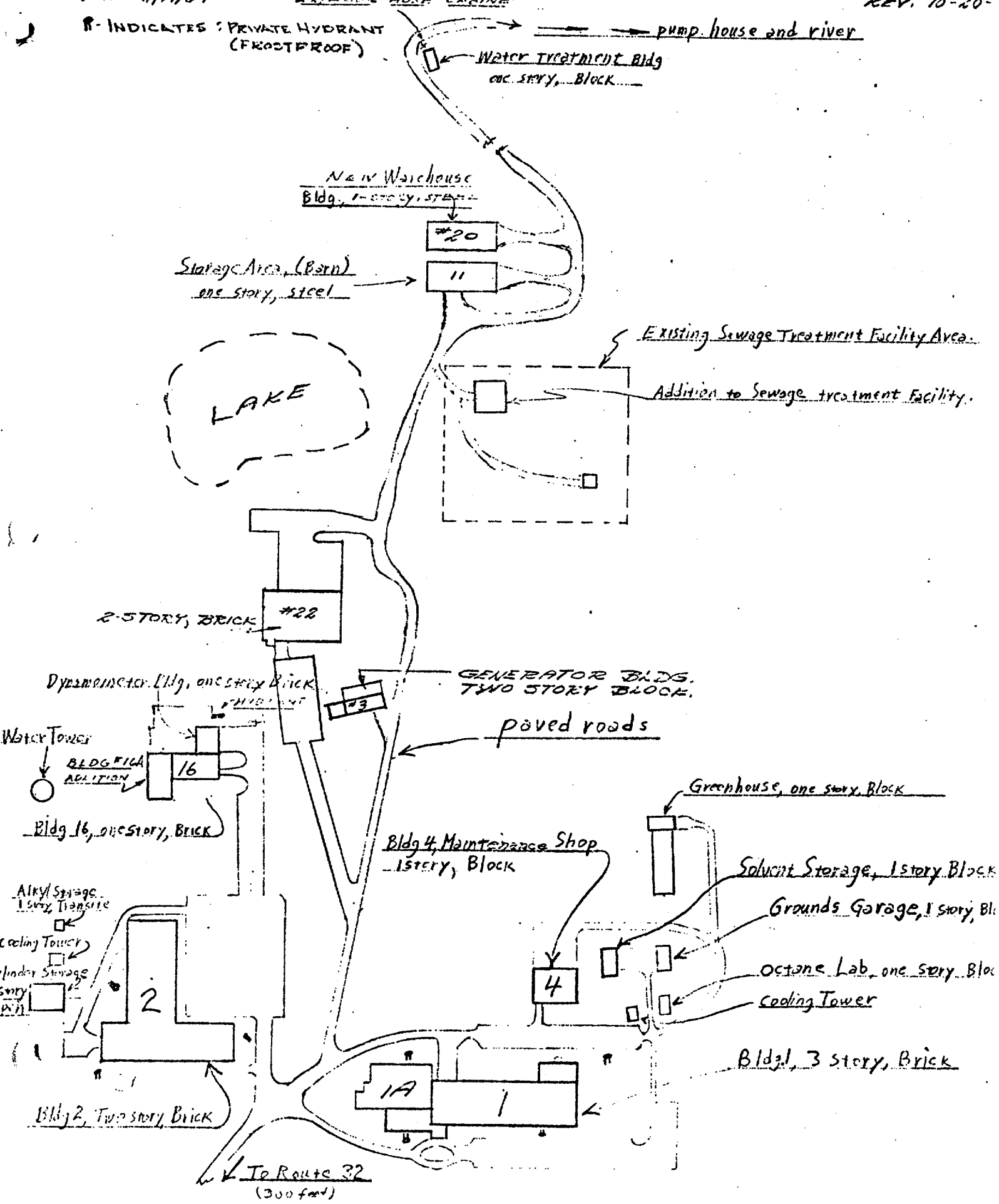
Training is continued in monthly in-plant training sessions devoted to specific first aid techniques and problems. W. R. Grace & Co. sends one or more team members to The Industrial Safety and First Aid Institute each year for a one-week training course. The Institute is sponsored by the Red Cross, the Safety Council, and the American Society of Safety Engineers. Graduates qualify as Red Cross First Aid Instructors, and serve the WRC First Aid Team as team officers and squad leaders. Instructor training is reviewed at Red Cross First Aid Clinic sessions every two years. All team members stand ready to give aid and assistance to their fellow employees at all times. All team members are trained in first aid techniques of resuscitation, control of bleeding, treatment for burns and shock, splinting, dressing and bandaging wounds, lifting and carrying the injured. Training includes the use of first aid equipment which is strategically located at various locations throughout the plant site. Inspection and maintenance of the equipment is the responsibility of the First Aid Team officers.

Nine team members have received training in cardiopulmonary resuscitation technique and are authorized to use this method within the confines of the company property. Training and certification was received from the Baltimore Chapter of the Heart Association. Certification is to be renewed by participating in a training session at least once a year.

The First Aid Team responds to fire or evacuation alarm as a unit, or individually to other emergency calls as requested. A telephone call system is used to back up the general alarm or to call out individual team members. A telephone watch is maintained during a general emergency as described in the Evacuation Plan. The First Aid Team Captain has an emergency "300" phone at his desk, from which location he initiates the telephone back-up call system.

DATE: 11/19/64 EXTERNAL HOSE CABINET REV. 10-20-

R- INDICATES: PRIVATE HYDRANT
(FROSTPROOF)



EMERGENCY CONTROL
ORGANIZATION

RADIATION EMERGENCY PROCEDURES

ISSUE DATE August 1, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 5.10
AUTHORIZED BY <i>W. S. Frank</i>		PAGE 1 OF 3
		SUPERSEDES 5.20 dated 1/25/72

SUBJECT
RADIATION EMERGENCY - GENERAL

A Radiation Emergency is defined as an incident in which the exterior Nuclear Alarms located on the premises and the interior alarm in the involved building only will be activated. The exterior Nuclear Alarms have a distinctive modulating siren sound to differentiate from the interior General Emergency alarm system. In the event that the Nuclear Alarms are activated:

1. All personnel will seek immediately the closest cover available away from the Building 16 Complex* and Building 20 and will remain under cover for the duration of the emergency. No one other than the Emergency Controller, Radiological Protection Officer, Plant Manager, or personnel specifically authorized by the Emergency Controller is permitted outside of a building during a Radiation Emergency. The Emergency Controller will determine the end of the emergency condition and advise members of the Emergency Control Organization, who will in turn communicate the "all clear" to all other personnel.
2. Personnel in the affected building (16 or 20) will quickly evacuate to the Lobby Conference Room No. 1 in Building 2. The evacuation routes for the Building 16 Complex and Building 20 will be via the nearest outside exit and the most direct route to the south (main) entrance to Building 2.
3. As soon as practical after arriving in the assembly area, evacuees will connect the local red EMERGENCY TELEPHONE EXTENSION which is stowed in the EMERGENCY CACHE at the back of Lobby Conference Room No. 1 to the "red" jack located in Lobby Conference Room No. 2, dial 300 and communicate their understanding of the situation to the Emergency Control Organization. The direct outside yellow emergency telephone extension is to be connected to the "yellow jack to receive outside calls from emergency personnel and agencies.
4. All evacuees will be surveyed by the Health Physics Technician, Radiological Protection Officer or other personnel skilled in the operation of the survey equipment. A cache of supplies and equipment, including portable survey equipment to be used in the event of an emergency, is located in the northeast closet of Lobby Conference Room No. 1, Building 2.

* Building 16 Complex = Bldgs. 16, 16-A, 16-B, and the Dynamometer Bldg.

5. First-aid will be administered to affected personnel requiring medical attention. Contaminated persons requiring first-aid will be decontaminated to levels consistent with their need for medical attention.

6. Injured personnel requiring further medical attention will be evacuated to medical centers specially qualified to administer their injuries.

7. Uncontaminated and decontaminated personnel will be released by the Radiological Protection Officer and instructed to proceed to the secondary emergency assembly area at the east end of the East-West corridor of Building 2. No one will be permitted to leave this area until the Emergency Controller determines that no further hazard exists.

8. When all personnel decontamination is complete, the Radiological Protection Officer will assemble the Radiation Survey Team.

9. The Radiation Survey Team will delineate and clearly identify all contaminated areas on the WRC site. They will also determine the location and clearly identify isodose lines circumscribing the actual point of occurrence of any nuclear incident.

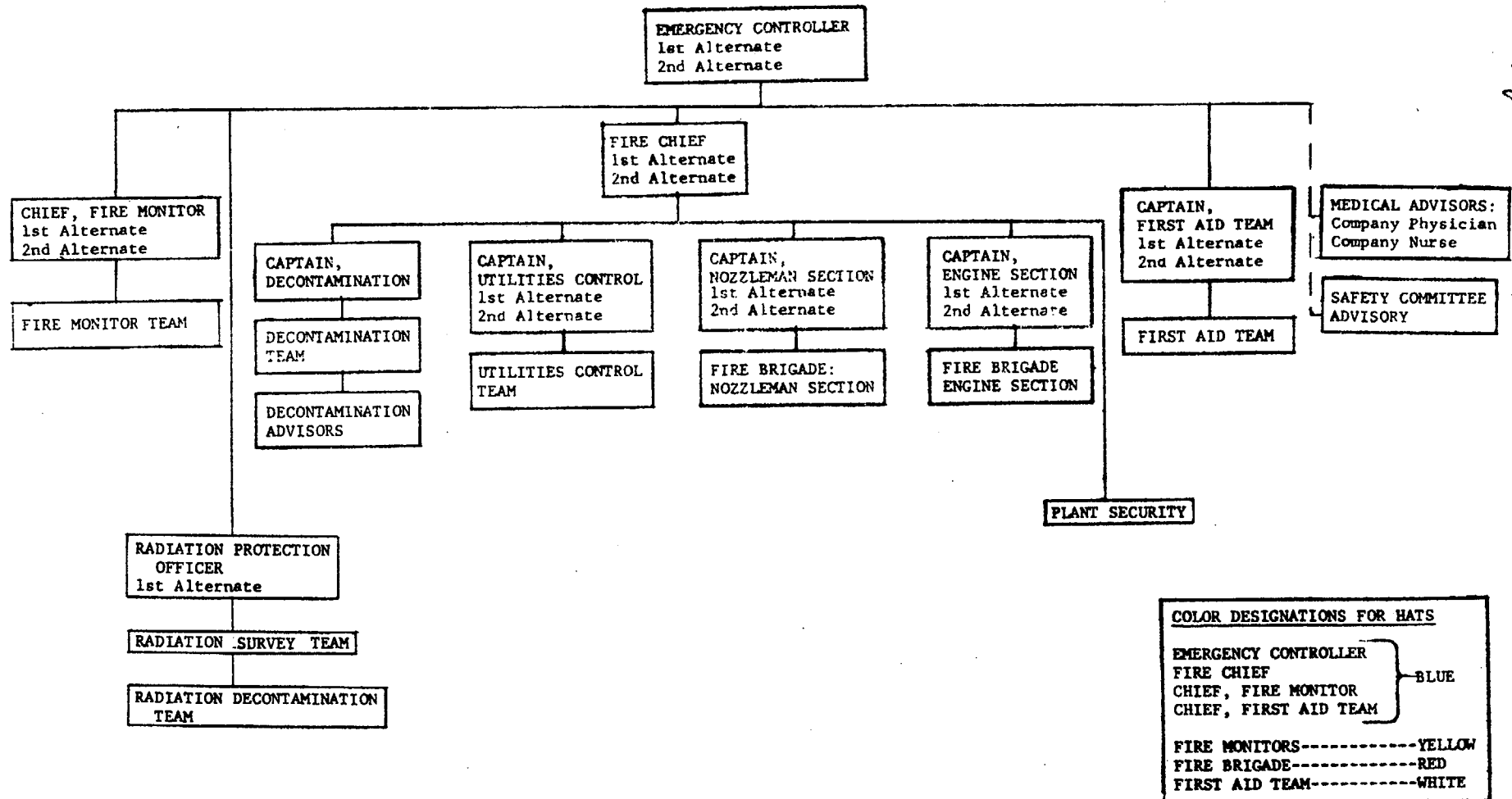
10. At the conclusion of the radiation survey of the WRC site, persons unaffected by any continuing hazard will be instructed by Emergency Monitors to return to their usual work locations and to resume their assignments.

11. Personnel assigned to work locations in areas affected by any continuing radiation hazard resulting from any nuclear incident will be reassigned to other locations or enlisted to aid in decontamination procedures.

12. The Radiation Emergency shall be deemed to be over by the Emergency Controller when the Radiation Survey Team has completed their assessment of any continuing hazard and the risk of exposure for the majority of site personnel is determined by the Radiological Protection Officer and Emergency Controller to be negligible.

13. Decontamination of the site and facilities will be undertaken by the Decontamination Team after delineation of the isodose lines by the Survey Team and when unaffected facilities and operations have been returned to normal.

EMERGENCY CONTROL ORGANIZATION



Issue Date 10/1/11
Authorized by [Signature]

ISSUE DATE August 1, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 6.10
AUTHORIZED BY <i>W S Frank</i>		PAGE 1 OF 1
SUPERSEDES 6.10 dated 1/25/72		

SUBJECT
 EMERGENCY CONTROLLER

Responsibilities

1. In the event of a Radiation Emergency during normal working hours, the Emergency Controller will:

- a. Proceed to the Lobby Conference Room No. 2, Building 2 and assume responsibility for coordinating the efforts of Radiological Protection and Medical personnel.
- b. Coordinate all requests for outside aid.
- c. Determine the end of any site-wide emergency and detailed procedures to be followed to return personnel and facilities to normal operation--based on the assessment of the Radiation Survey Team and in cooperation with the Radiological Protection Officer, Plant Manager-Nuclear Facility, and other qualified personnel or consultants.

2. In the event that a Radiation Emergency occurs during other than normal business hours, the Emergency Controller will summon the Radiological Protection Officer, Company Physician, Company Nurse, Plant Manager-Nuclear Facility, Director of Public Relations, and Vice President of Research.

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		SUPERSEDES 6.20 dated 1/25/72

SUBJECT

RADIOLOGICAL PROTECTION OFFICER

Responsibilities

In the event that the radiation alarms are activated or upon notification from the Emergency Controller that a Radiation Emergency exists, the Radiological Protection Officer will proceed to Lobby Conference Room No. 1, Building 2 and:

1. Supervise and assist the Health Physics Technician in determining the extent of radiation exposure and contamination and in decontaminating all affected personnel.
2. Authorize release of uncontaminated personnel to the secondary assembly area in the East Lobby of Building 2.
3. Supervise the Radiation Survey Team in determining the extent of contamination of the WRC site and locating isodose lines.
4. Limit the exposure of Survey Team members.
5. Determine, in cooperation with the Emergency Controller and Plant Manager, the conclusion of the site-wide emergency and the extent of any limited continuing emergency.
6. Determine—in concert with the Emergency Controller, Plant Manager and other qualified personnel or consultants—detailed procedures and action to be taken to decontaminate and return affected areas and facilities to normal operations.

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AUTHORIZED BY <i>W. S. Frank</i>		PAGE 1 OF 1
		SUPERSEDES 6.50 dated 1/25/72

SUBJECT

HEALTH PHYSICS TECHNICIAN

Responsibilities

In the event of a Radiation Emergency, the Health Physics Technician will go immediately to the Lobby Conference Room No. 1 in Building 2 and assist the Radiological Protection Officer in determining the extent and magnitude of the exposure and contamination of personnel and facilities. He will assist in the decontamination of affected personnel and in the supervision of the Radiation Survey Team. He will:

- a. do survey measures of affected personnel in the order of established priorities,
- b. assist in the decontamination of any injured and non-ambulatory personnel,
- c. instruct ambulatory, injured and uninjured personnel in correct decontamination procedures, and
- d. assist the Radiological Protection Officer in the supervision of the Radiation Survey Team and in limiting exposure of the team members.

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		SUPERSEDES 6.70 dated 1/25/72

SUBJECT

RADIATION SURVEY TEAM

Responsibilities

At the conclusion of all personnel decontamination, the Radiological Protection Officer will assemble a Radiation Survey Team comprised of four members chosen from experienced nuclear personnel. The Radiation Survey Team will be responsible for determining the magnitude and extent of any continuing hazard. In this regard team members will:

1. Don the protective clothing and dosimeters included in the emergency cache.
2. Use suitable survey instrument under the direction of the Radiological Protection Officer and Health Physics Technician to determine the location of a 2.5 mRem/hr isodose line circumscribing the point of occurrence of any nuclear incident.
3. With the aid of the rope and signs included in the emergency cache, clearly identify the location of the 2.5 mRem/hr isodose line as follows:

CAUTION RADIATION AREA - ACCESS
LIMITED TO AUTHORIZED PERSONNEL

4. Determine the location of a second isodose line at 100 mRem/hr and clearly identify its location with rope and signs saying:

DANGER HIGH RADIATION AREA - ACCESS BY
PERMISSION OF RADIOLOGICAL PROTECTION
OFFICER AND PLANT MANAGER ONLY

The Radiological Protection Officer will assure that the radiation exposure of team members is limited to no more than 3 Rem.

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AUTHORIZED BY <i>VS Frank</i>		PAGE 1 OF 1
		SUPERSEDES 6.90 dated 1/25/72

SUBJECT

DECONTAMINATION TEAM

Responsibilities

At the conclusion of any Radiation Emergency, a Decontamination Team will be formed to decontaminate all affected areas and facilities. The Decontamination Team will be chosen as needed from the entire work force at the WRC site. The Decontamination Team will execute detailed decontamination procedures which will be developed jointly by the Radiological Protection Officer, Plant Manager-Nuclear Facility, Emergency Controller, and other qualified personnel or consultants as the circumstances dictate.

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		SUPERSEDES 6.30 dated 1/25/72

SUBJECT

COMPANY PHYSICIAN

Responsibilities

Upon notification that a Radiation Emergency exists, the company physician will proceed to the site and take the following action:

1. Administer first-aid to injured evacuees who are not contaminated.
2. Administer first-aid to injured personnel who are contaminated and have been decontaminated under the direction of the Radiological Protection Officer to minimum levels consistent with their need for first-aid.
 - a. Injured personnel requiring no further medical attention will be released by the Company Physician or Nurse and the Radiological Protection Officer and instructed to proceed to the secondary emergency assembly area in the East Lobby of Building 2.
 - b. Injured personnel requiring further medical attention will be evacuated to the University of Maryland Hospital in Baltimore where special facilities and qualified personnel are available to render needed aid.
3. Contact the University of Maryland Hospital in Baltimore and alert them to prepare to receive contaminated or injured personnel.
4. Arrange for the admittance of the injured personnel at the University of Maryland Hospital.

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SUBJECT
COMPANY NURSE

Responsibilities

1. In the event of a Radiation Emergency, the Company Nurse immediately will don protective clothing, proceed to Lobby Conference Room No. 2 in Building 2, prepare to administer to injured evacuated personnel in Lobby Conference Room No. 1, and notify the Company Doctor.

2. Injured evacuees who are not contaminated will be given first-aid treatment and then released and instructed to proceed to the secondary emergency assembly area in the East Lobby of Building 2.

3. Injured personnel who are contaminated will be decontaminated under the direction of the Radiological Protection Officer to minimum levels consistent with their need for first aid.

- a. Injured personnel requiring no further medical attention will be released by the Company Physician or Nurse and the Radiological Protection Officer and instructed to proceed to the secondary emergency assembly area in the East Lobby of Building 2.
- b. Injured personnel requiring further medical attention will be evacuated to the University of Maryland Hospital in Baltimore where special facilities and qualified personnel are available to render needed aid.

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SUBJECT

FIRST AID TEAM

First Aid Team Captain

In the event that the exterior Radiation alarms are activated, the First Aid Team Captain will be notified via the Emergency 300 Telephone System and will take the following action:

1. Notify the Squad Leader of Building 2 that a Radiation Emergency has occurred.
2. Report the implementation of the Radiation Emergency plan for Building 2 to the Emergency Controller.
3. Notify the remaining Squad Leaders of the First Aid Team that a Radiation Emergency has occurred.
4. Stand by for subsequent instructions from the Emergency Controller.

Squad Leader - Building 2

Upon notification that a Radiation Emergency exists, the Squad Leader - Building 2 will take the following action:

1. Notify all Building 2 First Aid Team members only that a Radiation Emergency has occurred.
2. Immediately don protective clothing and proceed to Lobby Conference Room No. 2, Building 2.
3. Assemble Building 2 First Aid Team members in Lobby Conference Room No. 2 and insure that corridor door is closed off.
4. Administration of first aid to injured personnel will be under the direction of the Company Nurse with the concurrence of the Radiological Protection Officer.

First Aid Team Members - Building 2

Upon notification that a Radiation Emergency has occurred, First Aid Team Members - Building 2 only will take the following action:

1. Immediately don protective clothing.
2. Proceed to the assembly area, Lobby Conference Room No. 2, Building 2.
3. Assist in the administration of first aid to injured personnel as directed by the Company Nurse and Squad Leader with the concurrence of the Radiological Protection Officer.

ISSUE DATE August 1, 1972	<p style="text-align: center;"> W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY </p>	NUMBER 6.40
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SUBJECT

PLANT MANAGER-NUCLEAR FACILITY

Responsibilities

In the event of a Radiation Emergency during normal business hours or upon notification by the Emergency Controller that such a condition exists, the Plant Manager-Nuclear Facility will:

1. Proceed to the Lobby Conference Room No. 2 in Building 2 and confer with the Radiological Protection Officer in determining the nature and extent of the emergency.
2. Notify the highest responsible Corporate officer at the WRC site as to the nature and magnitude of the emergency.
3. Assist the Radiological Protection Officer in the decontamination of affected personnel and facilities.

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SUBJECT

MONITORS

Chief Monitor

In the event that the exterior Radiation alarms are activated, the Chief Monitor will be notified via the Emergency 300 Telephone System and will take the following action:

1. Notify the Monitor Captains of each building that a Radiation Emergency has occurred.
2. Receive the report from each Monitor Captain that the Radiation Emergency plan has been implemented.
3. Report the implementation of the Radiation Emergency plan to the Emergency Controller.
4. Report to Emergency Controller any unauthorized exits from the building.
5. Upon notification from the Emergency Controller, notify Monitor Captains when Radiation Emergency is all clear.

Monitor Captains

Upon notification that a Radiation Emergency exists, the Monitor Captains of each building will take the following action:

1. Insure that each exit door is manned by an emergency monitor and each exit door is posted with a "CAUTION - Do Not Leave Building - Contaminated Area" sign.
2. Report to the Chief Monitor that all doors have been posted and manned.
3. Report to the Chief Monitor any unauthorized exits from the building.
4. Upon notification from Chief Monitor, notify Emergency Monitors when Radiation Emergency is all clear.

Emergency Monitors

Upon notification that a Radiation Emergency exists, the Emergency Monitors of each building will take the following action:

1. Proceed to the preassigned exit door as defined in 3.10 of General Emergency Plan.
2. Post a "CAUTION - Do Not Leave Building - Contaminated Area" sign on the interior of the assigned door.

Building 2 east door monitors only:

The second monitor to reach the east door of Bldg. 2 will clip on film badge (with monitor side out) and pick up rope and warning sign from emergency station located at east door station. He will then proceed down Grace driveway to first marked lamppost on right and cordon off access to the Center. Upon completion he will immediately report to Lobby Conference Room No. 1, Building 2, via the main door, for checkout by Radiological Protection Officer before returning to station.

3. Inform personnel who may attempt to exit that a Radiation Emergency exists, the Emergency Control Plan is in effect, and authorized emergency personnel only are allowed to leave the building.
4. Report to the Monitor Captain any personnel who make an unauthorized exit from the building.
5. Remain on duty at assigned exit door until notified by Monitor Captain that Radiation Emergency is all clear.

ISSUE DATE August 1, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 6.60
AUTHORIZED BY <i>V S Frawley</i>		PAGE 1 OF 1
		SUPERSEDES 6.80 dated 1/25/72

SUBJECT
PLANT SECURITY PERSONNEL

In the event the radiation alarms are actuated after normal working hours, the watchman on duty will notify the Emergency Controller or his alternates. In addition, the watchman will cordon off the main driveway to prevent individuals, other than emergency personnel, from entering the premises.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 8.10
AUTHORIZED BY <i>Victor S Frank</i>		PAGE 1 OF 1
SUPERSEDES		

SUBJECT

SUPPLEMENTAL RADIATION EMERGENCY PERSONNEL

There are other employees in the Nuclear Research Department with special qualifications and extensive experience in handling radioactive materials--they are trained in radiation survey techniques and are familiar with the radiological hazards of these materials and with decontamination techniques. These people will be called upon by the Emergency Controller and/or Radiological Protection Officer as required.

ISSUE DATE January 25, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 10.10
AUTHORIZED BY <i>Victor S Frank</i>		PAGE 1 OF 1
		SUPERSEDES

SUBJECT

REQUIREMENT OF CODE OF FEDERAL REGULATIONS

In the event of a radiation emergency, the Vice President of Research will notify the Director, Region 1, Division of Compliance, 970 Broad Street, Newark, N.J., pursuant to the Code of Federal Regulations under:

- Par. 20.403(a), requiring immediate notification, OR
- Par. 20.403(b), requiring 24-hour notification.

The day time phone number of the Region Director is 201-645-3960; nights and holidays call 212-989-1000.

DATE: 4/12/04

R-INDICATES FUTURE REVISIONS
(PICK UP HERE)

EXISTING ROOF CONCENT

pump house and river

WASTE TREATMENT BLDG
ONE STORY, BRICK

New Warehouse
Bldg. 1-story, steel

Storage Area (Paved)
one story, steel

LAKE

Existing Sewage Treatment Facility Area

Addition to Sewage treatment Facility

2-STORY, BRICK

#22

DYNAMOMETER BLDG, one story BRICK

GENERATOR BLDGS.
TWO STORY BLOCK

paved roads

Water Tower

BLDG #16
ADDITION

16

Bldg 16, one story, BRICK

Greenhouse, one story, Block

Bldg 4, Maintenance Shop
1-story, Block

4

Solvent Storage, 1 story Bldg

Grounds Garage, 1 story, Bldg

Octane Lab, one story Bldg

Cooling Tower

Bldg 1, 3 story, BRICK

Bldg 2, Two story, BRICK

17

1

To Page 22

ISSUE DATE August 1, 1972	W. R. GRACE & CO. Washington Research Center Divisions EMERGENCY CONTROL ORGANIZATION RADIATION EMERGENCY	NUMBER 12.20
AUTHORIZED BY <i>V.S. Frank</i>		PAGE 1 OF 1
		SUPERSEDES 12.20 dated 1/25/72

SUBJECT

DISTRIBUTION

1. Vice President - Inorganic/Nuclear Research
2. Emergency Controller
3. Not assigned
4. Emergency Controller, 1st Alternate
5. Company Doctor/Company Nurse
6. WRC Managers Office
7. Director - Process Development/Engineering
8. Emergency Controller, 2nd Alternate
9. Not assigned
10. Vice President - Chemical Group
11. Director - Public Relations
- 12 thru 24 - Not assigned
25. Plant Manager - Nuclear Facility
26. Radiological Protection Officer - WRC
27. Supervisor - Nuclear Facility
28. Emergency Cache, Bldg. 2
- 29 thru 31 - Marsh & McLennan, Inc.
- 32 thru 38 - U. S. Atomic Energy Commission, Material Licensing
39. Nuclear Safety Associates
40. Nuclear Facility
41. Nuclear Facility
42. Nuclear Facility

DOCKET NO. 70-456

W. R. GRACE & CO.
RESEARCH DIVISION

GRACE

Washington Research Center, Clarksville, Maryland 21029

REGULATORY OPERATIONS

September 1, 1972

Mr. C. E. MacDonald
Chief of Transportation Branch
Directorate of Licenses
USAEC
Washington, D. C. 20545

Gentlemen:

Re: 10 CFR - Part 71.7-71.9

User: W. R. Grace & Co.
Research Division
Washington Research Center
Clarksville, Maryland 21029

License No. SNM-840

From: United Nuclear Corp.
Wood River Junction
Rhode Island

SNM-33, SNM-777
SP # 5021

Container Model - UNC-2400

1972 SEP 6 AM 8 57
RECEIVED
U.S. ATOMIC ENERGY COMM.
REGULATORY
MAIL & RECORDS SECTION

Very truly yours,


H. G. Davis

HGD:jk

cc: D. R. Telesca (Facilities Manager)
R. J. Herbst (SS Representative)

ITEM # 239

4902

~~REGULATORY OPERATIONS~~
W. R. GRACE & CO.
RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

October 4, 1972

GRACE

Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation
Branch
Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D.C. 20545

Re: Docket No. 70-456

Dear Sir:

The W. R. Grace & Co. hereby requests that its Special Nuclear Material License SNM-840 as amended be renewed for a period of five years from the current expiration date of November 30, 1972.

The information required by paragraphs 70.21 and 70.22 of 10CFR have been submitted previously and updated from time to time. We wish to incorporate all of that information as is permitted under paragraph 70.33.

If any additional information is desired, please let us know.

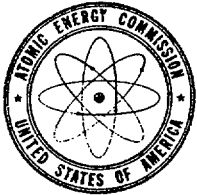
Very truly yours,

G. E. Ashby
G. E. Ashby
Vice President
Research Division

GEA:jk

ITEM # 240

B/239
5432
I



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

October 5, 1972

L:FTR:MAD
70-456

W. R. Grace & Company
ATTN: Mr. D. R. Telesca
Plant Manager
Washington Research Center
Clarksville, Maryland 21029

Gentlemen:

Notice is given that Special Nuclear Material License Number SNM-840 expires on **November 30, 1972**.

If you desire to continue your program using special nuclear material(s), an application for renewal of the license should be filed with this office pursuant to Title 10, Code of Federal Regulations, Part 70, Section 70.33. The application should be in letter form and seven copies submitted.

It is to your advantage to file such an application at least thirty (30) days before the expiration date of your existing license. Your program will then be covered by your existing license until action is taken on your application for license renewal (Section 70.33(b)). If an application is received less than 30 days prior to the expiration date of your license and cannot be processed before your existing license expires, this could result in your possessing special nuclear material without a valid license.

If you do not wish to renew your license, please complete the enclosed form "Certification of Status of Special Nuclear Material Activities Under United States Atomic Energy Commission Special Nuclear Material License Number SNM-840," and return it to this office.

If you have obtained an amendment which has extended the expiration date of the above license or if a new license has been issued which supersedes the above license, please disregard this notice.

This notice of your license expiration is sent for your convenience and it should not be interpreted that similar notices will be sent in the future. The responsibility for timely submission of an application for license renewal remains with the licensee.

DISTRIBUTION:
Document Room
→ RO, HQ (2)
Docket file

ITEM #

241

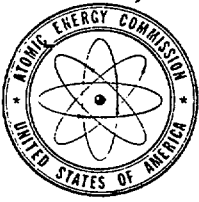
Sincerely,

R. B. Chitwood, Chief
Fuel Fabrication & Reprocessing Branch
Directorate of Licensing

0/240

Enclosures:

1. "Certification . . ."
2. 10 CFR 70



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

NOV 8 1972

L:FFRB:JCD
70-456

SNM-840, Amendment No. 2 ✓

W. R. Grace & Company
ATTN: Mr. D. R. Telesca
Facilities Manager
Washington Research Center
Clarksville, Maryland 21027

Gentlemen:

Pursuant to Title 10, Code of Federal Regulations, Part 70, Special Nuclear Material License No. SNM-840 is hereby amended to incorporate in Item 8B the revised pages 1,2,4,5,9,11,12,13, 14,15,16,21,22,23,23A,25,25A,25C,26,26A,28,29,33,36,36A,37,38, 43,43A,59,59A and 59B dated July 1, 1972, and revised pages 3, 6,7,8,8A,10,10A,16A,16B,16C,17,18,19,20,20A,35 and 65 dated August 9, 1972.

All other conditions of this license shall remain the same.

As discussed with Mr. Telesca on October 25, 1972, we are not including the revised page 39 dated July 1, 1972, which would change the labeling specifications now approved based on page 39 of your application dated April 8, 1970. We will consider this proposed change upon receipt of additional information from you that justifies not labeling containers of 125 ml volume or less.

Please note that the safeguards amendment to your license, SG-1, is still in effect. With the resumption of operations involving special nuclear material, you will be required to comply with the conditions of this amendment. In addition, you should note that the physical protection requirements of Part 73, Title 10, Code of Federal Regulations, must be met whenever you possess more than 5000 grams of U-235 contained in uranium enriched to greater than 20% in the U-235 isotope.

ITEM # 242

B241
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1

NOV 9 1972

W. R. Grace & Co.

- 2 -

Your request that the revisions to pages 22,23,23A,25,25A, 25C,26,26A and 28 be withheld from public disclosure pursuant to Section 2.790 of 10 CFR 2 is under review. We shall contact you when a final determination has been made regarding the request for withholding.

Your request dated October 4, 1972, for renewal of SNM-840 is also under review. You will be advised if additional information is required.

FOR THE ATOMIC ENERGY COMMISSION

Original signed by
R. B. Chitwood

R. B. Chitwood, Chief
Fuel Fabrication and Reprocessing
Branch
Directorate of Licensing

Distribution:
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✓ RO, HQ (2)
HJMcAlduff, OR
RGPage, L:MPP
ACabell, DRA
BBrooks, GM
VJD'Amico, RO
RBChitwood, L:FFRB
JCDeLaney, L:FFRB

NOV 29 1972

L:FFR:JCD
70-456

W. R. Grace & Co.
ATTN: Mr. D. R. Telesca
Plant Manager
Washington Research Center
Clarksville, Maryland 21029

Gentlemen:

Your letter to us dated July 14, 1972, requested that pages 22, 23, 23A, 25, 25A, 25C, 26, 26A, and 28, forwarded with your July 6, 1972, request for amendment of Special Nuclear Material License No. SNM-840 be withheld from public inspection pursuant to 10 CFR 2.790(b).

After reviewing this information, we have determined that disclosure of the information contained therein is not required in the public interest nor by the provision of 10 CFR 9 and would adversely affect the interest of W. R. Grace & Co. Accordingly, we are withholding from public inspection the information contained in the above referenced pages pursuant to 10 CFR 2.790(b). Withholding of this information from public inspection shall not, however, affect the rights, if any, of persons properly and directly concerned to inspect these documents.

Sincerely,

[Signature]
S. H. Smiley, Deputy Director
for Fuels and Materials
Directorate of Licensing

DISTRIBUTION:

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Docket file
Branch Reading file
L:FM Reading file
~~BO~~, HQ, (2)
HJMcAlduff, OR
RGPage, L:MPP
ACabell, DRA
RBrooks, CM

VJD'Amico, RO
JCDeLaney, L:FFRB
RBChitwood L:FFRB
DANussbaumer, L:FC
SHSmiley, L:FM
C R/F

ITEM #

243

B1242

W. R. GRACE & CO.

RESEARCH DIVISION



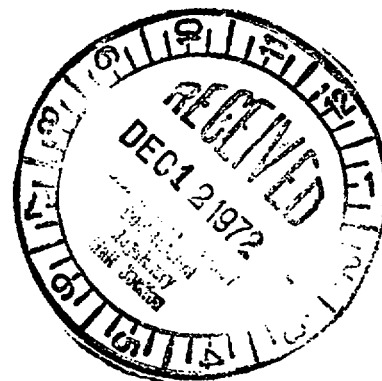
Washington Research Center, Clarksville, Maryland 21029

December 11, 1972

Mr. Donald A. Nussbaumer, Chief
 Fuel Fabrication and Transportation Branch
 Division of Materials Licensing
 USAEC
 Washington, D. C. 20545

Dear Mr. Nussbaumer:

Re: Docket No. 70-456



W. R. Grace & Co. requests that its license SNM-840 as amended be further amended to incorporate changes in the dissolver arrangement, the waste solution boildown arrangement, and to add an inplant storage area for solutions of fissile material in 11 liter 4 3/8" inside diameter polyethylene containers. These changes were discussed with Mr. J. Delaney during his recent visit to the facility, and they are described on the following pages which are enclosed herewith. These pages replace the present pages or add to them.

<u>Page No.</u>	<u>Rev. No.</u>	<u>Date</u>	
23	2	11/6/72	Company Proprietary
23A	1	11/6/72	" "
29	3	11/6/72	
50	1	11/6/72	
55	3	11/6/72	
56	2	11/6/72	
66A	3	11/6/72	
66B	0	11/6/72	

Pages 23 and 23A contain proprietary information and we request that they be withheld from the public.

ITEM # 244

6794

②

B/243

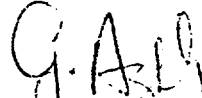
Mr. Donald A. Nussbaumer

- 2 -

December 11, 1972

Your prompt consideration and approval of these changes would be appreciated. If there are any questions, please telephone.

Sincerely,

A handwritten signature in dark ink, appearing to read "G. E. Ashby". The signature is stylized with a large "G" and a cursive "Ashby".

G. E. Ashby

Vice President, Nuclear

GEA:srh

Enclosures

REGULATORY OPERATIONS

DOCKET NO. 70-456

W. R. GRACE & CO.

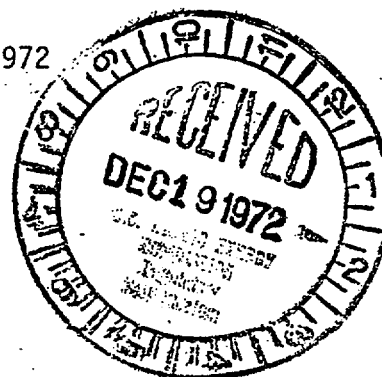


RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

11 December 1972

Director of Regulation
U.S. Atomic Energy Commission
7920 Norfolk Avenue
Bethesda, Maryland 20014



Ref: (1) 10 CFR 20, Para. 20.103 (a) and (c)
(2) Special Nuclear Materials License: SNM 840

Subject: Allowance for particle size distribution in determining
personnel exposure to airborne contamination.

Dear Sir:

Authorization is requested to determine and limit personnel exposure to airborne radioactive contamination by sampling respirable size particles only using the National Environmental Instruments, Inc. Model C-115 Personnel Monitor and Lapel Sampler or its equivalent.

W. R. Grace & Co. proposes to augment and improve its method of air sampling to determine personnel exposure to airborne radioactive contamination by using personal air samplers whenever operations which are suspected to involve probably significant levels of airborne activity are done. Such operations may be identified before or during their execution by operating or radiation safety personnel. The specific equipment proposed for this use has an integral particle size classifier which permits respirable size particles only to reach the filter medium used to collect the air sample. We understand that the determination of exposure based on measurements of the activity in samples collected this way is precluded by Federal Regulations unless specifically authorized as requested by this letter.

If more information is required to disposition this request, please contact me at the above address or by telephone at (301) 531-5711, X 536.

Sincerely,

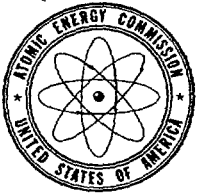
R. J. Herbst
Radiation Protection Officer

B244

RJH/cal

ITEM # 245

6024



UNITED STATES
ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION V
2111 BANCROFT WAY
BERKELEY, CALIFORNIA 94704

TELEPHONE: 841-8121
EXT. 651

December 15, 1972

Dep - SNM - 840

H. W. Crocker, Senior Fuel Facility Inspector
Region I, Directorate of Regulatory Operations

W. R. GRACE AND COMPANY
WASHINGTON RESEARCH CENTER
CLARKSVILLE, MARYLAND

Enclosed with this memorandum are the following items.

1. Air sample data sheets dated October 4 through October 7, 1972, which indicate the air sample coverage during the reported incident. On the rear of one of those air sample sheets appears Dr. Herbst's recapitulation of the incident. That recapitulation is the only written record I could find (other than the licensee's report) on the incident.
2. A penciled letter to me from Dr. Herbst in which he states that second counts were not obtained on the air samples listed in item 1 above. While I was at the facility second counts were made to account for radon decay and Herbst's letter to me lists the results of those second counts.
3. Management and Organization chart for the newly formed Grace/Nuclear Division of the organization.
4. Your original copy of the licensee's November 7, 1972 report of the high airborne concentration incident and the attachment to that report.
5. Copy No. 37 of the licensee's "Emergency Control Organization - Standard Operation Procedures", which has been assigned to the USAEC in my name.
6. A copy of the inspection plan which you presented to me for W. R. Grace with my marginal notation regarding those portions accomplished.

I am mailing, simultaneously, your files for Gulf United Nuclear, Pawling, New York; the ASDA Plutonium Storage Facility; W. R. Grace; and the major portion of the Metals and Controls. They are contained in two separate packages.

William J. Cooley

W. J. Cooley
Fuel Facilities Inspector

B/245

Enclosures:
As stated

ITEM # 246

70-346

DEC 27 1972

W. R. Grace & Company
Washington Research Center
ATTN: Mr. G. E. Ashby
Vice President Research Division
Clarksville, Maryland 21029

Gentlemen:

This will acknowledge receipt of your interim report dated November 7, 1972, concerning the exposure of some of your employees to radioactive material. This matter was examined during a recent inspection of your facilities.

We understand that a final report of the incident is to be submitted by the Company. We will look forward to receiving that report.

Very truly yours,

Original signed by
F. E. Kruesi

F. E. Kruesi, Director
of Regulatory Operations

bcc: w/cpy ltr dtd 11/7/72
PDR
NSIC
L: AEB
L: BMB
C. F. Eason, AWCRR, AGMES
License Files
Incident Files

RO:I
DR Central Files
DR Reading Files

ITEM # 247

B/246

OFFICE ▶	RO	RO	RO	RO		
SURNAME ▶	RHandler:ef	GWRoy	RHEngelken	FEKruesi		
DATE ▶	12/20/72					

JAN 4 1973

James P. O'Reilly, Director
Directorate of Regulatory Operations, Region I

MANAGEMENT MEETING WITH W. R. GRACE AND COMPANY
NUCLEAR DIVISION
11:00 AM
JANUARY 8, 1973

Organization

The licensee has been engaged in nuclear research for several years. They have spent a great deal of effort on development of the "Sol Gel" process for fabrication of highly enriched UO₂ reactor fuel. Mr. G. E. Ashby is Vice President of Research and is Manager of the Nuclear Division. The licensee's activities are conducted at their Clarksville, Maryland, Fuel Laboratory. In August 1972, the SNM processing rate for their laboratory was significantly increased.

Attending for W. R. Grace

G. E. Ashby, Vice President

Attending For Region I

J. P. O'Reilly
R. T. Carlson
H. W. Crocker
R. H. Smith
E. E. Epstein

Meeting Agenda

On December 18, 1972, the agenda was discussed with Mr. Ashby and he was informed that Region I expects him and his staff to present the W. R. Grace and Company position and program plans regarding their corrective actions concerning the November 29 - December 1, 1972 and December 12-14, 1972, inspections.

Inspection History

December 12-14, 1972 (Epstein, Crocker)
Re: Radiological Safety

ITEM #

248

B/247

OFFICE ▶	CRESS: I					
SURNAME ▶	Crocker.pac					
DATE ▶	1/4/73					

Violations

1. Failure to maintain fixed contamination levels below license limits.
2. Failure to take corrective action on items of noncompliance and noted hazards.
3. Failure to perform air particulate surveys when process equipment containment is breached.
4. Failure to perform adequate air particulate surveys for plant operations.
5. Failure to perform adequate surveys and evaluation to determine exposure of employees involved in a reported overexposure occurrence.
6. Failure to perform continuous air sampling in operations area as required by license.
7. Failure to provide instructions to employees involved in the venting and removal of the top of a fluid bed reactor containing SNM.

Safety Items

1. The radiation safety representative has not been informed of non-standard process area operations.
2. Employees do not appear to have been instructed in methods to reduce hazards and improve safety.
3. Proper safety evaluations were not made prior to use of a fluid bed reactor without special ventilation.

November 29 - December 1, 1972 (Cooley)

Re: Criticality and radiological safety

Violations

1. Failure of Nuclear Safety Committee, as a body, to investigate the high airborne concentration incident of November 7, 1972 (Section 6.9).
2. Failure to provide approved written procedures and instructions for the liquid waste dilution operation (Section 6.10), and failure to adhere to SOP No. 1 for the incoming material storage cage in that SNM bearing liquid was stored in the cage.

3. Failure to prepare and maintain written procedures and instructions in the areas of criticality and radiological safety.
4. Failure to transfer fissile solutions from the boil down unit directly into DOT special permit packages.
5. Unauthorized storage of containers of fissile solutions in the fabrication laboratory.
6. Safety Item - storage of flammable materials, boxes of clerical papers and wood storage frames, with fissile material containers in the incoming material storage cage.
7. Safety Item - use of unstable, free standing fissile material storage rack.
8. Safety Item - use of a fissile material storage rack that was not equipped with spacer railing to prevent inadvertent interaction with other fissile material in motion.

March 20-23, 1972 (Browne)

Re: Criticality and radiological safety

Violation - Failure to properly label containers.

February 23-24, 1971 (Browne, Smith)

Re: Criticality and radiological safety

No Violations

Facility to be held in stand-by until fuel processing order is received.

H. W. Crocker
Fuel Facilities Section

cc: R. T. Carlson
P. R. Nelson
R. Smith

DOCKET NO. 70-456

SC

April 16, 1968

TRT-20

File: SP 4877

WKB

SP5330

TRT-21

Dr. Robert A. Kaye
Chief, Traffic Management Branch
Division of Construction
U. S. Atomic Energy Commission
Washington, D. C. 20545

WAB

Dear Dr. Kaye:

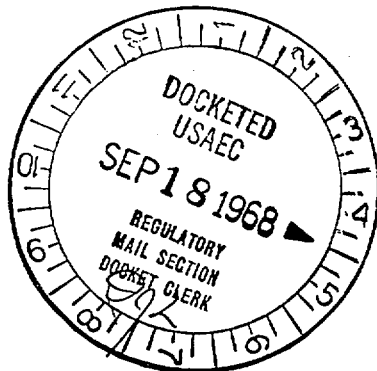
This refers to your letter of April 3, 1968, regarding a number of special permits for the shipment of plutonium nitrate.

The requirement for ultraviolet light protection described in Section 178.19 may be considered as having been met by the use of a steel outer container, and the inhibitors are not required.

The requirement in the permits for venting of the polyethylene bottle has been imposed to prevent unusually high pressures within the polyethylene bottle during transportation. If a vented bottle is used, the venting requirement would be automatically met.

The above interpretations will be reflected in the next revision of the special permits.

Sincerely,



William K. Byrd
Acting Director
Office of Hazardous Materials

ITEM # 200

6/19/9

5

SECOND REVISED SPECIAL PERMIT NO. 5330

Pursuant to the authority of '49 CFR 173.22(a)(1), Department of Transportation (DOT) Hazardous Materials Regulations, as amended:

Special Permit No. 5330, authorizing shipment of certain fissile radioactive materials as Fissile Class II or III, is hereby amended by adding a new paragraph (2a) and changing paragraph (10) to read as follows:

"2a. For shipment of nitrate solutions, no polyethylene bottle may be used which has also been used as a storage vessel for nitrate solutions for more than 30 days. Any internal pressure within the polyethylene bottle must have been relieved within 48 hours prior to shipments. An O-ring seal (Viton-Fluorelastomer, or approved equivalent) must be used as a part of the cap closure. The cap must be subjected to at least 15 foot-pounds of torque during closure. Venting is ~~not~~ authorized. Bottles must conform to the requirements for DOT Specification 25, 27, or 34, with a minimum wall thickness of 0.045 inches, ~~as measured at any point on the bottle.~~ The package is

not authorized for

"10. Shipments of solids are authorized only by cargo aircraft, motor vehicle, rail freight and rail express. Shipments of liquids are authorized only by motor vehicle, rail freight, and rail express."

AT	
CONCURRENCES	
RTG. SYMBOL	
INITIALS/SIG.	FHWA
DATE	12/7
RTG. SYMBOL	
INITIALS/SIG.	FRA
DATE	12-8-67
RTG. SYMBOL	
INITIALS/SIG.	WKB
DATE	12/7
RTG. SYMBOL	
INITIALS/SIG.	TRT-21
DATE	12/7
RTG. SYMBOL	
INITIALS/SIG.	TRT-222
DATE	12-5
RTG. SYMBOL	
INITIALS/SIG.	GR C.R.
DATE	
RTG. SYMBOL	
INITIALS/SIG.	
DATE	
RTG. SYMBOL	
INITIALS/SIG.	
DATE	

SP 5330

THIRD REVISED SPECIAL PERMIT NO. 5330

Pursuant to the authority of Section 313(a) of the Federal Aviation Act of 1958, and 49 CFR 173.22(a)(1) of the Department of Transportation (DOT) Hazardous Materials Regulations, as amended:

Special Permit No. 5330, authorizing the shipment of certain fissile radioactive materials as Fissile Class II or III, is hereby amended by changing paragraph (2a) to read as follows:

"2a. For shipment of nitrate solutions, no polyethylene bottle may be used which has also been used as a storage vessel for nitrate solutions for more than 30 days. Any internal pressure within the polyethylene bottle must have been relieved within 48 hours prior to shipments. An O-ring seal (Viton-Fluorelastomer, or approved equivalent) must be used as a part of the cap closure. The cap must be subjected to at least 15 foot-pounds of torque during closure. Venting is authorized. Bottles must conform to the requirements for DOT Specification 34. The package is not authorized for nitrate solutions containing free nitric acid in strength exceeding 6 molar. The package is exempted from the provisions of 173.268 of the DOT regulations."

All other terms of the permit as revised remain unchanged.

Issued at Washington, D.C., this 19th day of March 1968.

W. R. Fiste
For the Administrator
Federal Highway Administration

H. R. Longhurst
For the Administrator
Federal Railroad Administration

Address all inquiries to: Secretary, Hazardous Materials Regulations Board, U.S. Department of Transportation, Washington, D.C. 20590. Attention: Special Permits.

CONCURRENCES

RTG. SYMBOL

FHWA

INITIALS/SIG.

Curt

DATE

3/19

RTG. SYMBOL

FRA/RS-

INITIALS/SIG.

M. B. R.

DATE

3/21

RTG. SYMBOL

TRT020

INITIALS/SIG.

WKB

DATE

3/19

RTG. SYMBOL

TRT-21

INITIALS/SIG.

WAB

DATE

3/19

RTG. SYMBOL

TRT-222

INITIALS/SIG.

CR G.R.

DATE

3-19

RTG. SYMBOL

INITIALS/SIG.

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All other terms of the permit as revised remain unchanged.

Issued at Washington, D.C., this 5th day of December 1967.

W. R. Fiste
For the Administrator
Federal Highway Administration

H. R. Longhurst
For the Administrator
Federal Railroad Administration

Address all inquiries to: Director, Office of Hazardous
Materials, U. S. Department of Transportation, Washington,
D.C. 20590. Attention: Special Permits Branch.

REVISED SPECIAL PERMIT NO. 5330

Pursuant to the authority of S173.22(a)(1), Department of Transportation (DOT) Hazardous Materials Regulations, 49 CFR Parts 171-190, as amended:

Special Permit No. 5330, authorizing shipment of certain fissile radioactive materials consisting of plutonium or enriched uranium, is hereby amended by adding BATTELLE NORTHWEST, Battelle Memorial Institute, as an authorized shipper under its terms.

All other terms of the permit remain unchanged.

Issued at Washington, D.C., this 16th day of November 1967.

W. R. Fiste
For the Administrator
Federal Highway Administration

H. R. Longhurst
For the Administrator
Federal Railroad Administration

Address all inquiries to: Director, Office of Hazardous Materials, U.S. Department of Transportation, Washington, D.C. 20590. Attention: Special Permits Branch.

CONCURRENCES	
RTG. SYMBOL	
INITIALS/SIG.	
DATE	11/16
RTG. SYMBOL	PRA
INITIALS/SIG.	<i>MBL</i>
DATE	11-21-67
RTG. SYMBOL	TPT-2
INITIALS/SIG.	<i>MBL</i>
DATE	11/17
RTG. SYMBOL	TPT-2
INITIALS/SIG.	<i>MBL</i>
DATE	11/17
RTG. SYMBOL	TPT-2
INITIALS/SIG.	<i>MBL</i>
DATE	11-17
RTG. SYMBOL	
INITIALS/SIG.	
DATE	
RTG. SYMBOL	
INITIALS/SIG.	
DATE	
RTG. SYMBOL	
INITIALS/SIG.	
DATE	

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

1. LICENSEE <i>W.R. GRACE & Company</i> <i>RESEARCH DIVISION</i> <i>WASHINGTON, RESEARCH CENTER</i>	2. REGIONAL OFFICE <i>Region I, Division of Compliance</i> <i>U. S. Atomic Energy Commission</i> <i>970 Broad Street, Newark N.J.</i> <i>07102</i>
3. LICENSE NUMBER(S) <i>19-4003-1 and 5NM-840</i>	4. DATE OF INSPECTION <i>August 20, 1968 (RII)</i>
5. INSPECTION FINDINGS	
<p><input checked="" type="checkbox"/> A. No item of noncompliance was found.</p> <p><input type="checkbox"/> B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 34.42</p> <p><input type="checkbox"/> C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c) (1) or 34.42</p> <p><input type="checkbox"/> D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)</p> <p><input type="checkbox"/> E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)</p> <p><input type="checkbox"/> F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f) (1) or (f) (2)</p> <p><input type="checkbox"/> G. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)</p> <p><input type="checkbox"/> H. Form AEC-3 was not properly posted. 10 CFR 20.206(c)</p> <p><input type="checkbox"/> I. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b)</p> <p><input type="checkbox"/> J. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)</p> <p><input type="checkbox"/> K. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.51, 40.61 or 70.51</p> <p><input type="checkbox"/> L. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c)</p> <p><input type="checkbox"/> M. Records of inventories were not maintained. 10 CFR 34.26</p> <p><input type="checkbox"/> N. Utilization logs were not maintained. 10 CFR 34.27</p>	
<p style="text-align: right;"><i>Raymond Epstein</i> (AEC Compliance Inspector)</p>	
6. LICENSEE'S ACKNOWLEDGMENT	
<p>The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.</p> <p style="text-align: right;"><i>B/200</i></p>	
<p>(Date) _____ (Licensee Representative — Title or Position) _____</p>	

ORIGINAL: LICENSEE. COPIES: ☐ CO REGION ☐ CO HEADQUARTERS ☐ CO ENFORCEMENTITEM # 201

W. R. GRACE & CO.

PC-022

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

September 12, 1968

DOCKET NO. 70-456

Secretary, Hazardous Material Division
Department of Transportation
400 Sixth Street, S. W.
Washington, D. C. 20590

Dear Sir:

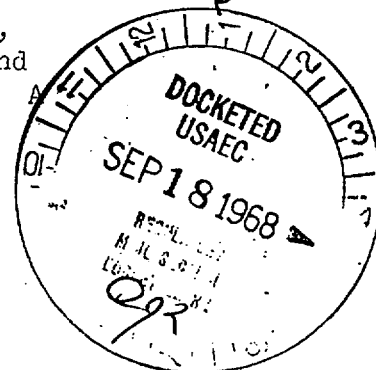
We want to ship a small quantity of plutonium (fissile radioactive material; Class D, Group IV poison) to the Atomic Energy Commission's Richland Operation in Richland, Washington. We received the plutonium from Richland in February 1968. We have not opened any part of the shipping container and, further, we have no facility for opening it now. We propose to return the container and its contents unopened.

The shipping container is a type L-3 assembly. The particular one we propose to use belongs to the AEC. It was originally authorized for use by the Bureau of Explosives. We understand, however, that the B. of E. permit has been superseded by a DOT special permit (SP-5330).

SP-5330 in turn has been revised several times. The third revision, issued May 19, 1968, specified the innermost polyethylene container. To comply with the provisions of this revision, we have to open the outer and inner containers of the L-3 assembly, transfer the Pu solution from the innermost polyethylene container to a new, DOT specification 34 poly-bottle, reassemble the container and deliver it to a contract or common carrier within 48 hours. We have no facility for safely opening the assembly or transferring the solution. Therefore, we cannot comply with these requirements.

We ask to be added as a user of the L-3 type container for which DOT SP-5330 was issued. Simultaneously, we are asking to be exempted from the requirements of paragraph 2a of the permit. I am basing our justification for the exemption on the exclusive use of a vehicle for transport, the relatively small quantity of material to be shipped and the AEC's approval of the detailed plan for the shipment. copy of my letter to the AEC is enclosed.

ITEM # 202



W. R. GRACE & CO.
Research Division

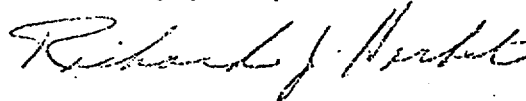
WASHINGTON RESEARCH CENTER

CONTINUATION

The exemption is understood to apply to this shipment of material to Richland only and is not interpreted to be a blanket exemption effecting any future use of the L-3 type container by WRC.

If you need additional information to act on this petition, please call me at (301) 531-5711, extension 550.
Thank you.

Sincerely yours,



Richard J. Herbst

RJH/par
Enclosure

W. R. GRACE & CO.

GRACE

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

September 13, 1968

DOCKET NO. 70-456

Director, Division of Materials Licensing,
U. S. Atomic Energy Commission
Washington, D. C. 20545

For Div. of Compliance

SVM 840

Dear Sir:

We want to return a small quantity of plutonium to the Commission. We ordered and received 25g of plutonium as plutonium nitrate solution from the Richland Operations in February, 1968. The material has been stored unopened in the original shipping container. We have no facility for opening the container and propose to return it unopened.

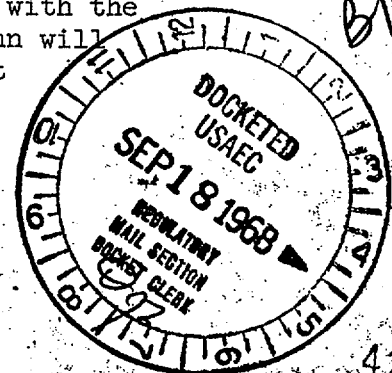
The Department of Transportation has told us that the Bureau of Explosives permit which originally authorized the use of this container has been superseded by a DOT special permit. Further, the DOT permit has been revised to place additional requirements on the construction of the innermost polyethylene container. I have attached a copy of the DOT permit (SP-5330) and the various revisions.

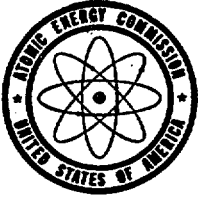
Since we cannot safely open and inspect the shipping container, we cannot assure compliance with the polybottle requirements of DOT SP-5330, paragraph 2a. Will the Commission specifically exempt us from complying with these provisions?

We are shipping a much smaller quantity of plutonium nitrate solution at a lower plutonium concentration than the quantity and concentration for which the container is authorized (0.156 l of 160g Pu/l versus 3.3 l of 250g Pu/l). Further, we are prepared to ship exclusive use of vehicle to minimize handling and to insure against loss or misdirection during transit. We have been working with receiver Atlantic Richfield Hanford Co. (AHRCO) and Mr. George F. Penn at the AEC Richland Operations' Office in formulating this plan. AHRCO originally shipped the material for AEC, and they are familiar with the details of the shipping assembly. I am sure Mr. Penn will answer any specific questions. He may be reached at (509) 942-1111, extension 65255.

ITEM # 203

SEP 30 1968





UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION I
970 BROAD STREET
NEWARK, NEW JERSEY 07102

201 645-

October 2, 1969

File *Hoe*
Thru: H. W. Crocker, Senior Fuel Facilities Inspector, CO:I

W. R. GRACE AND COMPANY
CLARKSVILLE, MARYLAND
SNM-840

A telephone call was made to the licensee on October 2, 1969 by C. W. Nilsen. Dr. R. J. Herbst, Senior Research Engineer stated that the only material under the license was 18 gms of U-235 which was being carried as a BPID (Book Physical Inventory Difference) and was not inspectable. He stated that no SNM activities had been performed since 1967. Herbst has replaced Gammill for license responsibility. No criticality inspection is planned.

C. W. Nilsen
C. W. Nilsen
Fuel Facilities Inspector

*HAP - set up for telephone
check on status for 4/70
RSC
11/25/69*

B/203

ITEM # 204

W. R. GRACE & CO.

GRACE

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

January 29, 1970

Mr. Lawrence D. Low, Director
Division of Compliance
United States Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Low:

This letter will serve as our Personnel Exposure and Monitoring Report for calendar year 1969 as required by 10 CFR 20.

The Research Division of W. R. Grace & Company has four AEC licenses in effect. These are:

SMB 334 -- Source material up to a total of 1600 pounds. This material is exempt under section 20.407.

SNM 840 -- Special Nuclear Material up to a total of 1000 grams. This material is exempt under the cited section.

Byproduct Material License 19-04003-06-- Byproduct materials atomic number 1 through 83 up to a total of 10 millicuries of each. This material is exempt under the cited section.

Byproduct Material License 19-04003-04-- This license is for a Brookhaven National Laboratory Tubular Cobalt-60 source containing 190 curies. This source is in storage and is not used except for periodic leak testing. In no case was exposure to radiation detected on the film-badge dosimeters provided to the two individuals doing the leak testing. This report is made in accordance with subdivision(i) of subparagraph (1) of paragraph (b) of section 20.407 of 10 CFR 20.

Very truly yours,

John N. Lomonte
Radiological Protection Officer

JNL/bjp 70-6

cc: W. K. O'Loughlin

ITEM # 225

70-456

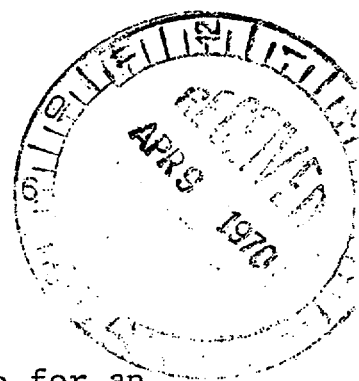
~~W.R. GRACE & CO.~~ W.R. GRACE & CO.

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

April 9, 1970

Dr. John A. McBride, Director
Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545



Dear Dr. McBride:

Enclosed herewith please find our application for an amendment to Special Nuclear Materials License 840 to permit additional operations involving enriched uranium to be performed in connection with a new facility in Building 16-A. The enclosed application is intended to be complete in itself without reference to the present license.

Information relating to safeguards is not included herewith but will be submitted directly to the Director, Division of Nuclear Materials Safeguards.

Further, the Research Division of W. R. Grace & Co. hereby requests that paragraphs 7.1 through 7.21 of the enclosed application, the process flow sheets Figures 7.3 a and 7.3 b, and Equipment Layout Drawing E-69020-51, furnished herewith, be withheld from public inspection pursuant to the provisions of 10 CFR Part 2.790(b). These documents disclose unpublished information regarding processes and equipment of competitive value which has been generated at private expense, and information regarding processes and equipment under development at the Research Center. This information is thus of the nature described in 10 CFR 9.5(4) as being exempt from disclosure to the public. Public inspection of this information will adversely affect the interests of W. R. Grace, since it will destroy the competitive value of such information.

We believe that withholding paragraphs 7.1 through 7.21, Figures 7.3 a, 7.3 b, and Drawing E-69020-51 from public inspection is not contrary to the public interest and that sufficient information is furnished for public inspection, such that, any person directly concerned may determine whether inspection of

ITEM # 206/205

Dr. John A. McBride

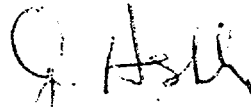
- 2 -

April 9, 1970

the withheld documents is essential to the public interest.
The documents to be withheld are submitted separately pursuant
to 10 CFR paragraph 2.790.

We would appreciate your early review and approval of the
requested amendment.

Very truly yours,



George E. Ashby
Vice President,
Research Division

GEA:sjr

Enclosures (copies 2 through 8 inclusive)

DOCKET NO. 70-456

W.R. GRACE & CO.
RESEARCH DIVISION

GRACE

Washington Research Center, Clarksville, Maryland 21029

For Div. of Compliance

June 2, 1970

Mr. Robert J. Dube
Atomic Energy Commission
Bethesda, Maryland

REF: Docket No. 70-456

Dear Mr. Dube:

Attached are the additional copies of paragraph 7.22, 7.23 and Table 7:23, which you requested in our meeting on May 28th. These paragraphs were inadvertently and erroneously included in the proprietary section of our license application.

Please delete the above mentioned paragraphs from the proprietary section of the license application which we submitted on April 9, 1970.

If there are further questions, please advise.

Very truly yours,

D. R. Telesca

D. R. Telesca
Plant Manager

DRT:lw

cc: S. Reese - no attach.

B/206

ITEM # 207 1734



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

Docket No. 70-456

SANM-840

JUN 15 1970

Crocker
~~RHS~~
~~WHELOSB~~

W. R. Grace and Company
Research Division
Washington Research Center
Clarksville, Maryland 21029

Hep

Attention: Mr. George D. Ashby
Vice President
Research Division

Gentlemen:

This will confirm our meetings of May 28, 1970, and June 4, 1970, with members of your staff regarding your application dated April 8, 1970.

Please expand and clarify the demonstration portion of your application by submitting the information requested in the enclosure. In addition, you should submit as a separate document minimum technical specifications covering the scope of your proposed activities, capabilities of facilities and equipment, capabilities of personnel, nuclear and radiation safety requirements, and administrative procedures to assure health and safety and compliance with AEC regulations. Conformance to these technical specifications will be made a condition of your license.

Sincerely,

Original Signed by
Donald A. Nussbaumer
Donald A. Nussbaumer, Chief
Fuel Fabrication and
Transportation Branch
Division of Materials Licensing

Enclosure:
As stated

Distribution:


Original
Document Room
Docket File
Branch Reading file
Division Reading file
Div. of CO, HQ (2)
RJDube, Reading file (2)
M. A. Dean, DML
J. C. Delaney, DML
L. C. Rouse, DML
D. A. Nussbaumer, DML

ITEM # 208

I 12/20/71
9

W. R. Grace and Company

DOCKET NO. 70-456

- 6.6 Specify the minimum technical qualifications and experience requirements for membership on the Committee. Specify the company official having authority to appoint members to the Committee.
- 6.7 What constitutes Committee approval?
- 6.8 Can Committee decisions be overruled?
- 6.12
- 8.19
- 6.16 Specify the minimum technical qualifications and experience requirements for positions assigned responsibility for safety programs, including the shift foreman and the emergency controller.
- 6.29 Submit a more detailed description of the nature and scope of the basic training course. It is not clear that a 4-hour period would be sufficient to properly train individuals. Specify by positions the persons who will conduct the course. Describe the method of determining that an individual has satisfactorily completed the course.
- 7.22 Provide a flow diagram of the process waste streams indicating their origins,
8.12 estimated concentrations, flow rates, hold-up points, volume of hold-up tanks,
9.10 sampling points, and disposition. Describe your sampling procedures in
11.0 sufficient detail to show that representative samples will be obtained. State your criteria for release of liquid effluents to unrestricted areas, and describe all waste treatment processes designed to minimize concentrations in effluents released to unrestricted areas. Every reasonable effort should be made to maintain releases as far below the limits specified in 10 CFR 20 as practicable. 
- 7.24 The emergency equipment should include at least one high range beta-gamma survey meter, capable of measuring exposure levels of at least 500 R/hr.
- 8.3 The second sentence in this section is misleading. Section 20.202(b)(2) of 10 CFR 20 does not establish a maximum level of exposure. It establishes the exposure levels above which a restricted area must be considered a radiation area. Also, the designation of a high radiation area should be on the basis of 20.202(b)(3) rather than 20.101(a). Entrances to a high radiation area must be controlled in accordance with 20.203(c)(2).
- 8.4 Bioassays should be performed at least monthly. You should also specify action or investigation levels and describe the follow-up action taken in

event the investigation levels are exceeded. Include the considerations that will be given to fecal sampling and/or lung counting since it appears that any exposures to airborne concentrations at your facilities will probably be to relatively insoluble forms of uranium.

- 8.6 You should describe your criteria for location of air samplers and your program for periodic evaluation of the adequacy of their location. In this regard, you should consider the use of lapel air samplers to supplement the sampling program described in your application. Specify the frequency and means of calibration of flow rate of air sampling equipment.
- 8.7 In the various limit specifications, the word "should" should be changed to "shall".
- 8.16 Enclosed is a copy of the minimum requirements for emergency plans which
- 8.17 will be incorporated into your license. You should expand your applica-
- 8.18 tion to cover each of the primary elements of the plan.
- 8.20
- 9.4 Does the mass limit specified in Section 9.5 and Item 1 of Table 9.4
- 9.5 apply to the laboratory as a whole?
- 9.4 Item 4 in Table 9.4 and Section 9.7 should be modified to specify a maxi-
- 9.7 mum concentration and to include criteria for nominal reflection. Other sections referencing these criteria should explain why concentrations greater than the maximum specified concentration cannot occur. In regard to Item 5 in Table 9.4, you should demonstrate that nominal reflection can be maintained with cooling jackets.
- 9.4 Item 9 in Table 9.4 and Section 9.10 should be modified to state that the
- 9.10 use of Raschig Rings will comply with the proposed ANS Standard, "Use of Borosilicate-Glass Raschig Rings as a Fixed Neutron Absorber in Solutions of Fissile Material," published in the Nuclear Engineering Bulletin, 3-3, November 1965, by the American Nuclear Society.
- 9.12 Additional information should be submitted to justify your use of 5 radii as the proper spacing of process vessels from building walls. The set of experiments described in ORNL-2367 was limited to a single diameter and relatively short cylinders.
- 9.15 Please confirm that containers of diameter greater than 3 and 1/2 inches will be clearly labeled to warn against use with dense particles.
- 10.2 Section 7.4 indicates that a dissolver batch will be weighed out in a dry box 14-1. Section 10.2 should be expanded to include nuclear safety and

radiation safety analyses of these operations, including transfer of the U-235 to the dissolver. Provide justification for the adequacy of the dissolver hood for controlling airborne concentration.

Your use of the term "bare pipe" in Section 10.2, and elsewhere in your criticality analyses, could lead to misinterpretations. "Bare" means no reflection. "Minimum" reflection is defined in TID-7016, Revision 1, as no more than 1/8 inch thickness of stainless steel or other common metal. Your nuclear safety analyses should be modified to take this into consideration.

You should show that the 6-inch dissolver jacket would be safe if uranium solution leaked into it.

- 10.3 What is the basis of the nuclear safety of the dialysis cell under normal and abnormal operating conditions? In this regard you should show that a breakdown in the dialysis cell resulting in an abnormal transfer of uranium to the waste boil down tank or holding tank would not create an unsafe condition. You should also show that uranium cannot be transferred to the scrub tank, 10-8, by overflow or pump or vacuum action, or show that such a transfer would not result in an unsafe condition.
- 10.4 You should specify the actual degree of reflection of the particle columns, the maximum concentration that can be tolerated, and the controls which prevent this concentration from being exceeded. You should also present an analysis to show that a failure in the 4-inch diameter cartridge filter could not result in an unsafe condition in the water scrubber column or the glass column particulate trap.
- 10.6 Describe the ventilation system for the sintering furnace and the controls for prevention of the development of an explosive mixture of gasses.
- 10.7 Regarding the coating operation, you should define your term "essentially unmoderated system". Also, 10.7 indicates that the coating equipment does not exceed 3.5" diameter while 10.7a says that except when operations are actually being performed upon the particles they are contained in geometrically safe systems. Please clarify. Does 10.7(b) also apply to the coating operation?
- 10.8 You should demonstrate the nuclear safety of the array of 5-inch cylinders in which washing solutions are stored. Describe the provisions for transferring the wash solution to the liquid treatment system, if measurements indicate that treatment is necessary.

- 10.9 Please note that in regard to the particle storage racks, we do not agree with the nuclear safety analysis on the basis of a density of 0.08 grams per cc. However, we do agree that the racks as described are safe.
- 11.1 Describe your provisions for contamination control and fire protection
11.2 in regards to the handling, packaging, and storage of solid waste materials, and provide a nuclear safety analysis of the packaging and storage of both solid and liquid waste.
- 12.4 What is the source of the remaining 38% of the air supply to working areas?
- Please note that pursuant to Section 20.103(a), credit can be taken for respiratory protective equipment only if specifically authorized pursuant to 20.103(c)(3).

In addition, you should supply the following information:

- a. In Appendix A you state that the minimum critical diameter for water reflected solutions of 93.2% U-235 is 5.6 inches. The generally accepted minimum diameter is 5.4 inches, although the value of 5.6 is accepted for $U(93.2)O_2F_2$.
- b. In Appendix B, you assume a partially reflected cylinder diameter halfway between the bare and fully reflected values. If it is your intent to find the nominal reflection diameter a more quantitative method should be used, as the nominal value does not always occur at the halfway point. As indicated before, while we concur in the safety of the storage racks, we do not concur in the k effective calculations in Appendix B.
- c. In Part IC of Appendix B and at other times you indicate that when using solid angle to calculate interaction, the units which contribute less than 0.05 steradian may be neglected. This is incorrect, and only units contributing less than 0.005 steradian may be neglected.
- d. Describe the frequency and means of measuring hood velocities.
- e. Describe the building 20 storage area, the storage conditions, and the location of the emergency alarm sensor. Describe procedures for storage of both incoming and outgoing materials, including scrap. Describe the relationship of the criticality alarm in building 20 to the building 16A alarm system and the plant alarm system.
- f. Describe in more detail your provisions for stack sampling and analysis. You should confirm that your sampling will be isokinetic and show

that the system is capable of obtaining a representative sample of the stack effluent.

- g. Specify contamination limits, considering both removable and fixed contamination, for controlled and uncontrolled areas. Specify your criteria for the frequency at which smear surveys will be performed. Surveillance practices should include frequent inspection and survey of glove box gloves.
- h. Specify which transfers of material, if any, are made in unsealed containers. Any such transfers should be closely monitored.
- i. Specify your schedule for periodic tests of emergency power equipment. Describe your administrative procedures for operational tests of the criticality alarm system.
- j. Describe your system of internal audits of performance to assure adherence to approved operating procedures, particularly administrative controls placed on procedures for nuclear safety reasons.
- k. Describe the health and safety controls employed for cleanup and decontamination operations, including the requirements for collection, handling and disposition of waste material.
- l. Identify equipment which is not safe geometry under all conditions and demonstrate that nuclear safety cannot be compromised as a result of accident or failure. This should include a demonstration of the nuclear safety of the sump in the still room, with respect to both accidental release and long-term build-up.

A N N E X B

MINIMUM REQUIREMENTS FOR LICENSEE'S PLANS FOR COPING WITH RADIATION EMERGENCIES

The licensee shall develop and maintain an emergency plan and implementing procedures for coping with radiation emergencies which shall include, but not necessarily be limited to, the following:

1. An organization for coping with radiation emergencies, in which specific authorities, responsibilities, and duties are clearly defined and assigned. The methods used to assure that persons assigned specific authority and responsibility are initially qualified and are periodically trained so that they can continue to properly fulfill their duties should be specified. The means of notifying persons assigned to the organization in the event of an emergency and the means of notifying appropriate local, state, and Federal agencies so that emergency action beyond the site boundary may be taken should be specified.
2. A list of employees of the licensee (by position), other than those assigned to the emergency organization, who have any special qualifications for coping with emergency conditions. A similar list shall be made of other persons whose assistance may be needed. The special qualifications of these employees and persons shall be specified. All of the foregoing lists shall be available to the individuals responsible for directing the action necessary to cope with the emergency.
3. The actions planned to protect the health and safety of individuals and to prevent damage to property both within and outside the site boundary in the event of various types of emergencies that can be anticipated, i.e., internal accidents such as criticality, fire, and explosions, and natural occurrences such as floods, tornadoes, and earthquakes. This should include the means for determining: (i) the magnitude of the release of radioactive materials, including guidelines for evaluating the need for notification and participation of local, state and Federal agencies, and (ii) the type and extent of protective action to be taken within and outside the site boundary to protect health and safety and prevent damage to property.

4. The post-accident recovery and reentry actions including guidelines for implementing these actions which shall include (i) corrective actions that may be necessary to terminate or minimize the consequences of the accident, (ii) criteria for plant reentry, (iii) securing the accident area from inadvertent or unauthorized reentry, (iv) and resumption of operations.
5. Procedures for notifying and agreements to be reached with local, state, and Federal officials for the early warning of the public and for appropriate protective measures should such measures become necessary or desirable.
6. Provisions for maintaining up to date: (i) the organization for coping with emergencies, (ii) the procedures for use in emergencies, and (iii) the lists of persons with special qualifications for coping with emergency conditions.
7. The specifications for emergency first aid and personnel decontamination facilities, including:
 - (i) Identification of individuals directly involved in the accident;
 - (ii) Equipment at the site for personnel monitoring;
 - (iii) Facilities and supplies at the site for decontamination of personnel;
 - (iv) Facilities and medical supplies at the site for appropriate emergency first aid treatment;
 - (v) Arrangements for the services of a physician and other medical personnel qualified to handle radiation emergencies; and
 - (vi) Arrangements for transportation of injured or contaminated individuals to treatment facilities outside the site boundary.
8. Arrangements for treatment of individuals at treatment facilities outside the site boundary.

9. Provisions for testing, by periodic drills, of radiation emergency plans to assure that employees of the licensee are familiar with their specific duties. Provisions for participation in the drills by other persons whose assistance may be needed in the event of a radiation emergency shall be included.
10. The provisions for the training of persons other than employees of the licensee whose assistance may be needed in the event of a radiation emergency.
11. Provisions for maintenance and storage of emergency equipment, considering the various types of accidents that can be anticipated, also, the performance criteria of the various types of equipment.

The licensee's emergency plan shall consist of a document providing the objectives and the bases for the actions to be taken to cope with various types of accidents which affects, or threatens the health and safety of the general public, employees of the licensee or other persons temporarily or permanently assigned to the facility. It should specify the objectives to be met by the implementing procedures and should assign organizational and individual responsibilities to achieve such objectives.

Emergency procedures shall consist of a document defining in detail the implementation actions and methods necessary to achieve the objectives of the emergency plan for each set of circumstances considered in the emergency plan. To the extent possible these two documents should be separated.

ITEM # 209

RECOMMENDED CHANGES IN CATEGORY, PRIORITY, DUE DATE

LICENSEE Grace W. R. & Co. CITY, STATE Charksville, Md.

LICENSE NO. SNM-840 DATE OF LAST INSP. 8/20/68

REPORT FORM, PREVIOUS INSPECTION 591 CLEAR? yes

CLASSIFICATIONS

<u>PRESENT</u>		<u>PROPOSED</u>
<u>A</u>	CATEGORY	<u>ACI</u>
<u>II</u>	PRIORITY	<u>I</u>
<u>4/70</u>	DUE DATE	<u>8/70</u>
<u>yes</u>	PHONE CALL	<u>no</u>

REASONS:

Dr. Triziani, Nuclear Fuels Mgr., said no mat presently possessed, none used for last several years but a new amendment is being processed which will cover a large SNM program. He anticipates activity being handled by August of this year (1970)

JB 6/19/70

~~CHRIS: PLEASE CHANGE THE BOOK AS INDICATED ABOVE.~~ INITIALS ~~DATE~~

HARRY: PLEASE CHANGE CARDS AS INDICATED ABOVE. . . DONE INITIALS DATE

Signed

W. H. Crocker 6/24/70
NAME DATE

Bad - Fred inquired not knowing that this license was your responsibility. I would suggest you change due date so that it will not be counted as overdue for the July quarterly report.

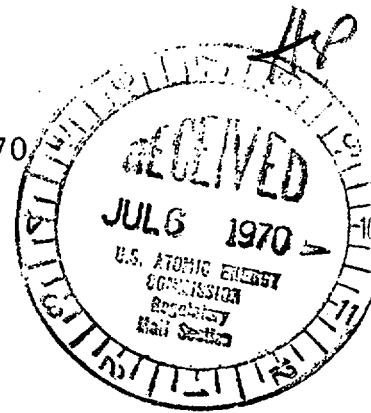
Will be resuspended in 8/70. New amendment it is now A(1)-T

W. R. GRACE & CO.
RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

July 2, 1970

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D. C. 20545



Re: Docket No. 70-456

For Div. of Compliance

Dear Mr. Nussbaumer:

In response to your request of June 15, 1970, for additional information relative to our application of April 8, 1970, we enclose herewith seven copies of the pages which have been revised to incorporate the additional information requested. Where pages have been added they are numbered with the original page number followed by a letter in sequence. The pages submitted herewith are to replace those previously furnished.

The emergency procedure for the Center is in the process of being revised to comply with the Annex B you furnished us and it will be forwarded to you shortly, as stated in Paragraph 8.16.

We request that a provisional license be issued for operation pursuant to the conditions set forth in the information previously submitted as supplemented herewith and the emergency procedure.

The broad license specifications which we understand will constitute the overall limiting conditions of the license for final approval will be submitted at an early date for your review and concurrence.

We would appreciate your early review and approval of this application.

Very truly yours,

Donato R. Telesca
Plant Manager

DRT/mb

ITEM # 210

B/209
2000

(1)

DOCKET 70-456

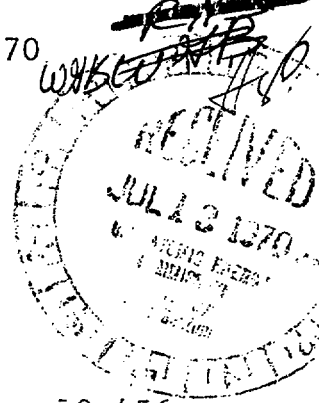
W. R. GRACE & CO.
RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

For Div. of Compliance

July 9, 1970



Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D. C. 20545

Re: Docket No. 70-456

Dear Mr. Nussbaumer:

When we submitted revisions on July 2 we inadvertently left out a number of pages which had been corrected.

We request that the enclosed seven copies of each of the corrected pages (nos. 26, 56, 58, and 59) be incorporated into our Application for Amendment to Special Nuclear Materials License SNM-840. The pages submitted herewith are to replace those previously furnished.

Very truly yours,

Donato R. Telesca

Donato R. Telesca
Plant Manager

DRT/mb
Enclosures

ITEM # 211

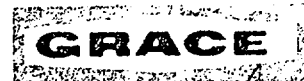
I

B/210
211 (1)

W. R. GRACE & CO.
RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

July 29, 1970



Crocker
WAB
Smith

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D.C. 20545

Re: Docket No. 70-456

Dear Mr. Nussbaumer:

For Div. of Compliance

In our meeting of July 17, a number of questions concerning our Application for Amendment to Special Nuclear Materials License SNM-840, were raised by members of your staff.

We have made the required changes and corrections and request that the enclosed seven copies of each of the corrected pages be incorporated into our application. The pages and drawing submitted herewith replace those previously furnished.

We urgently desire that an operating license be issued before August 7, 1970.

Very truly yours,

Donato R. Telesca
Plant Manager

DRT/drg
Enclosures

B/211

ITEM # 212

I

2075

W. R. GRACE & CO.
RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

August 5, 1970



Fluc
WKB CO AB
RC HS

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D.C. 20545

For Div. of Compliance

Re: Docket No. 70-456

Dear Mr. Nussbaumer:

In reply to a question raised by Mr. J. Delaney in reference to the nuclear safety of the drying furnace we are submitting a clarification and revised paragraph 10.5 (a).

We request that the enclosed seven copies of the revised pages be incorporated into our application. The pages submitted herewith replace those previously furnished.

We understand that this will not delay issuance of the license by August 7 as requested.

Very truly yours,

Donato R. Telesca
Plant Manager

DRT/drg
Enclosures

ITEM # 213

B/2/12

2460

COPY

Form AEC-401
9/68

UNITED STATES
ATOMIC ENERGY COMMISSION

SPECIAL NUCLEAR MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 70, "Special Nuclear Material", a license is hereby issued authorizing the licensee to receive and possess the special nuclear material designated below; to use such special nuclear material for the purpose(s) and at the place(s) designated below; and to transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 70.32(a) of said regulations, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee		3. License No. SNM-840
1. Name W. R. Grace & Company Research Division		4. Expiration Date November 30, 1972
2. Address Washington Research Center Clarksville, Maryland 21029		5. Docket No. 70-456
6. Special Nuclear Material A. Plutonium; and uranium enriched in the U-235 isotope B. Uranium enriched in the U-235 isotope		7. Maximum quantity of special nuclear material which licensee may possess at any one time under this license A. Plutonium: 25 grams U-235: One kilogram B. 200 kilograms U-235
8. Authorized use A. For use in accordance with the statements, representations, and procedures contained in the licensee's application dated October 5, 1967, and supplements dated October 30 and November 15, 1967. (Continued on Page 2)		

CONDITIONS

9. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.
10. The licensee shall develop and maintain an emergency plan and implementing procedures in accordance with the conditions specified in the attached Annex B.

ITEM #

214

11

MATERIAL LICENSE

License Number SNM-840

Supplementary Sheet

8. Authorized use (continued)

- B. For use in accordance with the statements, representations, and procedures contained in the licensee's application dated April 8, 1970, and supplements dated July 2, July 9, July 29, and August 4, 1970.

CONDITIONS

(Continued)

The following Conditions 11. and 12. shall apply only to the use of special nuclear material licensed above as Subitems 6.A., 7.A., and 8.A.

11. The licensee is hereby exempted from the requirements of Section 70.24, 10 CFR 70.
12. The licensee shall comply with the radioactivity contamination limits specified in the attached Annex C.

The following Conditions 13. and 14. shall apply only to the use of special nuclear material licensed above as Subitems 6.B., 7.B., and 8.B.

13. Pursuant to Section 20.103(c)(1) and (3), 10 CFR 20, the licensee is hereby authorized to make allowance for the use of respiratory protective equipment in determining whether individuals in restricted areas are exposed to concentrations of airborne radioactivity in excess of the limits specified in Appendix B, Table I, Column 1, 10 CFR 20, subject to the conditions specified in the attached Annex A.
14. The licensee is hereby exempted from the labeling requirements of Section 20.203(f), 10 CFR 20, for containers which do not leave the Nuclear Facility restricted areas. Such containers shall be labeled as specified in Section 8.11 of application dated April 8, 1970.

Date AUG 10 1970

COPY

For the U. S. Atomic Energy Commission
Donald A. Nussbaumer
Fuel Fabrication and
by Transportation Branch
Division of Materials Licensing
Washington, D. C. 20545

A N N E X A

CONDITIONS FOR USE OF RESPIRATORY PROTECTIVE EQUIPMENT PURSUANT TO PARAGRAPHS 20.103(c)(1) AND (2), 10 CFR 20

1. In circumstances in which adequate limitation of the inhalation of radioactive materials by use of process or other engineering controls is impracticable, the licensee may permit an individual in a restricted area to be exposed to average concentrations of airborne radioactive materials in excess of the limits specified in Appendix B, Table 1, Column 1 of 10 CFR 20 provided:
 - A. The individual uses respiratory or other appropriate protective equipment such that the total intake, in any period of seven consecutive days by inhalation, ingestion or absorption, would not exceed that intake which would result from breathing the concentrations specified in Appendix B, Table 1, Column 1 of 10 CFR 20 for a period of 40 hours.
 - B. The licensee shall advise each respirator user that he may leave the area for relief from respirator use in case of equipment malfunction, physical or psychological discomfort, or any other condition that might cause reduction in the protection afforded the wearer.
 - C. The licensee maintains a respiratory protective program adequate to assure that the objective of Item "A" above is met. Such program shall include:
 - (i) Air sampling and other surveys sufficient to identify the hazard, to evaluate individual exposure, and to permit proper selection of the respiratory protective equipment;
 - (ii) Procedures to assure proper selection, supervision and adequate training of personnel using such protective equipment;
 - (iii) Procedures to assure the adequate fitting of respirators and the testing of equipment for operability.
 - (iv) Procedures for maintenance to assure full effectiveness of respiratory protective equipment, including issuance, cleaning and decontamination, inspection, repair, and storage;

- (v) Bioassays of individuals and other surveys as may be appropriate to evaluate individual exposures and to assess protection actually provided; and
 - (vi) Records sufficient to permit periodic evaluation of the adequacy of the respiratory protective program.
- D. The licensee has evaluated the protective equipment^{1/} and has determined that, when used to protect against radioactive material under the conditions of use to be encountered such equipment is capable of providing a degree of protection at least equal to the protection factors listed in Table I attached hereto^{2/}.
- 2. The licensee shall notify, in writing, the Director of the appropriate AEC Regional Compliance Office listed in Appendix D, 10 CFR 20, when the respiratory protection program is initiated. Such notification shall be made within thirty (30) days after the date that allowance for the use of respiratory protective equipment is first made.
 - 3. The licensee shall not assign protection factors in excess of those given in Table I attached hereto in selecting equipment.

^{1/} In evaluating respiratory protective equipment for use against radioactive materials to assure that the equipment provides the protection factors listed in the attached Table I, the licensee may accept equipment approved under appropriate test schedules of the U. S. Bureau of Mines to the extent pertinent.

^{2/} The factors listed apply only to protection against radioactive materials. Additional precautions may have to be taken to protect against concurrent nonradiation hazards.

TABLE I

PROTECTION FACTORS FOR RESPIRATORS

Description	Modes ^{1/}	PROTECTION FACTORS ^{2/}	
		Particulates and Vapors and Gases Except Tritium Oxide ^{3/}	Tritium Oxide
<u>I. AIR-PURIFYING RESPIRATORS</u>			
Facepiece, half-mask	NP	10	1
Facepiece, full	NP	100	1
<u>II. ATMOSPHERE-SUPPLYING RESPIRATOR</u>			
<u>1. Air-line respirator</u>			
Facepiece, half-mask	CF	100	2
Facepiece, half-mask	D	100	2
Facepiece, full	CF	1000	2
Facepiece, full	D	500	2
Facepiece, full	PD	1000	2
Hood	CF	1000	2
Suit	CF	<u>4/</u>	<u>4/</u>
<u>2. Self-contained breathing apparatus (SCBA)</u>			
Facepiece, full	D	500	2
Facepiece, full	PD	1000	2
Facepiece, full	R	1000	2
<u>3. Combination respirator</u>			
Any combination of air-purifying and atmosphere supplying respirator.		Protection factor for type and mode of operation as listed above.	

^{1/} CF: continuous flow

D : demand

NP: negative pressure (i.e., negative phase during inhalation)

PD: pressure demand (i.e., always positive pressure)

R : recirculating (i.e., negative phase during inhalation)

- 2/ (a) For purposes of this authorization the protection factor is a measure of the degree of protection afforded by a respirator, defined as the ratio of the concentration of airborne radioactive material outside the respiratory protective equipment to that inside the equipment (usually inside the facepiece) under conditions of use. It is applied to the airborne concentration to determine the concentration inhaled by the wearer, according to the following formula:

$$\text{Concentration Inhaled} = \frac{\text{Airborne Concentration}}{\text{Protection Factor}}$$

- (b) The protection factors apply:

- (i) only for individually fitted respirators worn by trained individuals and used and maintained under supervision in a well-planned respiratory protection program.
- (ii) for air purifying respirators only when high efficiency particulate filters and/or sorbents appropriate to the hazard are used.
- (iii) for atmosphere supplying respirators only when supplied with adequate respirable air.

- 3/ Excluding radioactive contaminants that present an absorption or submersion hazard.

- 4/ Appropriate protection factors must be determined taking account of the permeability of the suit to the contaminant under conditions of use. No protection factor greater than 1000 shall be used except as authorized by the Commission.

NOTE 1: Protection factors for respirators as may be approved in the future by the U. S. Bureau of Mines according to approval schedules for respirators to protect against airborne radionuclides may be used in lieu of the protection factors listed in this Table. Where additional respiratory hazards other than radioactive ones are present, especially those immediately dangerous to life, the selection and use of respirators shall also be governed by the approvals of the U. S. Bureau of Mines in accordance with their applicable schedules.

NOTE 2: Radioactive contaminants for which the concentration values in Appendix B, Table I of 10 CFR Part 20 are based on internal dose due to inhalation may, in addition, present external exposure hazards at higher concentrations.

A N N E X B

MINIMUM REQUIREMENTS FOR LICENSEE'S PLANS FOR COPING WITH RADIATION EMERGENCIES

The licensee shall develop and maintain an emergency plan and implementing procedures for coping with radiation emergencies which shall include, but not necessarily be limited to, the following:

1. An organization for coping with radiation emergencies, in which specific authorities, responsibilities, and duties are clearly defined and assigned. The methods used to assure that persons assigned specific authority and responsibility are initially qualified and are periodically trained so that they can continue to properly fulfill their duties should be specified. The means of notifying persons assigned to the organization in the event of an emergency and the means of notifying appropriate local, state, and Federal agencies so that emergency action beyond the site boundary may be taken should be specified.
2. A list of employees of the licensee (by position), other than those assigned to the emergency organization, who have any special qualifications for coping with emergency conditions. A similar list shall be made of other persons whose assistance may be needed. The special qualifications of these employees and persons shall be specified. All of the foregoing lists shall be available to the individuals responsible for directing the action necessary to cope with the emergency.
3. The actions planned to protect the health and safety of individuals and to prevent damage to property both within and outside the site boundary in the event of various types of emergencies that can be anticipated, i.e., internal accidents such as criticality, fire, and explosions, and natural occurrences such as floods, tornadoes, and earthquakes. This should include the means for determining: (i) the magnitude of the release of radioactive materials, including guidelines for evaluating the need for notification and participation of local, state and Federal agencies, and (ii) the type and extent of protective action to be taken within and outside the site boundary to protect health and safety and prevent damage to property.

4. The post-accident recovery and reentry actions including guidelines for implementing these actions which shall include (i) corrective actions that may be necessary to terminate or minimize the consequences of the accident, (ii) criteria for plant reentry, (iii) securing the accident area from inadvertent or unauthorized reentry, (iv) and resumption of operations.
5. Procedures for notifying and agreements to be reached with local, state, and Federal officials for the early warning of the public and for appropriate protective measures should such measures become necessary or desirable.
6. Provisions for maintaining up to date: (i) the organization for coping with emergencies, (ii) the procedures for use in emergencies, and (iii) the lists of persons with special qualifications for coping with emergency conditions.
7. The specifications for emergency first aid and personnel decontamination facilities, including:
 - (i) Identification of individuals directly involved in the accident;
 - (ii) Equipment at the site for personnel monitoring;
 - (iii) Facilities and supplies at the site for decontamination of personnel;
 - (iv) Facilities and medical supplies at the site for appropriate emergency first aid treatment;
 - (v) Arrangements for the services of a physician and other medical personnel qualified to handle radiation emergencies; and
 - (vi) Arrangements for transportation of injured or contaminated individuals to treatment facilities outside the site boundary.
8. Arrangements for treatment of individuals at treatment facilities outside the site boundary.

9. Provisions for testing, by periodic drills, of radiation emergency plans to assure that employees of the licensee are familiar with their specific duties. Provisions for participation in the drills by other persons whose assistance may be needed in the event of a radiation emergency shall be included.
10. The provisions for the training of persons other than employees of the licensee whose assistance may be needed in the event of a radiation emergency.
11. Provisions for maintenance and storage of emergency equipment, considering the various types of accidents that can be anticipated, also, the performance criteria of the various types of equipment.

The licensee's emergency plan shall consist of a document providing the objectives and the bases for the actions to be taken to cope with various types of accidents which affects, or threatens the health and safety of the general public, employees of the licensee or other persons temporarily or permanently assigned to the facility. It should specify the objectives to be met by the implementing procedures and should assign organizational and individual responsibilities to achieve such objectives.

Emergency procedures shall consist of a document defining in detail the implementation actions and methods necessary to achieve the objectives of the emergency plan for each set of circumstances considered in the emergency plan. To the extent possible these two documents should be separated.

ANNEX C

RADIOACTIVITY CONTAMINATION LIMITS FOR UNRESTRICTED AREAS AND FOR
THE RELEASE OF MATERIAL AND EQUIPMENT FROM RESTRICTED AREAS

1. The maximum amount of fixed alpha radioactivity in disintegrations per minute per 100 square centimeters should not exceed 25,000.
2. The average amount of fixed alpha radioactivity in disintegrations per minute per 100 square centimeters should not exceed 5,000.
3. The maximum amount of removable (capable of being removed by wiping the surface with a filter paper or soft absorbent paper) alpha radioactivity in disintegrations per minute per 100 square centimeters should not exceed 1,000.
4. (a) The maximum level at one centimeter from the most highly contaminated surface, measured with an open-window beta-gamma survey meter through a tissue equivalent absorber of not more than seven milligrams per square centimeter, should not exceed one millirad per hour.

(b) The average radiation level at one centimeter from the contaminated surface, measured in the same manner, should not exceed 0.2 millirad per hour.
5. The contamination limits for U-233 or plutonium should not exceed 1/10 of the limits in Items 1, 2 and 3 above.

COPY

UNITED STATES
ATOMIC ENERGY COMMISSION

LICENSE AMENDMENT
FOR
SPECIAL NUCLEAR MATERIALS SAFEGUARDS

Pursuant to the Atomic Energy Act of 1954, as amended, and Title 10, Code of Federal Regulations, Chapter 1, Part 70, the following amendment to the special nuclear material license identified below is hereby issued, incorporating controls for the safeguarding of special nuclear material.

Licensee

Name: The Research Division of the W. R. Grace & Company	License No. SNM-840
Address: Washington Research Center Clarksville, Maryland 21029	Amendment No. SG-1
	Docket No. 70-456

CONDITIONS

- 1.0 FACILITY ORGANIZATION
 - 1.1 The SS Representative shall develop, revise, implement, and enforce the nuclear material control procedures and manage an overall system of special nuclear material control.
 - 1.2 Nuclear material control procedures and revisions thereto shall be approved by the Plant Manager. A manual containing all current nuclear material control procedures shall be maintained by the SS Representative.

- 1.3 The Plant Manager shall assure that the nuclear material control procedures are appropriately reflected in process specifications, manufacturing instructions, standard operating procedures, or similar detailed management instructions.
- 1.4 All delegations of safeguards responsibilities by the Plant Manager shall be in writing.
- 2.0 FACILITY OPERATION
- 2.1 Material Balance Areas (MBA's) shall be established by the Plant Manager.
- 2.2 Each MBA shall be an identifiable physical area into and out of which movement of special nuclear material can be measured.
- 2.3 Sufficient numbers of MBA's shall be established so that losses of special nuclear material can be identified and localized.
- 2.4 All operations within an MBA shall be the responsibility of a single employee who shall also be responsible for the custody of special nuclear material within his MBA.
- 3.0 MEASUREMENTS AND STATISTICAL CONTROLS
- 3.1 The licensee shall determine the U-235, U-233, and/or Pu content of all receipts, shipments, intentional discards, and material inventoried, along with the limits of error associated with these quantities. The licensee shall make sufficient measurements to substantiate the stated quantities and associated limits of error. Measurements are not required on items which have been determined by other means to contain less than ten (10) grams U-235, U-233, and/or Pu each. Limits of error as used herein means the boundaries within which the true or best value of the parameter being measured lies with a probability of 95%.
- 3.2 A program of standardizations and calibrations of measurement equipment and analytical procedures shall be maintained to provide data to substantiate the limits of error associated with all measurements required for safeguards purposes.

- 3.3 All measurements required by this amendment shall be reviewed annually by the Plant Manager. This review shall include a quantitative calculation of limits of error of the measurement system. The Plant Manager shall utilize data obtained through calibrations specified in Condition 3.2 to monitor performance of the measurement system to assure calculated limits of error are maintained between reviews. Records of reviews, calculations, and use of calibration data shall be kept by the Plant Manager.
- 3.4 After any physical inventory the material unaccounted for (MUF) and the limits of error associated with the material unaccounted for shall be computed promptly. The limits of error associated with MUF shall be calculated by statistically combining the limits of error determined for shipments, receipts, beginning inventory, ending inventory, and measured discards for the period since the last inventory.
- 3.5 If the quantity of MUF exceeds the associated limits of error, the licensee shall promptly notify the Atomic Energy Commission, Division of Nuclear Materials Safeguards, District I, Newark, New Jersey. The licensee shall investigate the MUF and notify the Division of Nuclear Materials Safeguards within thirty (30) days after the initial notice, specifying the probable reasons for the MUF and the corrective action taken or planned.

4.0 SHIPPING AND RECEIVING

- 4.1 All shipper-receiver differences shall be brought to the attention of the SS Representative, who shall evaluate these differences to determine whether they are statistically significant and of sufficient magnitude to warrant investigation. The SS Representative shall investigate all statistically significant differences which exceed \$500 value. A shipper-receiver difference shall be considered statistically significant when (1) the difference exceeds the statistical combination of the limits of error of the shipper's and receiver's measurements, or (2) if the shipper's limit of error is unknown, the difference exceeds twice the limits of error for the receiver's measurement. Statistical analyses of past performance, measurement uncertainties, and other data shall be kept by the licensee.

5.0 STORAGE AND INTERNAL TRANSFERS

- 5.1 A documented system of control over special nuclear material stored and processed within the facility shall be maintained which will provide continuous knowledge of the location and quantity of all material contained in discrete, identifiable items or containers.
- 5.2 All transfers of special nuclear material between MBA's shall be documented to show the identity, quantity, and isotopic analysis of the material transferred. A system of controls shall be maintained by the licensee for the distribution and accounting of all transfer documents.
- 5.3 Each document supporting a transfer of material between MBA's shall be signed by the delegated individual.

6.0 INVENTORY

- 6.1 A complete physical inventory of all special nuclear material subject to this license shall be conducted at approximately twelve-month intervals, but in no case shall more than fourteen months elapse between inventories.
- 6.2 Prior to each complete physical inventory, written procedures shall be prepared which:
 - 6.2.1 specify the extent to which each MBA is to be shut down and process equipment cleaned out;
 - 6.2.2 specify the extent to which each MBA is to remain static during the inventory;
 - 6.2.3 identify the basis for accepting for inventory purposes previously made measurements and their limits of error;
 - 6.2.4 designate measurements to be made for inventory purposes to establish and demonstrate the limits of error associated with the quantity of material on inventory; and
 - 6.2.5 identify the manner by which material on inventory will be listed to assure each item is inventoried and there are no duplications or omissions.

6.3 The book inventory shall be reconciled with and adjusted to the results of the physical inventory upon completion of the physical inventory.

6.4 Special physical inventories of an MBA shall be conducted whenever there is reason to believe that subsequent to the last prior physical inventory a particular MBA has experienced losses or gains that are different by a statistically significant amount from those expected.

7.0 RECORDS AND REPORTS

7.1 The licensee shall establish and maintain a records system which will provide sufficient information to maintain a material balance around each MBA and the total plant. These records shall contain information pertaining to all receipts, shipments, measured discards, inventory, and MUF for each material balance. MBA and plant records shall be reconciled at the end of each accounting period. All entries in the records shall be supported by appropriate documents.

7.2 All measured discards and MUF shall be reported on a monthly basis by the SS Representative to the Plant Manager.

7.3 The licensee shall report on a monthly basis all intentional discards and material unaccounted for. The MUF shall be that which has been determined during the month as a result of completing a material balance around a single operation, a number of operations, or the entire plant. This report shall be made within fifteen (15) days after the end of the month in which the discard was made or the material unaccounted for was determined. Reports shall be sent to the U.S. Atomic Energy Commission, Division of Nuclear Materials Safeguards, District I, Newark, New Jersey. Each report shall be identified by the Reporting Identification Symbol(s) (RIS) assigned to the licensed operations and shall include a statement of the nature of the discards, the probable reasons for the MUF and any actions taken or planned with respect to the MUF.

8.0 MANAGEMENT OF MATERIALS CONTROL SYSTEM

8.1 Licensee management, independent of the SS Representative, and through the use of its independent nuclear materials auditors,

COPY

License No. SNM-840

Page 6 of 6 pages

Amendment No. SG-1

Docket No. 70-456

shall conduct, at least once each year, an internal review of the nuclear materials control procedures and management of the overall system of special nuclear material control, and report the findings to the Plant Manager.

- 8.2 An estimate of anticipated losses (measured discards plus MUF) for each period of time between inventories shall be prepared for each MBA, with the concurrence of the SS Representative, and shall be based on prior experience, throughput quantities and rates, etc. If losses exceed the estimate of those anticipated, they shall be investigated by the SS Representative and the results of his investigation shall be reported to the Plant Manager.
- 8.3 Any apparent loss of a discrete item or container of special nuclear material which cannot be resolved by an immediate investigation shall be reported to the SS Representative, who shall promptly notify the Atomic Energy Commission, Division of Nuclear Materials Safeguards, District I, Newark, New Jersey, and shall conduct an investigation of the loss. The SS Representative shall report the results of his investigation to the Plant Manager.

FOR THE ATOMIC ENERGY COMMISSION

Original Signed by
Ralph G. Page

Date of Amendment AUG 10 1970

Division of Nuclear Materials
Safeguards

COPY



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

AUG 10 1970

78-456

W. R. Grace & Co.
ATTN: Mr. George H. Selby
Washington Research Center
Clarksville, Maryland 21030

சென்னை:

Enrolled as Special Agent in Charge, New York City, April 8, 1970. Also enrolled as Special Agent in Charge, Amherst, Massachusetts, April 8, 1970.

in accordance with our previous letter, the order of items is not authorized to make changes in the order of items, the order of items is not authorized in your application. Changes can be made only after an application has been filed and an appropriate order is issued. If enclosed license does not authorize the use of the state collector for the use of, including, and using, other forms of this system, we are not sufficiently developed to permit a complete nuclear safety analysis.

[illegible]

2-2-62

Original Signed by
Donald A. Nussbaumer

Division of Materials Licensing

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

ITEM # 215

Best possible copy

3/2/4



FIRST FLOOR

DATE _____

10/4/73

BUILDING OR AREA

16A

SUSPECTED ACTIVITY

Enriched Uranium

SAMPLED BY

Delaney

FILTER PAPER USED

Class Fiber

COUNTED BY

O'Learyman

INSTRUMENT USED

PC-4

~~BOOK-AND-PAGE~~

Sample No. 1A 3:31 PM 10/3/72 to 11:31 AM
10/4/72

[illegible]

AIR SAMPLE DATA SHEET

MEZZANINE DIAGRAM OF AREA

FIRST FLOOR

DATE 10-5-72

2.4 hr. Sample

BUILDING OR AREA 11, A

SUSPECTED ACTIVITY Enriched Uranium

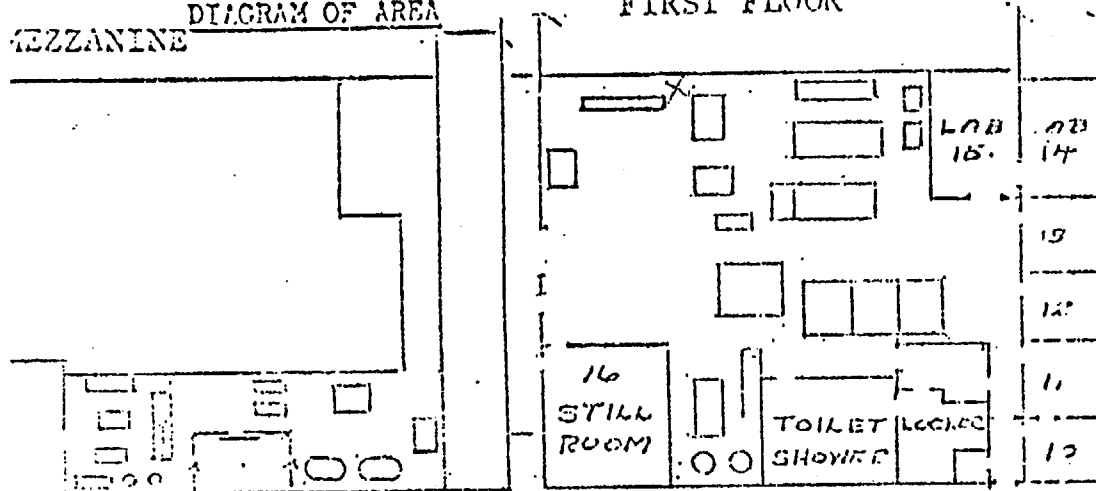
SAMPLED BY *D. Williams*

FILTER PAPER USED Glass Fiber

COUNTED BY R. L. L. L. L.

INSTRUMENT USED PC-41

BOOK AND PAGE Sample Period 11:35 A.M 10-4 to 12:05 P.M 10-5

[illegible]

AIR SAMPLE DATA SHEET

DIAGRAM OF AREA

MEZZANINE

FIRST FLOOR

DATE 10-6-72 8:45 A.M.

BUILDING OR AREA 167A

SUSPECTED ACTIVITY Enriched uranium

SAMPLED BY Bl. Higgins

FILTER PAPER USED Flashed Teflon

COUNTED BY ALF

INSTRUMENT USED IC-4

BOOK AND PAGE 5:18 P.M. 10/5 to 8:38 A.M. 10/6/72

[illegible]

demopofester
pm

FIRST FLOOR

DATE 10/6/72 5:45-6:38 53 min.

MEZZANINE

BUILDING OR AREA 16A

SUSPECTED ACTIVITY Em. U.

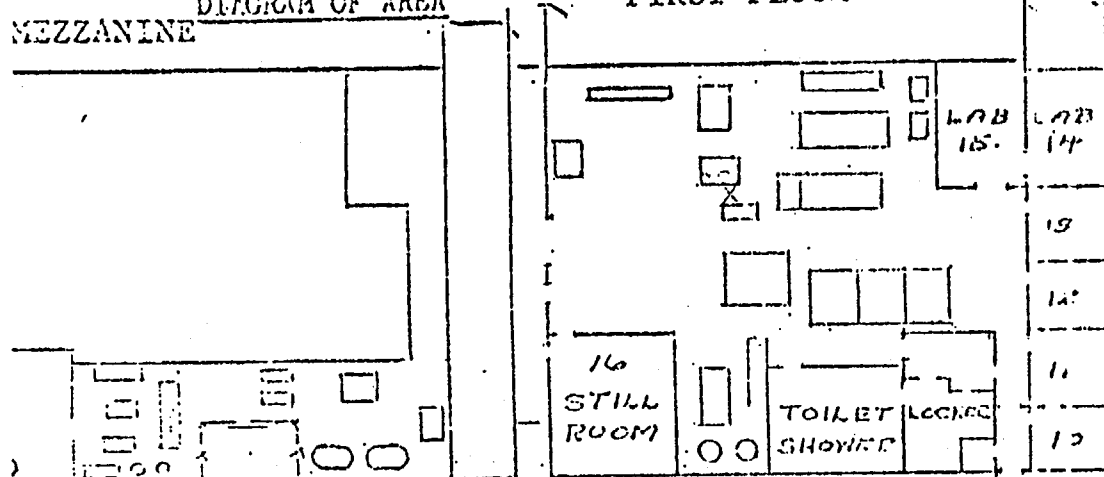
SAMPLED BY AS

FILTER PAPER USED 6.F

COUNTED BY 28

INSTRUMENT USED PC-4

BOOK AND PAGE

[illegible]

PM change

FIRST FLOOR

BUILDING OR AREA 11-A

SUSPECTED ACTIVITY Encl. 4.

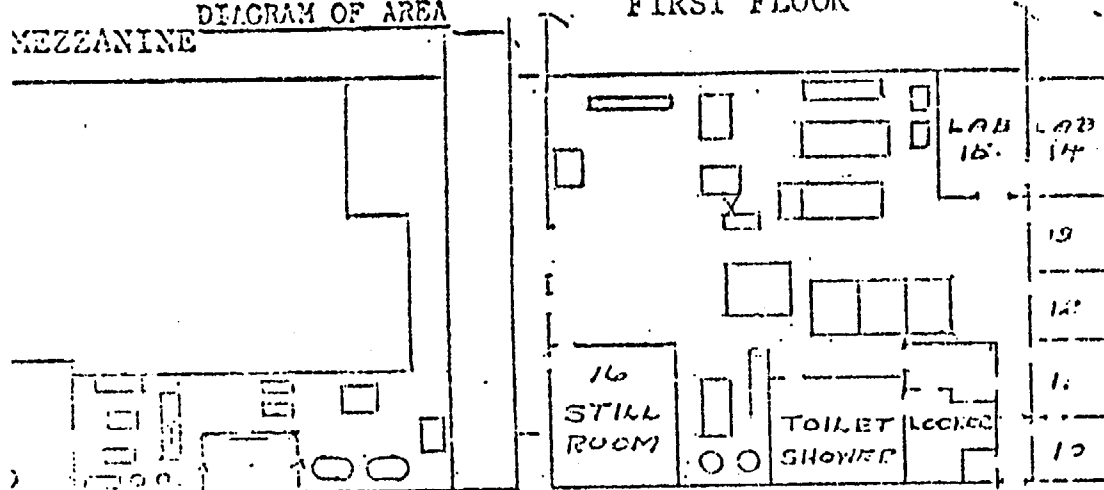
SAMPLED BY DE

FILTER PAPER USED C.F.

COUNTED BY 22

INSTRUMENT USED PC-4

BOOK AND PAGE

[illegible]

Reactivation

12:00N
1747
12:00N
1730
87%
0830
0930

- 10/3/72 Operation begun @ ~ 7:00 pm
begun = reactor charged
and fluidizing gas flow begun
- 10/4/72 Vaporizer preheater failure
- 10/4/72 Plug rodded by CTL between 4-7 pm.
- 10/5/72 → Vaporizer outlet plugged and cleared
~~and~~ Reactor fluidized.
- Operation begun again between
0800 - 0900 10/5/72.
- 10/6/72 → Reactor vented @ ~ 10:00 by G. Whistman
smoke and dust ---- L. Wallace
SWM vented reactor @ 11:30 and observed
dust, smoke etc. waited ~ 45
minutes, ^{donned respirator} and opened the valve
repeatedly noting smoke and dust
each time. Repeated cycle until
no dusting noted - opened valve
and attempted rodding - resistance
encountered very near valve opening
Closed valve and loosened flange
noting smoke and dusting ... added
vacuum hose to vicinity of flange
and disassembled reactor.

$$\frac{4.55 \times 10^{-9}}{100} = \frac{0.45 \times 10^{-9}}{4.5 \times 10^{-10}}$$

(2 x 10⁻¹⁰)

(2)

12/1/72

Mr. Cooley, USPAEC

Regulatory Operations, Region 5

The following are samples
related to the reported incident of
exposure of personnel
to airborne contamination
in excess of ^{the} 40 mCi/l. ^{during the period 11/1 to 11/30/72} were accounted
on 11/30/72 to account for the
effects of long term decay of radon
which may have influenced the
interpretation of ^{actual} ^{radon} concentrations
estimated at the time of the incident.
The original data has been
transmitted to you by copy of the

actual records prepared at the time

The samples were analyzed

(Circum-
stantial)

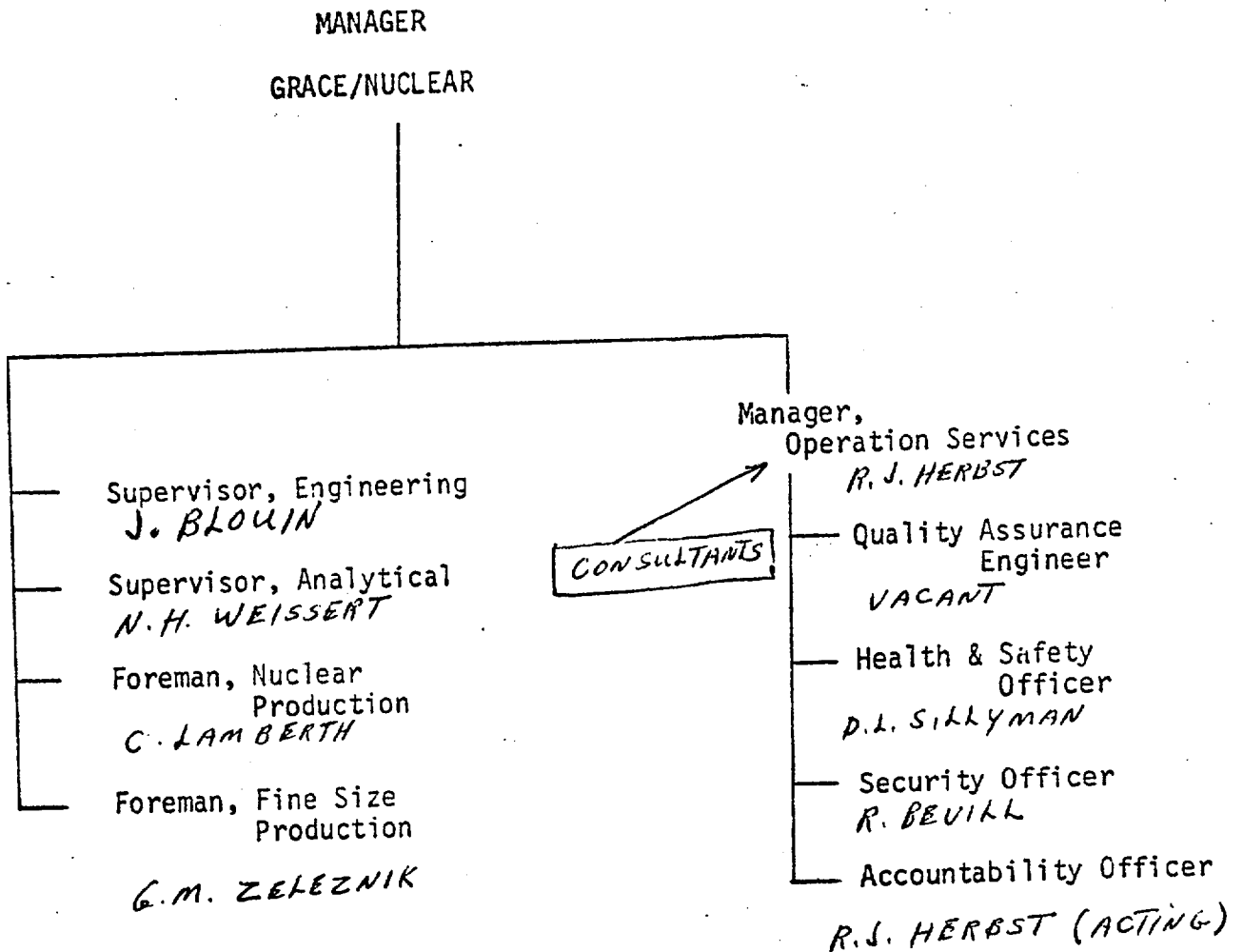
| <u>Date of Sample</u> | <u>Collection Interval</u> | <u>Activity, % ATPC</u> |
|-----------------------|--|-------------------------|
| 10/4/72 | 3:31P ¹⁰ / ₅ to 11:31A ¹⁰ / ₄ | 0.2 |
| 10/5/72 | 11:35A ¹⁰ / ₄ to 12:55P ¹⁰ / ₅ | 195 (189) |
| 10/6/72 | 5:18 ¹⁰ / ₅ to 8:38A ¹⁰ / ₆ | 58 (57) |
| 10/6/72 | 5:45P to 6:55P | 1560 (1820) |
| 10/6/72 | 9:15P to 10:54P | 3780 (1500) |
| 10/7/72 | 11:38P ¹⁰ / ₆ to 12:33A ¹⁰ / ₇ | 0.9 (35) |

R. J. Herbst, RPO
W. R. Krieger & Co.
Washington D. C.
Chesham, Md. 2102

3.0 MANAGEMENT AND ORGANIZATION

3

3.1 The management organization of GRACE/NUCLEAR is shown in Figure 3.1.



PROCEDURE: QUALITY ASSURANCE POLICY & PROCEDURES MANUAL

W. R. GRACE & CO.

GRACE/NUCLEAR

W. R. GRACE & CO.

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029



Crocker
~~WHS~~
~~PAS~~

September 22, 1970

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D. C. 20545

For Div. of Compliance

Dear Mr. Nussbaumer:

Re: Docket No. 70-456

In reviewing the descriptive material furnished with our amendment application, we have found a number of minor items, now conditions of the license as issued, which are not important to safe operation under the license. These items tend to unnecessarily complicate compliance.

We have reviewed certain pages of our amended amendment application to clarify these items and enclose seven copies of the revised pages for your review and approval.

Also, we wish to advise that the emergency procedure has been revised to comply with the requirements of the license and is available for inspection.

Very truly yours,

D. R. Telesca

D. R. Telesca
Plant Manager

DRT:drg
Enclosure



8/215

ITEM # 216

3065



D. 133

1-56

SNM-840, Amendment No. 1

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

DEC 8 1970

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Division of Compliance, HQ (2) *RP*
HJMcAlister, OROO
RWeber, SML
Director, NMS
A. Cabell, ADM:DR
CFEason, OM
RJDube, DML
JCDelaney, DML
LCRouse, DML
DANussbaumer, DML

W. R. Grace and Company
ATTN: Mr. D. R. Telesca
Washington Research Center
Clarksville, Maryland 21029

Gentlemen:

In accordance with your application dated September 22, 1970 and pursuant to Title 10, Code of Federal Regulations, Part 70, Special Nuclear Material License No. SNM-840 is hereby amended to incorporate in Item 8 the revised pages 9, 10, 25, 26, 26A, 27, 28, 32, 33, 35, 36, 37, 38, 41, 44, and 59, dated August 31, 1970.

All other conditions in this license shall remain the same.

Page 59 appears to contain a typographical error in the second sentence. We believe this sentence should read "is 4.4 liters" rather than "of 4.4 liters."

Page 21 dated August 31, 1970, was not included in this amendment because the page, as submitted to us, is identical to page 21 dated April 8, 1970.

We were unable to include your revision of page 39 in this amendment because of a lack of specificity. The labeling specifications listed on page 39 of your application dated April 8, 1970, provided the basis for condition 14 of your license which exempts you from the labeling requirements of Section 20.203(f) of 10 CFR 20. This exemption can be maintained in your license only if alternate labeling requirements are specified. A statement that containers will be "properly labeled and identified" is insufficient.

FOR THE ATOMIC ENERGY COMMISSION

Original Signed by
Donald A. Nussbaumer

Donald A. Nussbaumer, Chief
Fuel Fabrication and
Transportation Branch
Division of Materials Licensing

B/216

I ITEM # 217

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

A(1)

| | |
|---|---|
| 1. LICENSEE

W. R. Grace & Company
Research Division
Washington Research Center
Clarksville, Maryland 21029 | 2. REGIONAL OFFICE

U. S. Atomic Energy Commission
Region I, Division of Compliance
970 Broad Street
Newark, New Jersey 07102 |
| 3. LICENSE NUMBER(S)

SNM-840 | 4. DATE OF INSPECTION

RI
February 23 and 24, 1971 |

5. INSPECTION FINDINGS

- ☒ A. No item of noncompliance was found.
- ☐ B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA.
10 CFR 20.203(b) or 34.42
- ☐ C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA.
10 CFR 20.203(c) (1) or 34.42
- ☐ D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA.
10 CFR 20.203(d)
- ☐ E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL.
10 CFR 20.203(e)
- ☐ F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL.
10 CFR 20.203(f) (1) or (f) (2)
- ☐ G. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)
- ☐ H. Form AEC-3 was not properly posted. 10 CFR 20.206(c)
- ☐ I. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b)
- ☐ J. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)
- ☐ K. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained.
10 CFR 30.51, 40.61 or 70.51
- ☐ L. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c)
- ☐ M. Records of inventories were not maintained. 10 CFR 34.26
- ☐ N. Utilization logs were not maintained. 10 CFR 34.27

W. G. Browne
W. G. Browne, Fuel Facilities Inspector
(AEC Compliance Inspector)

6. LICENSEE'S ACKNOWLEDGMENT

The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.

(Date)

(Licensee Representative — Title or Position)

ORIGINAL: LICENSEE. COPIES: ☐ CO HEADQUARTERS ☐ CO ENFORCEMENT ☐ CO REGION

ITEM # 218

W. R. GRACE & CO.

RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

March 3, 1971

For Div. Compliance

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D.C. 20545

Dear Mr. Nussbaumer:

Re: Docket No. 70-456

This letter confirms my telephone conversation of February 26 with your Mr. Robert Dube.

This is to advise that W. R. Grace & Co. did not receive the anticipated order for development quantities of reactor fuels and, as a result, is temporarily discontinuing the operations in the Bldg. 16-A Nuclear Chemistry Facility, at the Washington Research Center.

All personnel, except the plant manager and secretary, are being transferred to other on-site locations.

We are herewith requesting a temporary suspension of the requirements for receipt, handling and possession of uranium as specified in the Nuclear Materials License, SNM-840 until we begin operations on enriched uranium.

As of February 24, we did not have any special nuclear material at the site.

Some examples of the type of activity we plan to suspend are:

- (1) Operation of the Nuclear Safety Committee and safety meeting program.
- (2) The training program for employees at the site.
- (3) Sampling of liquid waste systems.
- (4) The medical program, as outlined, concerning physicals, blood and urine samples of the employees.
- (5) Sampling of the air exhaust system.
- (6) Reports to AEC concerning possession, use, transfer, etc. of enriched nuclear material.

ITEM # 219

1001

W. R. GRACE & CO.
RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland

CONTINUATION

Mr. Donald A. Nussbaumer
March 3, 1971
Page Two

As discussed with Mr. Dube, when we receive an order requiring the use of enriched uranium, we will notify the USAEC Division of Compliance of the situation. When enriched uranium is received in the facility, we will begin operation under the provisions of the license.

If there are any questions, please advise.

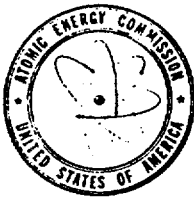
Very truly yours,



D. R. Telesca
Plant Manager

DRT:drg

RECEIVED
MAR 10 1971
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

APR 7 1971

DML:RJD
70-456

W. R. Grace and Company
ATTN: Mr. D. R. Telesca
Washington Research Center
Clarksville, Maryland 21029

Gentlemen:

Thank you for your letter of March 3, 1971, advising us that you are temporarily discontinuing operations in Building 16-A as authorized under the provisions of Special Nuclear Material License No. SNM-840. Since you do not possess any special nuclear material at the facility, the requirements of License No. SNM-840 for receipt, handling and possession of material may be suspended until activities are initiated with the exception noted in the following paragraph.

Section 70.53 of 10 CFR 70 requires the filing of Material Status Reports on Form AEC-742 by licensees authorized to possess special nuclear material above specified quantities. These reports are required even though you may not have material in your possession at the time of filing. Accordingly, Form AEC-742 should be submitted at the required intervals until License No. SNM-840 is terminated or expires.

We also request that you inform, in writing, the Director of Region I, Division of Compliance, of your operational plans at least thirty (30) days prior to commencement of operations with special nuclear material.

Sincerely,

Original Signed by
Donald A. Nussbaumer

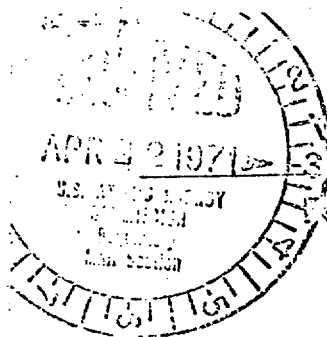
Donald A. Nussbaumer, Chief
Fuel Fabrication and
Transportation Branch
Division of Materials Licensing

Distribution:

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RMS

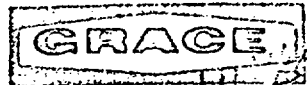
L. G. Rouse, DML
Branch R/F
DML R/F

ITEM # 220



W. R. GRACE & CO.

RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

April 19, 1971

Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation Branch
Division of Materials Licensing
USAEC
Washington, D.C. 20545

For Div of Compliance

RE: Docket No. 70-456

Dear Mr. Nussbaumer:

In your letter of December 8, you pointed out some errors and omissions in our application dated Sept. 22, 1970, pursuant to Title 10, Code of Federal Regulations, Part 70, Special Nuclear Materials License No. SNM-840.

We have corrected the typographical error and are enclosing corrected copies of page 59. *dated 1/8/71* *Replaced 3/15/72*

We are enclosing the corrected copies of page 21, which had been inadvertently omitted in our application of Sept. 22. *dated 8/31/70* *Replaced 3/15/72*

Inasmuch as we cannot supply detailed labeling requirements at this time, we will continue with the labeling specifications listed on page 39 of the application dated April 8, 1970. We are enclosing additional copies of p. 39, dated ~~April 8, 1970~~ in the event that they are required for your files. *January 1, 1971* *Replaced 3/15/72*

There are some changes in personnel, as a result of our temporary discontinuation of operations in Bldg. 16-A, but we will defer any additional applications for amendment to SNM-840, until we have definite plans to commence operations.

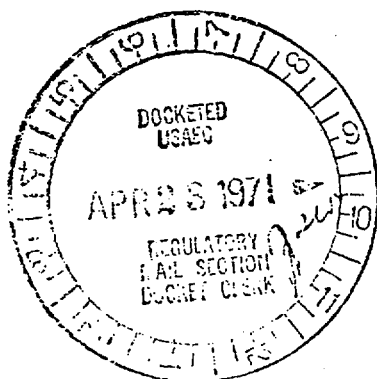
We will advise your office and the Director of Region I, Division of Compliance in writing, of our plans at least (30) thirty days before we commence operations with special nuclear material.

Very truly yours,

Donato R. Telesca

Donato R. Telesca
Plant Manager

DRT:drg
Enclosures



ITEM # 221

B/200

OCT 27 1971

TO: Files
THRU: H. W. Crocker,
Senior Fuels Facility Inspector

RE: W. R. GRACE CO, LICENSE NO. SNM-870, CLARKSVILLE, MARYLAND

Mr. D. R. Telesca, Plant Manager, was contacted by telephone at 4:00 pm on 10/21/71 and asked about the status of the Production facility. He said that they have tentatively received their order and that the process is now being tested with depleted uranium runs. He believes that "hot" runs with U-235 will begin in about February or March, 1972.

The present runs of wet batches will be dried and sized into 10 different products for further development work by the research and development group before the final process is approved. When plans are reasonably firm, Mr. Telesca plans to send a revised operating plan and organization chart to DML, probably in late November, 1971.

W. G. Browne
Fuels Facility Inspector

ITEM # 222

| | | | | | | |
|---------|------------|----------|--|--|--|--|
| OFFICE | CO | CO | | | | |
| SURNAME | Browne/abr | Crocker | | | | |
| DATE | 10/26/71 | 10/26/71 | | | | |

W. R. GRACE & CO.
RESEARCH DIVISION



Washington Research Center, Clarksville, Maryland 21029

January 13, 1972

Region I
Division of Compliance
USAEC
970 Broad Street
Newark, N. J. 07102

Gentlemen:

This is to advise you that we are planning to receive special nuclear material, under License No. SNM-840, approximately March 1, 1972.

At the present time, we are operating our Nuclear Development Facility on depleted uranium and plan to complete these runs approximately February 1. During February, we plan to prepare the Facility for operation with special nuclear material.

Very truly yours,

D. R. Telesca
Plant Manager
Nuclear Facility

DRT:jk

cc: Donald A. Nussbaumer, Chief
Fuel Fabrication and
Transportation Branch
Division of Materials Licensing
USAEC
Washington, D. C. 20545

Called on 3/3/72. SNM had not arrived but CO: I will be notified when it does arrive. Start up plans are for 3/20/72

B/222

ITEM # 223

40-2810

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

| | |
|---|--|
| 1. LICENSEE
W.R. GRACE & COMPANY
RESEARCH DIVISION
WASHINGTON RESEARCH CENTER
CLARKSVILLE, MARYLAND 21209 | 2. REGIONAL OFFICE
U. S. ATOMIC ENERGY COMMISSION
Compliance Division Region I
970 Broad Street
Newark, N.J. 07102 |
| 3. LICENSE NUMBER(S)
SMB-334 | 4. DATE OF INSPECTION
August 20, 1968
reinsp |
| 5. INSPECTION FINDINGS
<p><input checked="" type="checkbox"/> A. No item of noncompliance was found.</p> <p><input type="checkbox"/> B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA.
10 CFR 20.203(b) or 34.42</p> <p><input type="checkbox"/> C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA.
10 CFR 20.203(c) (1) or 34.42</p> <p><input type="checkbox"/> D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA.
10 CFR 20.203(d)</p> <p><input type="checkbox"/> E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL.
10 CFR 20.203(e)</p> <p><input type="checkbox"/> F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL.
10 CFR 20.203(f) (1) or (f) (2)</p> <p><input type="checkbox"/> G. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)</p> <p><input type="checkbox"/> H. Form AEC-3 was not properly posted. 10 CFR 20.206(c)</p> <p><input type="checkbox"/> I. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b)</p> <p><input type="checkbox"/> J. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)</p> <p><input type="checkbox"/> K. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained.
10 CFR 30.51, 40.61 or 70.51</p> <p><input type="checkbox"/> L. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c)</p> <p><input type="checkbox"/> M. Records of inventories were not maintained. 10 CFR 34.26</p> <p><input type="checkbox"/> N. Utilization logs were not maintained. 10 CFR 34.27</p> <p style="text-align: right;">EUGENE EPSTEIN <i>Eugene Epstein</i>
(AEC Compliance Inspector)</p> | |
| 6. LICENSEE'S ACKNOWLEDGMENT
<p>The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.</p> <p style="text-align: right;">B1170</p> <p>_____
(Date)</p> <p>_____
(Licensee Representative - Title or Position)</p> | |

ORIGINAL: LICENSEE. COPIES: ☐ CO REGION ☐ CO HEADQUARTERS ☐ CO ENFORCEMENT

ITEM # 171

GRACE RESEARCH AND DEVELOPMENT DIVISION

W. R. GRACE & CO.

WASHINGTON RESEARCH CENTER

CLARKSVILLE, MD.

Telephone:
ATlas 6-2101
Clarksville, Md.

May 22, 1958

Reply to:
P. O. Box 2117
Baltimore 3, Maryland

File: 170

Mr. J. C. Delaney
Chief, Materials Section
Division of Licensing and Regulation
United States Atomic Energy Commission
Washington 25, D. C.

Dear Mr. Delaney:

The Grace Research and Development Division of W. R. Grace and Company, with principal offices at 7 Hanover Square, New York 5, N. Y., requests a license to receive refined source material for research and bench-scale development at the Washington Research Center, located on Maryland Route 32 near Clarksville, Maryland.

In anticipation of a license to be issued for a two-year period we wish to receive over the period, 600 pounds of natural uranium in the form of its water-soluble compounds, and 600 pounds of thorium in the form of thorium hydrate (wet cake) or the water-soluble compounds.

Our research will be directed toward nuclear fuel systems. This research will use wet chemical methods almost entirely. Even though health and safety problems are minimized, these materials will be handled so as to create no hazards to employees.

Wastes will be accumulated in stainless steel drums. It is requested that the license permit us to transfer uranium wastes to the Davison Division at Erwin, Tenn. and thorium wastes to the Davison Division at Curtis Bay, Md. for recovery and disposal. Both of these locations of our company now operate under AEC source material licenses.

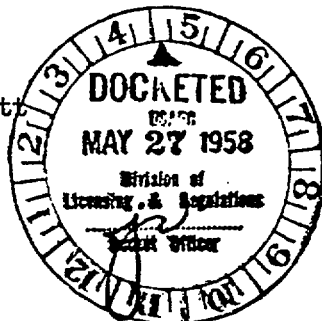
Sincerely,



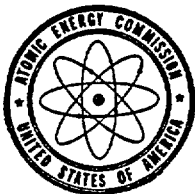
Forrest R. Hurley, Supervisor
Nuclear Chemistry Research

FRH:bhw

cc: W. T. Barrett



ITEM # 172



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

IN REPLY REFER TO:

40-2810

IRL:ND

Grace Research and Development Division
W. R. Grace & Co.
Washington Research Center
Clarksville, Maryland

SOURCE MATERIAL LICENSE

License No. **G-4132**

Dated: JUN 3 1958

Attention: Mr. Forrest R. Hurley, Supervisor
Nuclear Chemistry Research

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to, at the above stated location, twelve hundred (1,200) pounds of source material for research.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation."

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire **June 30, 1960.**

Encl:

10 CFR 20

FOR THE ATOMIC ENERGY COMMISSION

J. C. Delaney
Chief, Materials Section
Licensing Branch
Division of Licensing and Regulation

B1172



For. 1/6

ITEM # 173

GRACE RESEARCH AND DEVELOPMENT DIVISION

W. R. GRACE & Co.

WASHINGTON RESEARCH CENTER

CLARKSVILLE, MD.

January 21, 1959

DOCKET NO. 40-2810

Telephone:
ELgin 5-8700
Baltimore, Md.

Reply to:
P. O. Box 3461
Baltimore 26, Maryland

Mr. J. C. Delaney, Chief
Material Section
Div. of Licensing and Regulation
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Mr. Delaney:

The Process Development Department of the Grace Research and Development Division of W. R. Grace & Company, with principal offices at 7 Hanover Square, New York 5, New York, requests a license to receive refined source material for bench scale and pilot plant development studies at the pilot plants group located adjacent to the Davison Chemical Division Plant in Curtis Bay, Maryland. On June 3, 1958 you issued License No. C-4132 to our main research group at the Washington Research Center located on Maryland Route 32 near Clarksville, Maryland. The application for this earlier license had been submitted by Dr. Forrest R. Hurley on May 22, 1958.

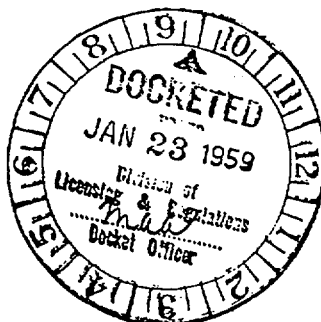
Our bench scale and pilot plant work will also be directed toward the development of nuclear fuel systems. We anticipate a maximum requirement over a 2 year period of about 1,000 lbs. of natural uranium and about 1,000 lbs. of thorium in the form of hydrates, oxides, or other compounds.

Part of our work will deal with both wet and dry chemicals handling. The safety practices developed at the Davison Division Plant in Erwin, Tennessee for handling both uranium and thorium materials and those applicable to the handling of thorium materials developed at the Davison Division Plant in Curtis Bay, Maryland will serve as guides for our activity in processing these materials. Recovery and disposal of any waste material accumulated by us can be handled by one or the other of the two Davison Division Plants. Both of these locations of our parent company now operate under AEC source material licenses.

Sincerely,

Philip Messina

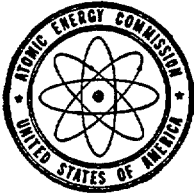
Philip Messina -
Process Development Department



PM:cch

ITEM # 174

31173



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

IN REPLY REFER TO:

40-2213
LAL:NE

SOURCE MATERIAL LICENSE

Grace Research and Development Division
M. E. Grace & Co.
Washington Research Center
Clarkeville, Maryland

License No. C-4172
Amendment # 1
Dated: JAN 23 1959

Attention: Mr. Forrest E. Marley, Supervisor
Nuclear Chemistry Research

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to ~~thirty-two hundred pounds~~ of source material for research, bench scale and pilot plant development studies. This license extends to your facilities at Clarkeville, Maryland and Cuttis Bay, Maryland.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation."

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire ~~June 30, 1960~~.

CC: Docket Officer
Document Room
S/H
M.M. Mann, Insp.

FOR THE ATOMIC ENERGY COMMISSION

J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing & Regulation

Dictator *[Signature]*
Approved *[Signature]*

ITEM # 175

MAY 15 1968

40-2810

W. R. Grace and Company
Washington Research Center
Clarksville, Maryland

Attention: Mr. Forrest R. Hurley, Supervisor
Nuclear Chemistry Research

Gentlemen:

This refers to the inspection conducted on January 22, 1959 of your activities authorized under Source Material License No. C-4132.

It appears that certain of your activities were not conducted in full compliance with the requirements of the AEC's "Standards for Protection Against Radiation," Part 20, Title 10, Code of Federal Regulations, in that:

1. No surveys were made to determine the extent of contamination and exposure of personnel to source material as required by Section 20.201(b), "Surveys."
2. The storage bottles containing more than 1.6 pounds of uranium and thorium were not labeled as required by Section 20.203(f)(2), "Caution signs, labels and signals."

Pursuant to the provisions of Section 2.201(a), "Notice of violation," of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, you are requested to notify this office, within thirty days of your receipt of this notice, of the steps taken or to be instituted to achieve correction of the above-described violations and the date when such correction has been or will be achieved.

Very truly yours,

Lyall Johnson, Chief
Licensing Branch
Division of Licensing and Regulation

Enclosures

REGISTERED MAIL

ITEM #

176

B/175



W. R. GRACE & CO.

Research and Development Division

WASHINGTON RESEARCH CENTER • CLARKSVILLE, MARYLAND

June 10, 1959

DOCKET NO. 40-2810

Atomic Energy Commission
Washington 25, D. C.

Attention: Mr. Lyall Johnson, Chief
Licensing Branch
Division of Licensing and Regulation

Dear Sir:

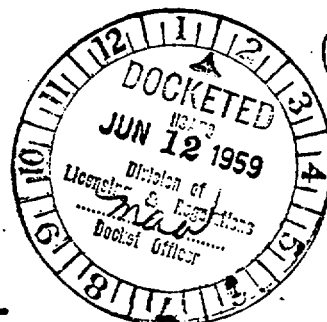
This refers to your letter of May 15, 1959 (Control No. 40-2810) which notes two irregularities in our activities under Source Material License No. C-4132.

In answer to the first, surveys, as required by Section 20.201(b), have been made in the past, but no formal reports were maintained. We have just made another survey of the radiation levels in our laboratories, and find that no worker can be exposed to even as much as 25 per cent of the limits specified in Appendix A of the AEC's "Standards for Protection Against Radiation, Part 20, Title 10, Code of Federal Regulations". This confirms previous evaluations of our working areas. By relocation of the larger bulk quantities of starting materials and older samples we can and will reduce the radiation to even lower levels for our own benefit.

We will initiate regular inspections of the working areas using a portable survey meter, and will maintain records of this survey. At the present time we see no need for personnel monitoring equipment. However, the practice has been for each worker to get a blood test every 6 months. As in most chemical laboratories our safety requirements are very high.

In answer to the second irregularity, all storage bottles containing more than 1.6 pounds of uranium and thorium are now marked with special labels as required by Section 20.203(f)(2).

ITEM # 177



2

CONTINUATION

Mr. Lyall Johnson

- 2 -

June 10, 1959

The above corrections bring our activities into compliance with the AEC regulations as we understand them. We welcome any suggestions.

Sincerely yours,



Forrest R. Hurley
Supervisor
Inorganic Chemical Research

FRH:imm

40-2810

JUN 10 1959

W. R. Grace and Company
Washington Research Center
Clarksville, Maryland

Attention: Mr. Forrest R. Hurley, Supervisor
Nuclear Chemistry Research

Gentlemen:

Thank you for your letter of June 10, 1959. It appears that you have taken adequate steps to correct those deficiencies in your Source Material Program which we brought to your attention in our letter of May 15, 1959. These matters will be reviewed during the next inspection of your facilities.

Your cooperation is appreciated.

Very truly yours,

Lyall Johnson, Chief
Licensing Branch
Division of Licensing
and Regulation

CC: Division of Inspection, Wash.)
Division of Inspection, NYOO) W/cpy ltr dtd 6-10-59
Public Document Room)

ITEM # 178

| | | | | | |
|-----------|----------|---------|---------|--|-------|
| OFFICE ▶ | DLR:RSB | DLR:RSB | DLR:LB | | |
| SURNAME ▶ | Lane:hkm | Rogers | Johnson | | B/177 |
| DATE ▶ | 6-15-59 | 6/18/59 | 6/19 | | |



W. R. GRACE & CO.

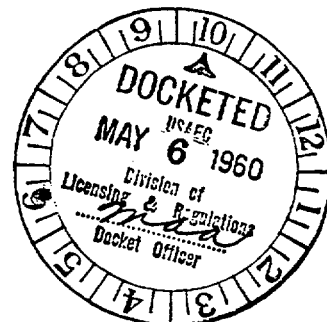
Research Division

WASHINGTON RESEARCH CENTER • CLARKSVILLE, MARYLAND

DOCKET NO. 40-2810
May 3, 1960

Atomic Energy Commission,
Washington 25, D. C.

Attention: Mr. Lyall Johnson, Chief,
Licensing Branch,
Division of Licensing & Regulation.



Dear Sir:

The Research Division of W. R. Grace & Co., with principal offices at 7 Hanover Square, New York 5, New York, requests renewal of Source Material License No. C-4132 which now permits receipt of and possession of thirty-two hundred pounds of source material for research and development studies at the Washington Research Center, Clarksville, Maryland, and at our facilities at Curtis Bay, Maryland. The original request for license No. C-4132 was submitted by Dr. Forrest R. Hurley on 22 May, 1958, and an amendment requested by Philip Messina on 21 January, 1959.

It is requested that this license be renewed for a two-year period and again permit the receipt during this period of 3200 pounds of source material in the form of hydrates, oxides, or other compounds.

Our laboratory, bench scale, and pilot plant work will continue to be directed primarily toward the development of nuclear fuel systems. Wet chemical methods will be used almost entirely in the laboratory work. The safety practices developed at the Davison Chemical Division plants at Erwin, Tennessee, and at Curtis Bay, Maryland, will serve as guides in handling these materials to prevent any hazard to personnel.

Wastes, which will be obtained in this work, are to be stored in stainless steel drums. It is requested that this license permit us to transfer the uranium wastes to the Davison Chemical Division at Erwin, Tennessee, and the thorium wastes to the Davison Chemical Division at Curtis Bay, Maryland. Recovery and disposal of these waste materials can be handled

B/178

ITEM # 179

(2)

W. R. GRACE & CO
Research & Development Division
WASHINGTON RESEARCH CENTER
CONTINUATION

Atomic Energy Commission

- 2 -

May 3, 1960

readily at these locations of our parent company, which now operate under AEC source material licenses.

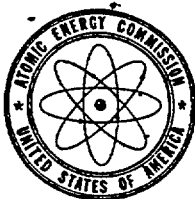
Yours sincerely,

A handwritten signature in cursive script, appearing to read "F. T. Fitch".

F. T. Fitch

FTF:imm

cc: A. E. C. (2)



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

IN REPLY REFER TO:

40-2810

REL:ND

Research and Development Division
W. R. Grace & Co.
Washington Research Center
Clarksville, Maryland

Attention: Mr. F. T. Fitch

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to thirty-two hundred pounds of source material for research, bench scale and pilot plant development studies. This license extends to your facilities at Clarksville, Maryland and Curtis Bay, Maryland.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation."

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire June 30, 1961.

FOR THE ATOMIC ENERGY COMMISSION

J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing & Regulation

B/179



Rec'd

ITEM # 180

REL:ND
40-2810

JUN 6 1960

W. R. Grace & Co.
Research & Development Div.
Washington Research Center
Clarksville, Maryland

Attention: Mr. F. T. Fitch

Gentlemen:

Pursuant to your request of May 3, 1960, enclosed is
a renewal of your Source Material License No. C-4132.

With reference to your request for permission to
transfer uranium and thorium wastes to the Davison
Chemical Divisions, in Erwin, Tennessee and Curtis
Bay, Maryland, both of these facilities are currently
licensed to receive source material, therefore, fur-
ther permission for their receipt of wastes is not
required.

Very truly yours,

J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing & Regulation

Enclosures:
License No. C-4132

ITEM #

181

B1180



W. R. GRACE & CO.

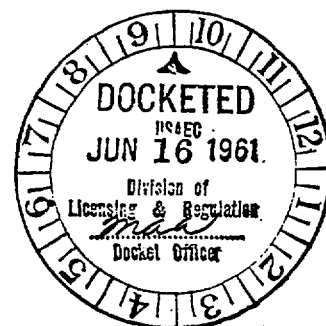
Research and Development Division

WASHINGTON RESEARCH CENTER • CLARKSVILLE, MARYLAND

June 15, 1961

Atomic Energy Commission
Washington 25, D. C.

Attention: Mr. J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing and Regulation



Dear Sir:

The Research Division of W. R. Grace & Co., with principal offices at 7 Hanover Square, New York 5, N. Y., requests renewal of Source Materials License No. C-4132 which now permits receipt of and possession of thirty-two hundred pounds of source material for research and development studies at the Washington Research Center, Clarksville, Maryland, and at our facilities at Curtis Bay, Maryland. The original request for license No. C-4132 was submitted by F. R. Hurley on May 22, 1958. An amendment was requested by Phillip Messina on January 21, 1959, and a renewal by F. T. Fitch on May 3, 1960. This license presently expires June 30, 1961.

It is requested that license No. C-4132 be renewed for a two year period and again permit receipt of 3200 pounds of source material in the form of hydrates, oxides, or other compounds during this period.

Wet chemical methods will be used almost entirely in our laboratory, bench scale, and pilot plant work which will continue to be directed primarily toward the development of nuclear fuel systems. The safety practices developed during our past research experience and at our Erwin and Curtis Bay plants, Davison Chemical Division, will serve as guides in handling these materials to avoid any hazard to personnel.

The wastes, which will be obtained in the course of this work, will be stored in stainless steel drums. The uranium wastes will be transferred to the Davison Chemical Division at Erwin, Tennessee, and the thorium wastes

B/181

ITEM # 182

(2)

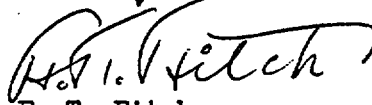
Mr. J. C. Delaney

- 2 -

June 15, 1961

to the Davison Chemical Division at Curtis Bay, Maryland for recovery and disposal of these materials. These operations can be handled readily at these locations of our parent company, which now operate under AEC source material licenses.

Yours sincerely,



F. T. Fitch

Inorganic Chemical Research

FTF:jz

cc: AEC (2)

40-2810

L&R:DH

JUN 21 1961

W. R. Grace & Company
Research and Development Division
Washington Research Center
Clarksville, Maryland

Attention: Mr. F. T. Fitch
Inorganic Chemical Research

Gentlemen:

This will acknowledge receipt of your application dated June 15, 1961,
for a source material license.

The following information is required in support of your application:

- (1) The maximum quantity of source material you wish to possess at any one time, and the maximum amount you will process at any one time.
- (2) A detailed description of the activities you will perform.
- (3) The procedures you intend to employ in safeguarding employees against dust and contamination exposure through the escape of radioactive materials in the use of such material.
- (4) A general description of the types of instruments you have available to perform necessary health and safety surveys and the surveys that will be conducted.

Upon receipt of this information, we will continue the evaluation of your application.

Very truly yours,

Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Licensing and Regulation

BCC: Div. of Compliance, w/cy
of appl. dtd 6-15-61

ITEM # 183

| | | | | | | |
|-----------|------------|-----------------|--|--|--|-------|
| OFFICE ▶ | L&R
DH | L&R
DH | | | | |
| SURNAME ▶ | Harmon/mad | D.A. Nussbaumer | | | | B1182 |
| DATE ▶ | 6-20-61 | 6/21/61 | | | | |



W. R. GRACE & CO.

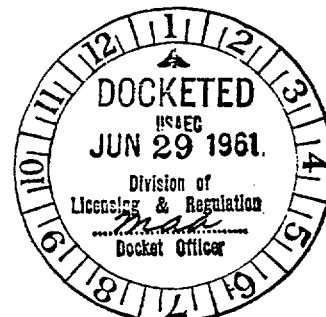
DOCKET NO. 40-2810

OK
D.F.H.
6/30/31

Research and Development Division

WASHINGTON RESEARCH CENTER • CLARKSVILLE, MARYLAND

June 26, 1961



Atomic Energy Commission
Washington 25, D. C.

Attention: Mr. Donald A. Nussbaumer, Chief,
Source and Special Nuclear Materials Branch,
Division of Licensing and Regulation

Subject: Renewal of Source Materials License No. C-4132
by Research Division of W. R. Grace & Co.

Reference: 40-2810
L and R:DH

Dear Sir;

The information below is presented in support of our request on June 15, 1961 for renewal of Source Materials License No. C-4132 as desired in your letter received June 21st.

Source material license No. C-4132 covers our fundamental laboratory research at the Washington Research Center, Clarksville, Maryland, and our development work at Curtis Bay, Maryland. No production is involved. The activities of both sites, although differing somewhat in scope, are modest in regard to quantities handled and extent of work. Solution chemistry primarily is involved avoiding many of the standard hazards such as dusting, etc. In compliance with our general policy of high safety standards, A.E.C. and State regulations and the practices of the Davison Chemical Division plants are followed in this work. Within this framework, the information you requested in your letter received June 21st is summarized below:

(1) Maximum quantities of Source Material to be possessed and also to be processed at any one time:

B/183

ITEM # 184

(4)

Mr. Donald A. Nussbaumer

- 2 -

June 26, 1961

It is anticipated that a limit of a 100 pounds source material in process at one time should not restrict any expected operations. In actual practice, source material quantities in process at one time generally are of the order of 50 to 500 g. in the laboratories and up to 30 pounds in the development work.

It is my understanding that Source Materials License No. C-4132 permits the possession of up to 3200 pounds source material at one time. In practice, it is doubtful that conditions should arise that would make desirable the possession at one time of source material quantities approaching 1600 pounds. —

(2) Description of the Activities to be performed:

At the Washington Research Center, standard laboratory manipulative procedures with up to 250 g. source material in solutions or suspensions generally are involved in the studies aimed at developing nuclear fuel systems. These are conducted with a past background that also has involved special nuclear materials and extremely toxic constituents which required establishing protected work areas, safe ventilating systems, and effective monitoring procedures.

The chemical process studies at Curtis Bay are in support of the Davison Chemical Division Erwin plant or based on the laboratory research. They involve studies and development of standard unit operations such as mixing, filtration, extracting, metallurgical, etc., and source material quantities as stated above.

(3) Safeguarding Procedures against Dust and Contamination Exposure through Escape of Radioactive Materials.

Wet chemical operations almost entirely are involved, avoiding dust hazards, etc. Effective continuing efforts are made to prevent area and personnel contamination. The limits and surveys specified in the A.E.C.'s "Standards for Protection Against Radiation, Part 20, Title 10, Code of Federal Regulations" are maintained. In fact, the laboratory group is equipped and trained to handle extremely toxic materials including the essential monitoring. An effective surveying and monitoring program is maintained and is the responsibility of Dr. J. D. Moyer, Radiation Protection Officer of the Washington Research Center Laboratories.

Mr. Donald A. Nussbaumer

- 3 -

June 26, 1961

A medical department is located at the Washington Research Center familiar with the problems involved. Medical records, with periodic physical examinations are maintained on personnel participating in the work.

(4) Types of Instruments to perform Necessary Health and Safety Surveys and the Surveys that will be conducted.

Radiation:

(a) Sampling: Staplex Hi-volume Air Sampler, Model TFIA.

Millipore Filter Corp., model XX60 000 00 and associated membrane filters.

(b) Detection: Victoreen Cutie Pie Survey Meter, model 740B sensitivity range 0-100 mr/hr., window thickness 0.0005 inches mylar, detects alpha combination as well as gamma and beta.

Tracer Lab. Survey Meter, model SU14, sensitivity range 0-25 mr/hr., window thickness less than 2 mg/cm².

Nuclear Measurements Corp. model PC-3A, windowless gas flow proportional counter.

General laboratory surveys are made at regular intervals, at least once a month under minimum conditions. With special nuclear materials or toxic agents, monitoring is frequent and may become daily. Monitoring includes both air and smear sampling.

The medical departments maintains complete medical records on the personnel involved. A semi-annual physical examination is made including blood tests and chest X-ray. When required by the work activities, the medical department has made general weekly checks on personnel including vital capacity tests. The medical department is well equipped for first aid requirements and general personnel supervision and utilizes outside facilities for detailed physical examinations and blood tests.

W. R. GRACE & CO.
Research & Development Division
WASHINGTON RESEARCH CENTER
CONTINUATION

Mr. Donald A. Nussbaumer

- 4 -

June 26, 1961

I trust that this information will prove sufficient for evaluation of our application for renewal of the source materials license. Please do not hesitate to contact us if we can be of any further assistance.

Yours sincerely,



F. T. Fitch
Inorganic Chemical Research

FTF:jz

cc: A.E.C. (2)

DEC 13 1955

FORM AEC-4
(3-47)UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSIONFORM APPROVED
BUDGET BUREAU NO. 38-R004.4MONTHLY REPORT OF PROCESSORS OF URANIUM
AND THORIUM SOURCE MATERIALSPURSUANT TO CODE OF FEDERAL REGULATIONS,
TITLE 10—ATOMIC ENERGY, PART 40—
CONTROL OF SOURCE MATERIALTo: U. S. Atomic Energy Commission,
P. O. Box 30, Ansonia Station,
New York 23, N. Y.

1. PROCESSOR'S NAME

Rare Earths, Inc.

ADDRESS

P.O.Box 488, Pompton Plains,

AEC LICENSE NO.

N.J.

R-132

2. REPORT FOR MONTH OF

November, 1955

INSTRUCTIONS.—File two (2) copies of this report with the U. S. Atomic Energy Commission, P. O. Box 30, Ansonia Station, New York 23, N. Y., not later than 15 days after the end of each month in which you transferred, delivered, or held possession of or title to any source material. Inventory means all source material in your possession or to which you have title, regardless of location.

3. Summary of receipts, deliveries, and inventories of source material during the month. (The entries for "Receipts" and "Deliveries" below should be the totals of transfers of each grade of source material. List in block 5 on the reverse side each receipt form and delivery to others included in these totals.)

(i) Raw source material (excluding residues and tailings).

Figures are reported in Short Tons (Specify unit of measure).

| DESCRIPTION OF RAW SOURCE MATERIAL AND URANIUM AND THORIUM CONTENT
(a) | INVENTORY BEGINNING OF MONTH
(b) | RECEIPTS FROM OWN PRODUCTION AND PURCHASES
(c) | TOTAL (b) and (c)
(d) | DELIVERIES TO: | | INVENTORY END OF MONTH
(g) |
|---|-------------------------------------|---|--------------------------|----------------|---------------|-------------------------------|
| | | | | Process
(e) | Others
(f) | |
| Monazite Sand | 115.2 | - | 115.2 | 25 | - | 90.2 |
| | | | | | | |
| | | | | | | |

(ii) Residues and tailings.

Figures are reported in Lbs. ThO₂ (Specify unit of measure).

| DESCRIPTION OF RAW SOURCE MATERIAL AND URANIUM AND THORIUM CONTENT
(a) | INVENTORY BEGINNING OF MONTH
(b) | RECEIPTS PROCESS
(c) | FROM OTHERS
(d) | TOTAL (b) and (c) and (d)
(e) | DELIVERIES TO: | | INVENTORY END OF MONTH
(h) |
|---|-------------------------------------|-------------------------|--------------------|----------------------------------|----------------|---------------|-------------------------------|
| | | | | | Process
(f) | Others
(g) | |
| Thorium Sludge | 28,642 | 2,196 | - | 30,838 | 3,164 | | 27,674 |
| | | | | | | | |
| | | | | | | | |

(iii) Refined source material.

Figures are reported in Lbs. ThO₂ (Specify unit of measure).

| DESCRIPTION OF REFINED SOURCE MATERIAL AND URANIUM AND THORIUM CONTENT
(a) | INVENTORY BEGINNING OF MONTH
(b) | RECEIPTS PROCESS
(c) | FROM OTHERS
(d) | TOTAL (b) and (c) and (d)
(e) | DELIVERIES TO: | | INVENTORY END OF MONTH
(h) |
|---|-------------------------------------|-------------------------|--------------------|----------------------------------|---------------------------|---------------|-------------------------------|
| | | | | | Further Processing
(f) | Others
(g) | |
| Refining Process | 5,974 | 3,164 | | 9,138 | | | 9,269 |
| Finished Stock | 691 | | | | | 20 | 671 |
| | | | | | | | |
| | | | | | | | |

(iv) Source material in process.

Estimated uranium and thorium content in inventory.

At beginning of month 13,000At end of month 9,700

ITEM #

185

(2)

By Richard M. Marshall Vice-President 3/5/56
(Signature of authorized official) (Title) (Date)

Section 35 (a) of the United States Criminal Code, 18 U. S. C. Sec. 80, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

Report each receipt or delivery of source material during the month, grouping together all transfers of one grade under the heading "Receipts" or "Deliveries." Do not include here the details of "Deliveries to process" or "Receipts from process." The totals of receipts from and deliveries to others of any one grade (column (f)) must agree with the total for that grade shown in block 3.

[illegible]

(If necessary, attach additional sheets, using the same grouping of columns (a) through (g)).



40-86
For Div of Compliance

DAVISON CHEMICAL DIVISION

August 2, 1961

Mr. Lyall Johnson
Division of Licensing and Regulations
U. S. Atomic Energy Commission
Washington 25, D. C.

Ref: CO-NY:AMB

Dear Mr. Johnson:

This is in reply to Mr. R. W. Kirkman's (Director - N.Y. Compliance Area) letter of July 26, 1961, advising this Company of the requirements for the possession of source material under the revised regulations contained in 10 CFR 40 and in addition, advising that Source Material License No. R-196 issued to this Company has expired. We appreciate Mr. Kirkman calling this to our attention and by this letter are requesting a renewal of our license for source material to be used at our Pompton Plains, New Jersey, operation in accord with information previously submitted to the Division of Licensing and Regulation.

Briefly, the situation as we are currently aware of it, is that some thirty odd days prior to the expiration of our license, we requested a renewal; however, at that time, as the result of an inspection by the New York Inspection Division, there were several items of non-compliance under 10 CFR 20 and renewal was withheld pending corrective action. Corrective measures were taken, including the submission of detailed information regarding the operations, and in particular procedures for assuring the health and safety of the public and Company employees. On June 29, 1961, the operations were re-inspected and we were subsequently advised by letter dated July 19, 1961, that there were no longer any items of non-compliance. At that time we assumed that our previous application, along with the additional information submitted, would be reviewed and a renewal granted. Apparently we were in error on this point.

Since our previous application is not adequate for licensing purposes, please consider this letter as this Company's application for a new source material license for an unlimited amount of material to be used in our rare earth operations located in Pompton Plains, New Jersey. In this connection, it is also requested (1) that the

ITEM # 186

W. R. GRACE & CO.
DAVISON CHEMICAL DIVISION

Mr. Lyall Johnson
August 2, 1961
Page 2

information submitted previously regarding our operations and procedures be used in support of this letter, (2) Mr. David Barrett's name and address be deleted from the license and (3) the new license as well as all future correspondence concerning this operation be addressed as follows:

W. R. Grace & Co.
Davison Chemical Division
P. O. Box 488
Pompton Plains, New Jersey
Attention: Mr. Richard Mandle
Plant Manager

Thank you again for calling this matter to our attention and should additional pre-licensing information be required, please contact Mr. Mandle at the above address or the undersigned at our Baltimore address.

Very truly yours,

W. R. GRACE & CO.
Davison Chemical Division



T. O. Tongue
Assistant Production Manager
Chemicals Division

TOT:flc

cc: Mr. Robert W. Kirkman, Director - New York Compliance Area
Mr. Richard M. Mandle, Plant Manager - Pompton Plains Plant

UNITED STATES GOVERNMENT

Memorandum

TO : R. W. Kirkman, Director
New York Compliance Area

DATE: AUG 8 1961

FROM : Leo Dubinski, Assistant Director *LD*
for Materials
Division of Compliance, Headquarters
SUBJECT: RARE EARTHS, INC., POMPTON PLAINS,
NEW JERSEY; LICENSE NO. R-196

CO:RMN

L&R has a pending application on the subject licensee. In view of the items of noncompliance noted during the previous inspection, they believe that it would be helpful to have detailed information on the inspection conducted on June 29, 1961. We would appreciate it if you would submit a complete inspection report to L&R on the June 29, 1961, inspection in order to assist them in processing the license application. We believe this is a rare case where an inspection report will be requested after a clear notice has been issued.

B1186
ITEM # 187

UNITED STATES GOVERNMENT

Memorandum

TO D. Nussbaumer, Chief, Source & Special
Nuclear Materials Branch, LR

DATE:

AUG 10 1961

FROM R. E. Cunningham, Chief REC
Enforcement Branch, LR

SUBJECT: RARE EARTHS, INCORPORATED
POMPTON PLAINS, NEW JERSEY
DOCKET NO. 40-86

LR:REC

We recently received a "clear" notice dated July 19, 1961, from the Division of Compliance informing us that the licensee was inspected on June 29, 1961, and that no items of noncompliance were noted. Therefore, we are not considering further enforcement action with regard to the licensee at this time. In view of the past history of the licensee, we have requested the Division of Compliance to submit a full report of the recent inspection.

The attached docket is returned to you for licensing action. We will forward a copy of the inspection report for your information when it is received.

Attachment
Docket No. 40-86

B/187

ITEM # 188

AUG 17 1961

Robert Lowenstein, Acting Director
Division of Licensing & Regulation, HQ.

Robert W. Kirkman, Director
New York Compliance Area

TRANSMITTAL OF LICENSE COMPLIANCE INSPECTION REPORT-10 CFR 40

CO-NY:PBK

Transmitted herewith is the following clear follow-up
inspection report:

W. R. GRACE & COMPANY
Davison Chemical Division
Pompton Plains, New Jersey

License No.: R-196

It should be noted that on July 19, 1961, a clear
inspection report form was mailed to the licensee.
On August 8, 1961, Leo Dubinski, Assistant Director
for Materials, Division of Compliance, HQ., requested
a complete inspection report in order to assist L&R
in processing W. R. Grace & Company's pending license
application. This complete clear inspection report is
now being transmitted.

Enclosure:
1 cy Rpt.

cc: Div of Cmp, HQ.
w/3 cys of Rpt.

C O M P L I A N C E

KLEVIN:eg SEARS KIRKMAN

8/16/61

ITEM #

B/188
189

4

WORK ANALYSIS SHEET

OPERATOR _____

MEN/SHIFT / SHIFTS/DAY _____

BALL MILL OPERATION

| Operation
or
operating
area | time
per
oper | oper
per
shift | time
per
shift
(min) | No.
of
slps. | CONCENTRATION
d/m / M ³ | | | AVGE
CONC
TOTAL
TIME |
|--------------------------------------|---------------------|----------------------|-------------------------------|--------------------|---------------------------------------|------|-------|-------------------------------|
| | | | | | LOW | HIGH | AVE. | |
| 1. BALL MILL
AREA | | | 170 | 3 | 3 | 124 | 63 | 1071 |
| 2. FURNACE ROOM | | | 170 | 3 | 3 | 5 | 4 | 610 |
| 3. FURNACE -
BARGE OX | | | 60 | 3 | 3 | 9 | 6 | 360 |
| 4. TANK #4
#5 AREA | | | 60 | 3 | 4 | 1 | 6 | 360 |
| 5. LUNCH
ROOM | | | 50 | 2 | 2 | 12 | 7 | 200 |
| | | | ET 510 | | | | TXC 6 | 1238 |

(TXC)
(T)

12380
510

24.3%

d/m / M³

TIME & MAX.
PER. CONC.

OPERATOR _____

JOB ANALYSIS SHEET

MEN/SHIFT / SHIFTS/DAY

| Operation
or
operating
area | time
per
oper | oper
per
shift | time
per
shift
(min) | No.
of
slps. | CONCENTRATION
d/m / M ³ | | | AVGE
CONC
TOTAL
TIME |
|--------------------------------------|---------------------|----------------------|-------------------------------|--------------------|---------------------------------------|------|------|-------------------------------|
| | | | | | LOW | HIGH | AVE. | |
| 1. BALL MILL
AREA | | | 170 | 3 | 3 | 124 | 63 | 10710 |
| 2. FURNACE ROOM | | | 170 | 3 | 3 | 5 | 4 | 610 |
| 3. FURNACE -
BARK CX | | | 60 | 3 | 3 | 9 | 6 | 360 |
| 4. TANK H-T
H-S AREA | | | 60 | 3 | 4 | 1 | 6 | 360 |
| 5. LUNCH
ROOM | | | 50 | 2 | 2 | 12 | 7 | 290 |
| | | ET | 510 | | | | | |
| | | | | | | | | 12386 |

(TFC)
(T)12386
510

24.3%

d/m / M³Hence MAX.
PER. CONC.

0 1 1

100 100 100 3

57

| Operation
or
operating
area | time
per
oper | oper
per
shift | time
per
shift
(min) | No.
of
slps. | CONCENTRATION
$d/m / M^3$ | | | AVGE
CONC X
TOTAL
TIME |
|--------------------------------------|---------------------|----------------------|-------------------------------|--------------------|------------------------------|-------|------|---------------------------------|
| | | | | | LOW | HIGH | Avg. | |
| 1. BALL MILL
AREA | | | 170 | 3 | 3 | 124 | 63 | 10710 |
| 2. FURNACE ROOM | | | 170 | 3 | 3 | 5 | 4 | 690 |
| 3. FURNACE -
BARE OX | | | 60 | 3 | 3 | 9 | 6 | 360 |
| 4. TANK & Y
H S AREA | | | 60 | 3 | 4 | 1 | 6 | 360 |
| 5. LUNCH
ROOM | | | 50 | 2 | 2 | 12 | 7 | 290 |
| | | ET | 510 | | | TXC E | | 12390 |

$$\frac{(TXC)}{(T)} = \frac{12390}{510} = 24.3\% \text{ d/m/M}^3$$
times max.
per. conc.

Exh. A

7.4. 110 Am m³

UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE: October 4, 1961

FROM : *D. F. Harmon*
D. F. Harmon, Source and Special Nuclear Materials
Branch, Division of Licensing and Regulation

SUBJECT: RADIOLOGICAL SAFETY EVALUATION, W. R. GRACE & COMPANY,
DAVISON CHEMICAL DIVISION, POMPTON PLAINS, NEW JERSEY,
DOCKET NO. 40-86

ANALYSIS, FINDINGS AND CONCLUSIONS

An analysis of the information submitted by the W. R. Grace & Company, Davison Chemical Division, has resulted in the following observations, conclusions and findings.

Conclusions:

It appears that the licensee's radiation safety program is designed to provide sufficient information for determining compliance with 10 CFR 20 and that the licensee has instituted the necessary steps in his processing facility to comply with the Commission's regulations.

Plant Location and Rated Ore Capacity:

The plant is located approximately 3/4 of a mile east of Pompton Plains, New Jersey, in a rather heavily populated area. The licensee has submitted topographical maps of this area which shows inhabited areas, locations of rivers and other pertinent data.

Approximately one ton of monazite ore (containing rare earth materials and thorium) is processed daily. Thorium is a by-product of monazite ore but is recovered and purified for resale. Fifteen hourly employees complete the three shift working force.

Plant flow diagram, dusty areas and ventilation equipment:

In support of his application, the licensee has submitted a flow diagram of his operations. In conjunction with the flow diagram, locations of dusty operations involving thorium have been specified and ventilation equipment at each operation has been described. This equipment appears to adequately control the airborne concentrations of radioactivity within the limits of 10 CFR 20.

ITEM # 190

B/189
(3)

Airborne Radioactivity Surveys:

General air, breathing zone and operational samples are conducted throughout the plant at all operations. Samples are collected with a staplex hi-volume air sampler equipped with T.F.A. #41 filter paper. Sample locations, sample techniques and sample frequencies are described by the licensee. In addition, a study has been made of the operations performed by each employee to determine occupancy factor. These procedures appear adequate to determine compliance with Section 20.103.

External Radiation Surveys:

An external radiation survey of the entire rare earth processing plant is conducted at least monthly. In addition, all employees who have reason to enter the plant processing area are required to wear film badges. This program appears adequate to determine external exposures of personnel.

Liquid & Airborne Effluent Survey Program:

Release of airborne radioactivity to unrestricted areas will be through the plant discharge stack system. This system has been adequately described by the licensee. To insure compliance with Section 20.106, the licensee has developed an air sampling program at the plant boundary line. Samples are collected three times per month at each of three different locations.

All liquid waste issuing from plant operations passes through a waste treatment plant. After holdup filtration and treatment to remove solids, the liquid flows to a storm drain and leaves the plant property. This effluent is sampled daily to determine compliance with Section 20.106. These programs appear adequate.

Waste:

Thorium is refined and purified for resale in this operation. However, a small amount of thorium will appear as waste. This material is either transferred, buried in accordance with Part 20, discharged in the liquid effluent in accordance with Part 20, or appears in the sludge from the waste treatment plant and is disposed of on plant property. This appears adequate from a radiological safety standpoint.

Instructions to Personnel:

Written radiological safety instructions are provided employees. All necessary items appear to be covered.

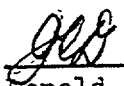
Respirators:

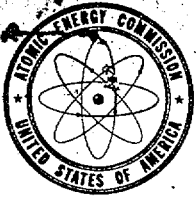
M.S.A. Dustfoe respirators are worn by employees during various plant operations. While the licensee appears to have a good program established for the wearing of respirators, he has not requested that allowance be granted in determining exposures to airborne radioactivity. The licensee is being informed that special approval must be granted by the Commission before allowance can be made for his respirator program.

Incineration of Source Material:

The licensee has requested permission to incinerate burlap bags which contained monazite sand. The licensee states that the bags will be as thoroughly emptied as possible and burned under favorable meteorological conditions. Airborne surveys will be conducted during incineration. It is recommended that authorization be granted under the conditions outlined by the licensee.

APPROVED:


Donald A. Nussbaumer, Chief, Source and Special Nuclear Materials
Branch, Division of Licensing and Regulation



UNITED STATES
ATOMIC ENERGY COMMISSION

WASHINGTON, D.C. 20545

DISTRIBUTION:

Dec. Room
Compliance
State Health (lic. only)
H. J. McAlduff, OROO
D. George, NMM
N. Doulos, ML
D. Mussaumer, ML
Suppl.
Br. & Div. RPs

DEC 14 1964

DML:CHW
70-456

W. R. Grace and Company
Research Division
Washington Research Center
Clarksville, Maryland

Attention: Mr. T. G. Gibian
President
Research Division

Gentlemen:

Enclosed is Special Nuclear Material License No. SNM-840. Since your application for renewal of License No. SNM-417 could not be processed prior to the expiration date, it was necessary to issue a new license. Please note that Item 12 of this license authorizes the shipment of special nuclear material provided that comingling control is exercised for each shipment of special nuclear material in quantities greater than those specified in Appendix B, 10 CFR 71.

Pursuant to paragraph 70.33(b), 10 CFR 70, application for renewal of this license should be submitted at least thirty (30) days prior to the expiration date of the license. Failure to do this may again result in your possessing special nuclear material without a valid license.

Very truly yours,

Robert L. Layfield
Source & Special Nuclear Materials Br.
Division of Materials Licensing

Enclosure:
SNM-840

ITEM # 191

From CO - Hdqrs.

COPY

Form AEC-401
(1-55)

UNITED STATES
ATOMIC ENERGY COMMISSION

SPECIAL NUCLEAR MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 70, "Special Nuclear Material Regulations," a license is hereby issued authorizing the licensee to receive and possess the special nuclear material designated below; to use such special nuclear material for the purpose(s) and at the place(s) designated below; and to transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 70.32(a) of said regulations, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

| Licensee | | 3. License No. |
|---|--|---|
| 1. Name | W. R. Grace & Company
Research Division | SNM-840 |
| 2. Address | Washington Research Center
Clarksville, Maryland | 4. Expiration Date
November 30, 1967 |
| | | 5. Docket No.
70-456 |
| 6. Special Nuclear Material
Uranium enriched in the U-235 isotope. | 7. Maximum quantity of special nuclear material which licensee may possess at any one time under this license. One (1) kilogram U-235 as contained in uranium enriched in the U-235 isotope. | |
| 8. Authorized use
For use in accordance with the procedures described in the licensee's undated application received October 28, 1964. | | |
| 9. Quantity of special nuclear material allocated to licensee pursuant to Section 70.31(b) of said part
- - - - | | |
| CONDITIONS | | |
| 10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above. | | |
| 11. The licensee is hereby exempted from the requirements of Section 70.24, 10 CFR 70, insofar as this Section applies to the material held under this license. | | |

ITEM #

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SPECIAL NUCLEAR
MATERIAL LICENSE
Supplementary Sheet

License Number SNM-840

12. Pursuant to 10 CFR 71, the licensee is hereby authorized to ship special nuclear material in accordance with the procedures described in the licensee's undated application received October 28, 1964, provided that commingling control is exercised for each shipment of special nuclear material in quantities greater than those specified in Appendix B, 10 CFR 71 by one of the following methods:

- (a) Exclusive use of the vehicle; or
- (b) Under escort by a courier assigned responsibility to assure that the shipment will not be commingled with other special nuclear material. The courier shall assure that the shipment is separated by at least 20 feet from other special nuclear material at points of loading, transshipment, storage and carriage; or
- (c) The licensee obtains a written certificate from the carrier which specifies that the special nuclear material will be transported in the same vehicle with no intermediate unloading or transshipment until final delivery to the consignee and that no cargo containing other special nuclear material will be transported in the same vehicle. The certificate shall specify also the name of the carrier, the consignee, the location of the consignee's facility at the destination, the mode of transport and the general route to be followed.
- (d) Any other procedures specifically approved by the Division of Materials Licensing.

DEC 14 1964

Date _____

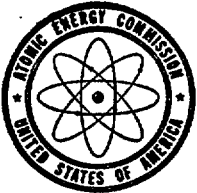
COPY

For the U. S. Atomic Energy Commission

Robert L. Hayfield

by Division of Materials Licensing

WASHINGTON 25, D. C.



UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION I
376 HUDSON STREET
NEW YORK 14, NEW YORK

TELEPHONE: YUWON 9-1000

Ext. 386

IN REPLY REFER TO:

CO11:JFB

September 8, 1965

W. R. Graze & Company
Research Division
Clarksville, Maryland 21029

Attention: Dr. J. W. Moyer

License Nos. 19-4003-1, -4, -6
2MB-334
2MM-240

Gentlemen:

The Division of Compliance, Region I, is charged with the responsibility of assuring compliance by the holders of licenses with the Atomic Energy Act of 1954, the applicable rules and regulations of the Atomic Energy Commission, and the terms and conditions of the licenses themselves.

Our representative, Mr. James F. Bresson plans to visit you at about 9:00 a.m. on Friday, 9/17/65, for the purpose of making an inspection of your facilities.

This inspection will be directed primarily to the status of your compliance with 10 CFR 30, "Licensing of Byproduct Material," and/or 10 CFR 40, "Control of Source Material," and 10 CFR 20, "Standards for Protection Against Radiation."

We request that you have available at the time of inspection the various records called for by the foregoing regulations, particularly those contained in 10 CFR 20.401(a) and (b).

Very truly yours,

Robert W. Kirkman, Director
Region I, Division of Compliance

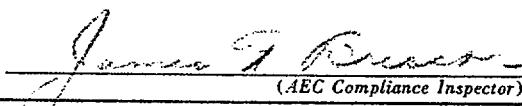
ITEM # 193

B1192

UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE

III-A

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

| | |
|--|---|
| 1. LICENSEE
W. R. Grace & Co.
Research Division
Clarksville, Maryland 21029 | 2. REGIONAL OFFICE
USAEC Division of Compliance
376 Hudson Street
New York, New York 10014 |
| 3. LICENSE NUMBER(S)
SNM-840 | 4. DATE OF INSPECTION
September 17, 1965 (Reinspection) |
| 5. INSPECTION FINDINGS
<p><input checked="" type="checkbox"/> A. No item of noncompliance was found.</p> <p><input type="checkbox"/> B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA.
10 CFR 20.203(b) or 34.42</p> <p><input type="checkbox"/> C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA.
10 CFR 20.203(c) (1) or 34.42</p> <p><input type="checkbox"/> D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA.
10 CFR 20.203(d)</p> <p><input type="checkbox"/> E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL.
10 CFR 20.203(e)</p> <p><input type="checkbox"/> F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL.
10 CFR 20.203(f) (1) or (f) (2)</p> <p><input type="checkbox"/> G. Storage containers were not properly labeled to show the quantity, date of measurement, or kind of radioactive material in the containers. 10 CFR 20.203(f) (4)</p> <p><input type="checkbox"/> H. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)</p> <p><input type="checkbox"/> I. Form AEC-3 was not properly posted. 10 CFR 20.206(c)</p> <p><input type="checkbox"/> J. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b)</p> <p><input type="checkbox"/> K. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)</p> <p><input type="checkbox"/> L. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained.
10 CFR 30.51, 40.61 or 70.51</p> <p><input type="checkbox"/> M. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c)</p> <p><input type="checkbox"/> N. Records of inventories were not maintained. 10 CFR 34.26</p> <p><input type="checkbox"/> O. Utilization logs were not maintained. 10 CFR 34.27</p> | |
| <p style="text-align: right;">
(AEC Compliance Inspector)</p> | |
| 6. LICENSEE'S ACKNOWLEDGMENT
<p>The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.</p> <p>_____
(Date)</p> <p>_____
(Licensee Representative — Title or Position)</p> | |

COPIES: ☐ LICENSEE; ☐ COMPLIANCE REGION; ☐ DIV. OF ST. & LIC. REL.; ☐ DIV. OF COMPLIANCE

8

DRAFT
BRESSION:cj
10/11/65

Reviewed by RG

Date 11/12/65

BACK-UP FOR AEC-591

PARTS 30, 40 AND 70 INSPECTION

W. R. GRACE & CO.
Washington Research Center
Clarksville, Maryland

Inspector: James F. Bresson

License Nos.: 19-4003-1, 4 & 6
SMB-334
SNM-840

Date of Inspections: 9/17/65 (Announced - License-1 reinspection,
SMB-334 reinspection, all others initial)

Persons Accompanying Inspector:

Robert Corcoran, Maryland Department of Public Health

Persons Contacted:

Dr. J. D. Moyer, Radiation Safety Officer and Chemist
Dr. Fred Fitch, Chemist

DETAILS

Background Information

1. License-1 and SMB-334 were inspected on September 29, 1961. Items of noncompliance were noted as follows:
 - a. 20.201(b) - failure to perform surveys to evaluate hazards relative to storage of natural uranium and thorium in a storage room,
 - b. 20.203(f)(2) - failure to label a container holding 5600 grams natural uranium, and
 - c. 20.201(b) - failure to determine air concentrations of tritium in a laboratory in surrounding areas during use and storage of 10 c of tritium.

These items were discussed as part of the current inspection.

Possession and Use of Material

2. License 19-4003-6 authorizes possession of a nominal 198 c Co-60 source for storage only. Records indicated this source was received March 25, 1963 and has been maintained in storage. It has been tested for leakage at six month intervals by the licensee ever since its receipt. Leak test procedures were described in the licensee's letter of application dated March 8, 1963. The unit was examined and it was noted that the storage container is labeled as required by 10 CFR 20.203. It is stored in a second floor room ⁱⁿ and the licensee's ^{an} ~~ex~~cclerator building and it is located inside a locked cage. The key to the cage is held by the building supervisor only. When not in use the ^{an} ~~ex~~cclerator facility is also locked.
3. License-4 authorized a 1500 mc Cs-137 sealed source to be utilized in an Industrial Nucleonics Corp. Model LS-102 unit to measure the level of material in a closed vessel. This source was purchased in August 1961 and is located at Hilltop Laboratory, Davison Chemical Co. which is a division of W. R. Grace & Co. in Baltimore, Maryland. Source strength is 1.5 c. Records indicated that the source has been leak tested at six month intervals and records are maintained in units of microcuries and that all tests have indicated contamination levels of less than .0001 uc. The source is labeled as per 10 CFR 20.203 and the general dose rate 18" from the device is approximately .5 mr/hr as measured in surveys performed by Industrial Nucleonics Corp. All installation of the device was performed by Industrial Nucleonics.
4. Dr. Meyer and Dr. Fitch both stated that material authorized by License SNM-840 has not yet been received at the facility. Enriched uranium will probably be ordered in the future in order to conduct experiments in production of ^{more} ~~these~~ compact ^{con}figuration of UO₂ for fuel.
5. License 19-4003-1
Dr. Meyer provided information as to possession of material under this license as follows:

| <u>Isotope</u> | <u>Authorized Amount</u> | <u>Possession and Use</u> |
|----------------|--------------------------|--|
| C-14 | 40 mc | Approximately 20 mc on hand as various types of organic compounds ordered mainly ⁱⁿ as small microcurie and millicurie amounts of material. |
| H-3 | 20 c | None procured since the previous inspection. 3 c unopened as gas, 5 c as tritiated lithium borohydride and 1 c as tritiated water. All the above are stored also one 250 mc gas chromatograph source. |
| Cs-137 | 1 mc | Procured 150 uc on July 1960 never used. |
| Co-60 | 5 mc
Sealed Source | Procured October 18, 1961 from Tracerlab and used for calibration. Leak tested at six month intervals. Leak test records in units of microcuries. No evidence of leakage or records of less than .001 uc. <i>etc</i> |
| Fe-59 | 10 mc
28 uc | Received December 1961. Discarded in the sink July 1963. Never used. |

| <u>Isotope</u> | <u>Authorized Amount</u> | <u>Possession and Use</u> |
|----------------|--------------------------|---|
| K-42 | 10 mc | Ordered 10 mc July, 1962.
Discarded August 1962.
Used 3 - 4 mc for
Tracer studies. None
on hand at the time of
inspection. |
| Sb-124 | 10 mc | <i>EX - 5 mc received in June 64
then studied
< 1 mc discarded on 11/11/61</i> |
| Ca-45 | 1 mc | Ordered 10 uc 4/11/61.
Discarded .001 uc one
year later. |
| Ag-111 | 2 mc
1.2 mc | Ordered to study
production of ceramic
microspheres. |
| Pm-147 | 10 mc | Received 10 mc 8/10/65 in
HCO solution. Not used
as of yet. |

6. Although several other isotopes are authorized to be handled at this facility none of the approved isotopes have been ordered or received, according to Dr. Moyer.
7. Dr. Moyer stated that all byproduct material has been used under his supervision to comply with license condition 13. Byproduct material ^{not} is being used in or on human beings, and sealed sources have not been opened, to comply with License Conditions 14 and 15. It was noted that License Condition 19, Amendment 11 issued November 15, 1964 authorizes Cs-137 to be used in Kansas City, Missouri. In accordance with procedures described in a letter signed by Baird. According to Dr. Moyer, Baird did use small uc amounts of material at this location in December 1964. Material has not been used at any other locations, according to Dr. Moyer.

SMB-334

8. SMB-334 authorizes possession of 1600 lbs of uranium and thorium for basic research and development work for the development of nuclear fuel materials. Drs. Moyer and Fitch stated that both uranium and thorium has been ordered and used in this program which is essentially designed to develop reactor fuel material. Originally material ordered was thorium oxide from 100 to 150 lbs which was utilized in 1963. Recently the material ordered has been uranium. Approximately 185 lbs of uranium has been ordered and possessed under this license. The licensee is attempting to develop ways to ^{make} compact reactor fuel. Material has been purchased from NFS in Erwin, Tennessee or Shattuck Chemical Co. Experiments consist of handling less than 20 lbs of material at any one time. It was noted that thorium is no longer handled at the facility, but that some thorium oxide which remains as results of experiments conducted is stored in a locked closet. The closet and containers are labeled as prescribed by 10 CFR 20.203. Dose rates in the closet area were noted to be less than .5 mr/hr. Material is stored in various types of plastic containers. There are two laboratories set up to conduct the uranium oxide experiments. In one laboratory uranium is handled beginning with a uranium chloride solution, in the other the uranium is as UO_2 . Various scale model towers and process equipment have been assembled ~~and~~ ⁱⁿ each of two laboratories. The laboratories are kept locked when not in use. Laboratories and associated containers and equipment are labeled as required by 10 CFR 20.203.

Surveys

9. Contamination surveys are performed by Dr. Moyer's technician and are conducted such that all areas in which radioisotopes are handled are covered at least once a month. Samples are evaluated on ~~an alpha~~-flow proportional counting system. Moyer stated that if any samples indicate levels of activity of above 100 dpm/100 cm² decontamination is required. Records were examined and it was noted that all surveys have indicated

~~and~~ contamination levels of less than 100 dpm/100 cm².

10. Air samples are also conducted monthly in the labs which Uranium is handled. Samples are pulled for at least an hour and are evaluated for alpha. It was noted that all samples have been evaluated at less than 10⁻¹² uc/cc.
11. Moyer stated that occasionally instrument surveys are conducted to determine dose rates in unrestricted areas. It was noted that all levels of activity have been less than .5 mr/hr. Moyer stated that byproduct material authorized under License e-1 has not been handled at all lately. It was noted that all material possessed under this license is currently stored in a safe in Dr. Moyer's laboratory. The safe is locked, Dr. Moyer retains the key, and the safe and all containers therein are labeled, as per 20.203. Surveys are conducted with a gm survey meter which is calibrated at least annually, according to Dr. Moyer.

Waste Disposal

12. Dr. Moyer stated that disposal of waste has occurred in several different ways. Waste has been incinerated on two occasions, 100 uc C-14 was incinerated in April 1962 and 44 uc was incinerated July 1963. Each of these incinerations was authorized by specific license application. Procedures were discussed and it was determined that they were in accord with the licensee's applications. Burial took place on one occasion, according to Dr. Moyer. ^{Sh}.16 mc ~~as~~ ^{Sh} C-14 was buried in April 1965. It was noted that burial procedures were in accord with those specified by 10 CFR 20.204.
13. One shipment of solid waste ^{Sh} ~~is~~ ^{Sh} taken place was sent to Radiological Services Co., Valley Stream, New York. It was in July 1963, the shipment consisted of 7.38 mc C-14, 3.5 c H-3, 1 mc Fe-59. No other transfer of waste has taken place.
14. Moyer stated that on two occasions small analytical samples have been disposed of down the sink. In July 1963 .12 mc C-14 was released to

sewerage and 1.05 mc H-3 in the same month was released to the sanitary sewerage system. No other occasions of release of radioactivity via sanitary sewerage system have occurred, according to Moyer.

Personnel Monitoring

15. Film badges are provided by Tracerlab and are changed every week. Badges are provided only for those people handling byproduct material and not for those not handling uranium. It was noted that all people on the film badge program or approximately 10 people have not received an excess of 50 mrem in any year. It was noted that exposure records have been maintained on form AEC-5.

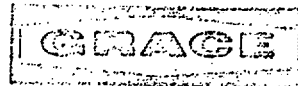
Posting and Labeling

15. ~~It~~ is noted in the preceding paragraphs no posting and labeling deficiencies were noted during the course of the inspection. It was noted that form AEC-3 is posted in all the laboratory areas in which radioactive material is handled.

W. R. GRACE & CO.

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029



October 5, 1967

For Div. of Compliance

Mr. Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Materials Licensing
United States Atomic Energy Commission
Washington, D. C. 20545


Re: DML:ND, 70-456
Subject: Special Nuclear Materials License SNM - 840

Dear Mr. Nussbaumer:

Enclosed please find four (4) copies of our application for renewal and amendment of Special Nuclear Material License SNM - 840. The renewal covers possession and use of 1 kilogram of Uranium-235, and the amendment covers possession and use of 25 grams of plutonium.

If you have any questions regarding this application, please let me know.

Yours very truly,


Adrian M. Cammill
Security Officer

AMG:mn

Enclosures



ITEM # 195

8/194

W. R. GRACE & CO.

RESEARCH DIVISION

GRACE

Washington Research Center, Clarksville, Maryland 21029

October 30, 1967

Mr. Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Materials Licensing
United States Atomic Energy Commission
Washington, D.C. 20545

~~EXTRA~~
Compliance

Re: DML:ND, 70-456
Subject: Special Nuclear Materials License SNM - 840

Dear Mr. Nussbaumer:

Please replace Pages 6, 7, 9, 15, 24, 25, 26, 27, and 36 of our APPLICATION FOR RENEWAL AND AMENDMENT OF SPECIAL NUCLEAR MATERIALS LICENSE SNM - 840, dated October 4, 1967, with the attached Pages 6, 7, 7A, 9, 15, 24, 25, 25A, 26, 27, and 36. These changes and clarifications are a result of the discussions with Messrs. Layfield and Rouse on October 20, 1967.

OK *ad*
11-22-67

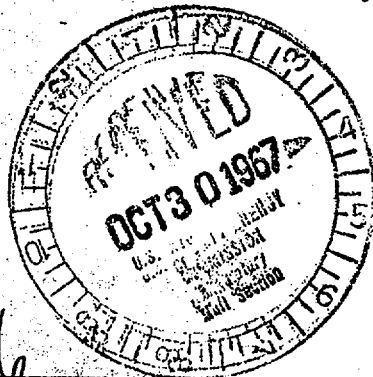
If you have any further questions regarding this application, please contact the undersigned.

Yours very truly,

Adrian M. Gammill
Adrian M. Gammill
Security Officer

AMG:mtn

Enclosures



Co. I

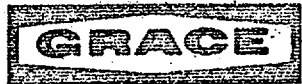
6/195

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2092

ITEM # 196

W. R. GRACE & CO.



RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

November 15, 1967

Mr. Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Materials Licensing
United States Atomic Energy Commission
Washington, D.C. 20545

EXTRA

Subject: SNM 840
Docket No. 70-456

Dear Mr. Nussbaumer:

Two sections in our Application for Renewal and Amendment of Special Nuclear Material License SNM-840 dated October 4, 1967, and amended on October 30, 1967, need some additional explanations and comments. These are detailed below and made a part of subject license application.

Pages 8 and 9. Please delete the information starting with the last sentence on Page 8 and continuing to the end of the first paragraph on Page 9. The following is to be substituted for this deleted material:

An inert gas supply is available for atmosphere control in any box when necessary. The inert gas use will be intermittent as required for quality control of the material being processed in the glove boxes. The gas supply will be adjusted manually at supply bottles which are located outside the boxes. In order to insure proper operation of the inert gas supply, strict administrative controls will be exercised at all times as discussed below. The inert gas will not be used unless someone is present at all times; therefore, overnight operation of the inert gas supply will be permitted only if an operator is present. In the event of failure of the exhaust system or other causes which could result in overpressure in the boxes, the inert gas system will be shut down immediately. This instruction will be posted as part of the emergency shut-down procedures in the laboratory. All gas cylinders will be equipped with reducing valves and pressure gauges to eliminate overpressures that might be caused by sudden surges with a direct connection. The needle valve on the

on correction made
on pages 12/11/67
(ed)

ITEM # 197

Co: I

3783

Mr. Donald A. Nussbaumer
November 15, 1967
Page Two


reducer will eliminate the possibility of sudden pressure increases.

Each box also has a coupling for a fire extinguisher for emergency uses. Three boxes will be equipped with fire extinguishers at present and one of these is the large furnace box.

Page 36. On Page 36, beginning with the second line "Puncture wounds suspected to contain plutonium..." and continuing to the end of the first paragraph should be removed and placed on Page 31 at the end of the first paragraph under IV. Medical. This reference is to plutonium and, therefore, should be under the medical section dealing with plutonium.

If you have any further questions regarding this application, please let me know.

Yours very truly,


A. M. Gammill
Security Officer

AMG:mtn

COPY

Form AEC-401
(1-66)UNITED STATES
ATOMIC ENERGY COMMISSION

SPECIAL NUCLEAR MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 70, "Special Nuclear Material Regulations," a license is hereby issued authorizing the licensee to receive and possess the special nuclear material designated below; to use such special nuclear material for the purpose(s) and at the place(s) designated below; and to transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 70.32(a) of said regulations, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

| | | |
|---|---|---|
| Licensee

1. Name W. R. Grace & Company
Research Division
2. Address Washington Research Center
Clarksville, Maryland 21029 | | 3. License No.

SNM-840
4. Expiration Date

November 30, 1972
5. Docket No.

70-456 |
| 6. Special Nuclear Material

Plutonium; and uranium enriched
in the U-235 isotope | 7. Maximum quantity of special nuclear material
which licensee may possess at any one time
under this license

Plutonium: Twenty-five (25) grams
U-235: One (1) kilogram | |
| 8. Authorized use
For use in accordance with the statements, representations and conditions
specified in the licensee's application dated October 5, 1967, and supple-
ments dated October 30 and November 15, 1967. | | |
| 9. Quantity of special nuclear material allocated to licensee pursuant to Section 70.31(b) of said part
- - - - - | | |

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.
11. The licensee is hereby exempted from the requirements of Section 70.24, 10 CFR 70, insofar as this Section applies to the material held under this license.
12. The licensee shall comply with the attached radioactivity contamination limits.

For the U. S. ATOMIC ENERGY COMMISSION

Date of issuance DEC 6 1967

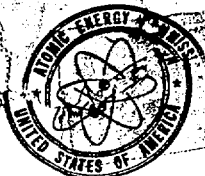
* U. S. GOVERNMENT PRINTING OFFICE : 1962 O - 632574

Robert L. Layfield
Division of Materials Licensing

ITEM # 198

COPY

6/197



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

IN REPLY REFER TO:

ENC-112
70-436

DEC 6 1967

W. E. Grace and Company
Research Division
Washington Research Center
Charlottesville, Maryland 21039

Attention: Dr. Adrian M. Gammill
Security Officer

Gentlemen:

Revised in Special Nuclear Material License No. SNM-840, as renewed. As requested, we have also amended your license to authorize the possession and use of 25 grams of plutonium for nuclear fuel development activities.

Please note the contamination limits attached to your license. These limits were agreed upon by your Mr. Gammill during a telephone conversation with Mr. Layfield of this office on December 1, 1967. These limits are applicable to unrestricted areas and for the release of material and equipment from your uranium and plutonium laboratories in line of the limits specified for such surveys on page 25 of your application dated October 30, 1967.

DISTRIBUTION:

Document Room, w/encl.
State Health, license only
Compliance, Regs. (2)
H. J. McAluff, CHCO, w/encl.
D. L. Crovson, SSM, w/encl.
H. Douglas, DML, w/encl.
Subject file, w/encl.
Br. reading file, w/encl.
Div. reading file, w/o encl.

Sincerely yours,

Robert L. Layfield
Source & Special Nuclear Materials
Branch
Division of Materials Licensing

Enclosure:
License No. SNM-840

12/198
ITEM # 199

COPY

COPY

EXHIBIT B

January 6, 1959

R. M. Mandle

FILES

Survey of Plant for St. John X-Ray Lab

| | |
|----------------------------|---------------|
| Monazite Storage area | 2-10 mr/hr |
| Ball Mill area | 1 mr/hr |
| Monazite transfer drums | 3 mr/hr |
| Centrifuge and Press #5 | 1-2 mr/hr |
| Barrels stored by tank #31 | 1-2 mr/hr |
| Crystal Dissolve Tank | 1 mr/hr |
| Tank #1 | 1 mr/hr |
| Tank #2 | 1 mr/hr |
| Tank #3 | 0.5-1mr/hr |
| Tank #4-5 | 0.1-0.2 mr/hr |
| Packing room | 0.2-0.3 mr/hr |
| WTP near Press | 0.5 mr/hr |

Dr. Isenberger - Califed 49

Badges - 150 for \$85.00 - Send holders and film. Enter numbers on reports and return them to St. John. They process and notify. We keep film and reports.

New AEC regulations require a 13 week accumulation. Mr. Isenberger suggests we purchase and load two films and keep one of them in for 13 week period.

Holders \$1.50 each.

R.M.M.

MEB:l

ITEM # 148

COPY

COPY

EXHIBIT C

Survey of Plant
(New batteries installed in Geiger Counter)

| | |
|---|-----------|
| Control Lab | 0.15 |
| Sample-Thorite | 6 |
| Sample - Indian Sand | 2.5 |
| Sample - Idaho Sand | 1.0 |
| Area between office and lab | 0.15 |
| Background in front of plant | 0.1 - 0.3 |
| Sump in front Th shed | 0.5 |
| Barrels along fence | 3.5 - 5 |
| Barrels near Milling Bldg. | 3.5 - 5 |
| Monazite Storage | 6 |
| Th(OH) ₃ under Whitney Press | 8 |

ENG. FILE

This document consists of 3 pages
No. 3 of 15 copies, Series A.

CONTRACT NO. AT(30-1)-1037, Amend. No. 1

AMENDMENT NO. 1

CONTRACTOR:
ADDRESS:

RARE EARTHS, INC.
Paterson R. D. #1, New Jersey

AMENDMENT FOR:

EXTENSION OF CONTRACT TERM

INCREASE IN COMMISSION OBLIGATION: \$30,000.00

NEW TOTAL CONTRACT PRICE: \$52,500.00

PAYMENT TO BE MADE BY:

Division of Disbursement, United
States Treasury Department, New
York, New York. Submit invoices to:
United States Atomic Energy Commission,
P. O. Box 30, Ansonia Station,
New York 23, New York

JUN 29 1951

ITEM # 149

77

THIS AMENDMENT, entered into as of the 18th day of June, 1951, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), represented by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter referred to as the "Commission"), and RARE EARTHS, INC. (hereinafter referred to as the "Contractor"),

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT(30-1)-1037 as of the 2nd day of November, 1950, for the purchase and sale of thorium oxide in the form of thorium fluoride sludge; and

WHEREAS, the Commission desires to purchase such material subsequent to June 30, 1951; and

WHEREAS, this Amendment is authorized by law, including the Atomic Energy Act of 1946;

NOW, THEREFORE, said Contract No. AT(30-1)-1037 is hereby amended, but only as follows:

1. Effective as of July 1, 1951, paragraph 1 of Article I, SCOPE OF THE WORK, is changed to read as follows:

"1. The Government agrees to purchase up to 18,000 pounds of thorium oxide in the form of thorium fluoride sludge conforming to the specifications set forth in Article II of this contract, produced and delivered by the Contractor during the period from July 1, 1950 to and including June 30, 1951, and up to 24,000 pounds of such material produced and delivered by the Contractor during the period from July 1, 1951 to and including June 30, 1952, at the unit price of One Dollar and Twenty-Five Cents (\$1.25) per pound of contained thorium oxide."

2. Substitute the date "June 30, 1952" for the date "June 30, 1951" appearing in paragraph 2 of Article III, captioned DELIVERY AND SHIPMENT.

IN WITNESS WHEREOF, the parties hereto have executed this Amendment as of the day and year first above written.

UNITED STATES OF AMERICA

By: UNITED STATES ATOMIC ENERGY COMMISSION

J. C. Clarke
J. C. Clarke
Authorized Representative of the
U. S. Atomic Energy Commission

Witnesses:

Richard L. Stone
Richard L. Stone
9 Bartholf Ave., Pompton
(Address) Lakes, NJ

Robert H. Moore
Robert Moore
126 Pine St.
(Address)
Pompton Lakes, N.J.

RARE EARTHS, INC.

By: Henry H. Mandle
Title: President

I, Richard M. Mandle, certify that I am the Ass't Sec'y of the corporation named as Contractor herein; that Henry H. Mandle who signed this amendment on behalf of the Contractor was then President of said corporation; that said amendment was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

IN WITNESS WHEREOF, I have hereunto affixed my hand and the seal of said corporation.

(Corporate Seal)

Richard M. Mandle
Richard M Mandle

This document consists of 3 pages
No. 2 of 11 copies, Series A

CONTRACT NO. AT(30-1)-1037, Amend. No. 2

AMENDMENT NO. 2

CONTRACTOR AND ADDRESS:

RARE EARTHS, INC.
Paterson R. D. #1, New Jersey

AMENDMENT FOR:

CHANGE IN SPECIFICATIONS

Encl 1

THIS AMENDMENT, entered into as of the 30th day of November, 1951, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), as represented by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter referred to as the "Commission"), and RARE EARTHS, INC. (hereinafter referred to as the "Contractor"),

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT(30-1)-1037 as of the 2nd day of November, 1950, for the purchase and sale of thorium oxide in the form of thorium flouride sludge; and

WHEREAS, the Government and the Contractor desire to amend this contract to change the specifications therefor; and

WHEREAS, this amendment is authorized by law, including the Atomic Energy Act of 1946;

NOW, THEREFORE, Contract No. AT(30-1)-1037, as heretofore amended, is hereby further amended as follows:

1. Delete Article II and substitute the following therefor:

"ARTICLE II - SPECIFICATIONS

The sludge delivered hereunder shall contain not less than forty-seven and one-half per cent ($47\frac{1}{2}\%$) thorium oxide on an as-received basis and not more than ten per cent (10%) water; provided, however, that in the event that any lot or lots do not meet such specifications, the Commission may, in its discretion, accept such lot or lots at any appropriate reduction in the price as may be agreed upon by the parties. The Contractor shall endeavor in good faith, but shall not be so obligated, to increase the thorium oxide content of the sludge to $52\frac{1}{2}\%$ - $57\frac{1}{2}\%$ on an as-received basis and to decrease the water content thereof to five per cent (5%) or less."

2. Delete Article XIII, COVENANT AGAINST CONTINGENT FEES, and Article XV, EIGHT-HOUR LAW, and substitute the following therefor:

"ARTICLE XIII - COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration the full amount of such commission, percentage, brokerage, or contingent fee.

"ARTICLE XV - EIGHT-HOUR LAW

No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the Contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight hours in any one calendar day upon such work, except upon the condition that compensation is paid to such laborer or mechanic in accordance with the provisions of this article of the contract. The wages of every laborer and mechanic employed by the Contractor or any subcontractor engaged in the performance of this contract shall be computed on a basic day rate of eight hours per day and work in excess of eight hours per day is permitted only upon the condition that every such laborer and mechanic shall be compensated for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay. For each violation of the requirements of this article of the contract, a penalty of five dollars (\$5.00) shall be imposed upon the Contractor for each laborer or mechanic for every calendar day in which such employee is required or permitted to labor more than eight hours upon said work without receiving compensation computed in accordance with this article of the contract, and all penalties thus imposed shall be withheld for the use and benefit of the Government: Provided, That this stipulation shall be subject in all respects to the exceptions and provisions of the Eight Hour Laws as set forth in U. S. Code, Title 40, Sections 321, 324, 325, 325a, and 326, which relate to hours of labor and compensation for overtime."

IN WITNESS WHEREOF, the parties hereto have executed this Amendment as of the day and year first above written.

UNITED STATES OF AMERICA

Witnesses:

Hilda May Breen
Hilda May Breen
Box 196, R.D. 4, Paterson, N.J.
(Address)

Venita S. Benesh
Venita S. Benesh
21 Pearl St., Bloomingdale, N.J.
(Address)

BY: UNITED STATES ATOMIC ENERGY COMMISSION

H. B. Fry
H. B. FRY
AUTHORIZED REPRESENTATIVE OF THE
U. S. ATOMIC ENERGY COMMISSION
RARE EARTHS, INC.

By: Richard L. Stone
Richard L. Stone
Title: Vice-President

I, Richard M. Mandle, certify that I am the Assistant Secretary of the corporation named as Contractor herein; that Richard L. Stone who signed this amendment on behalf of the Contractor was then Vice-President of said corporation; that said amendment was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

IN WITNESS WHEREOF, I have hereunto affixed my hand and the seal of said corporation.

(Corporate Seal)

Richard M. Mandle
Richard M. Mandle, Assistant Secretary

This document consists of 6 pages.
No. 3 of // copies. Series Q.

Loggert 7/24/52 HMB

CONTRACT No. AT(30-1)-1037.

File - AEC - Sales

AMENDMENT No. 3

CONTRACTOR AND ADDRESS:

RARE EARTHS, INC.,
Paterson R. D. #1, New Jersey.

AMENDMENT FOR:

EXTENSION OF CONTRACT TERM.

INCREASE IN COMMISSION
OBLIGATION:

\$32,400.00

TOTAL COMMISSION OBLIGATION:

\$84,900.00

PAYMENT TO BE MADE BY:

Division of Disbursement,
United States Treasury Department,
New York, New York.
Submit invoices to:
United States Atomic Energy Commission,
P. O. Box 30 - Ansonia Station,
New York 23, New York.

CONTRACT No. AT(30-1)-1037, Amend. No. 3.

THIS AMENDMENT, entered into the 26th day of June, 1952, by and between THE UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), acting through the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter referred to as the "Commission"), and RARE EARTHS, INC. (hereinafter referred to as the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT(30-1)-1037 the 2nd day of November, 1950, for the furnishing and delivering of certain materials; and

WHEREAS, this contract has heretofore been amended and the parties hereto desire to further amend this contract, as hereinafter provided; and

WHEREAS, this Amendment is authorized by law, including the Atomic Energy Act of 1946;

NOW, THEREFORE, said Contract No. AT(30-1)-1037, as heretofore amended, is hereby further amended but only as follows:

1. Effective July 1, 1952, paragraph 2 of Article I is changed to read as follows:

"2. The Contractor agrees to sell and the Government agrees to buy, in the form of thorium fluoride sludge, all of the thorium oxide produced by the Contractor during the period commencing July 1, 1952, and continuing through and including June 30, 1953, at a price of One Dollar and Thirty-Five Cents (\$1.35) per pound of contained thorium oxide; provided, that the quantity of such thorium oxide shall not exceed twenty-four thousand (24,000) pounds; and provided, further, that said thorium oxide shall conform to the specifications set forth in Article III hereof."

2. In paragraph 2 of Article III, the date "June 30, 1952" is changed to "June 30, 1953."

3. Effective July 1, 1952, Article IX is changed to read as follows:

"ARTICLE IX - DISCLOSURE OF INFORMATION

1. It is understood that unauthorized disclosure of any, or failure to safeguard all, material marked as 'Security Information' that may come to the Contractor, or any person under its control, in connection with the work under this contract may subject the Contractor, its agents, and employees to

criminal liability under the laws of the United States. See the Atomic Energy Act of 1946 (Public Law 585 - 79th Congress). See also Title 18, United States Code, Secs. 5 and 11, Secs. 791 to 797, both inclusive, Secs. 2381 to 2390, both inclusive, and Sec. 3241; Title 50, United States Code, Secs. 40 and 42.

2. The Contractor agrees to conform to all security regulations and requirements of the Commission. Except as the Commission may authorize, in accordance with the Atomic Energy Act of 1946, as amended, the Contractor shall not permit any individual to have access to restricted data until the designated investigating agency shall have made an investigation and report to the Commission on the character, associations, and loyalty of such individual, and the Commission shall have determined that permitting such person to have access to restricted data will not endanger the common defense and security. As used in this paragraph the term 'designated investigating agency' means the United States Civil Service Commission or the Federal Bureau of Investigation, or both, as determined pursuant to the provisions of the Atomic Energy Act of 1946, as amended by the Act of April 5, 1952, Public Law 298, 82nd Congress, 66 Stat. 43. The term 'restricted data' as used in this paragraph means all data concerning the manufacture or utilization of atomic weapons, the production of fissionable material, or the use of fissionable material in the production of power, but shall not include any data which the Commission from time to time determines may be published without adversely affecting the common defense and security.

3. Except as otherwise authorized in writing by the Commission, the Contractor shall insert in all agreements, made pursuant to the provisions of this contract which may involve security information, the provisions of paragraphs 1 and 2 of this Article."

4. Effective July 1, 1952, Article XV is changed to read as follows:

"ARTICLE XV - EIGHT-HOUR LAW

No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the Contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight hours in any one calendar day upon such work, except upon the condition that compensation is paid to such laborer or mechanic in accordance with the provisions of this Article of the contract. The wages of every laborer and mechanic employed by the Contractor or any subcontractor engaged in the performance of this contract

shall be computed on a basic day rate of eight hours per day in excess of eight hours per day is permitted only upon the condition that every such laborer and mechanic shall be compensated for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay. For each violation of the requirements of this Article of the contract a penalty of five dollars shall be imposed upon the Contractor for each laborer or mechanic for every calendar day in which such employee is required or permitted to labor more than eight hours upon said work without receiving compensation computed in accordance with this Article of the contract, and all penalties thus imposed shall be withheld for the use and benefit of the Government: Provided, that this stipulation shall be subject in all respects to the exceptions and provisions of the Eight-Hour laws as set forth in United States Code, Title 40, Secs. 321, 324, 325, 325a, and 326, which relate to hours of labor and compensation for overtime."

5. The following Articles are hereby added to the contract:

"ARTICLE XVII - CONVICT LABOR

In connection with the performance of this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment at hard labor. This provision shall not be construed to prevent the Contractor or any subcontractor from obtaining any of the supplies or any component parts or ingredients to be furnished under this contract or any of the materials or supplies to be used in connection with the performance of this contract, directly or indirectly, from any Federal, state, or territorial prison or prison industry, provided, that such articles, materials, or supplies are not produced pursuant to any contract or other arrangements under which prison labor is hired or employed or used by any private person, firm, or corporation.

"ARTICLE XVIII - DOMESTIC ARTICLES

Unless the Commission shall determine it to be inconsistent with the public interest, or the cost to be unreasonable, only such unmanufactured articles, materials, and supplies as have been mined or produced in the United States, and only such manufactured articles, materials, and supplies as have been manufactured in the United States substantially all from articles, materials, or supplies mined, produced, or manufactured, as the case may be, in the United States shall be acquired in furtherance of the work of this contract. The provisions of this Article shall not apply with respect to articles, materials, or supplies for use outside the United States, or if articles, materials, or

supplies of the class or kind to be used, or the articles, materials, or supplies from which they are manufactured are not mined, produced or manufactured, as the case may be, in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality.

"ARTICLE XIX - RENEGOTIATION

1. This contract shall be deemed to contain all the provisions required by Section 104 of the Renegotiation Act of 1951 (Public Law 9, 82d Congress).

2. The Contractor agrees to insert the provisions of this Article, including this paragraph 2 in all subcontracts, specified in Section 103(g) of the Renegotiation Act of 1951; provided, that the Contractor shall not be required to insert the provisions of this Article in any subcontract exempted by or pursuant to Section 106 of the Renegotiation Act of 1951."

IN WITNESS WHEREOF, the parties hereto have executed this Amendment the day and year first above written.

THE UNITED STATES OF AMERICA

By: UNITED STATES ATOMIC ENERGY COMMISSION

H. B. Fry
H. B. FRY

AUTHORIZED REPRESENTATIVE OF THE
U. S. ATOMIC ENERGY COMMISSION

Witnesses:

Ruth Teuk
Pulis Avenue
Franklin Lakes, N. J.

Heidi H. Bree
Box 496C, R. D. 4
Paterson, N. J.

RARE EARTHS, INC.

By: Richard J. Stone

Title: Vice President

I, RICHARD M. MANDLE, certify that I am the Assistant Secretary of the corporation named as Contractor herein; that Richard L. Stone who signed this Amendment on behalf of the Contractor was then Vice-President of said corporation; that said Amendment was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

IN WITNESS WHEREOF, I have hereunto affixed my hand and the seal of said corporation.


Richard M. Mandle

(Corporate Seal)

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31 Pages
Appendix 7
This document consists of 25
pages. No. 7 of 11. Series A.

49-6
CONTRACT NO. AT(29-6)-993

THIS CONTRACT, entered into this 18th day of July, 1955, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government") as represented by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission") and RARE EARTHS, INC., a corporation organized under the laws of the State of New Jersey (hereinafter called the "Contractor").

WITNESSETH THAT:

WHEREAS, the Government desires to have the Contractor perform certain work and services as hereinafter provided; and

WHEREAS, the Contractor is willing to install the facilities to perform this work and to furnish the services upon the terms and conditions hereinafter stated; and

WHEREAS, this contract is authorized by law, including the Atomic Energy Act of 1954;

NOW, THEREFORE, the parties hereto do mutually agree as follows:

ARTICLE I - SCOPE OF THE WORK

- (1) The Commission agrees to deliver to the Contractor f.o.b. cars or trucks at a plant in Sewaren, New Jersey, or a plant in Baltimore, Maryland, designated by the Contractor, approximately 7,900 short tons of monazite at the rate of approximately 600 tons per month, beginning seven months after the first day of the month following the execution of the contract by the Commission, or such earlier date as is mutually agreeable to the Contractor and the Commission. In the event of delay in any delivery of monazite the Commission shall, if requested by the Contractor, make a determination of the delay occasioned the Contractor thereby and shall grant to the Contractor a reasonable extension of time in respect of performance of this contract.

The Government shall not be liable to the Contractor for damages or loss of profit by reason of any delay in delivery of monazite, except that in case of such delay, upon the written request of the Contractor an equitable adjustment shall be made in the delivery dates, or price or both, and in any other contractual provision affected thereby, in accordance with the procedures provided for in the article entitled "Changes."

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It is mutually agreed by the Commission and the Contractor that this contract is entered into on the assumption that the total amount of all monazite delivered by the Commission will contain the average ThO_2 content and the average Rare Earth Oxide content set forth in Appendix A and that in the event the average ThO_2 content and/or the average Rare Earth Oxide content of such monazite is less than the averages set forth in Appendix A an equitable adjustment will be made in the provisions of this contract relating to deliveries by the Contractor, guaranteed recoveries, and deductions for failure to deliver guaranteed recoveries. It is agreed that any containers used in furnishing monazite to the Contractor are, and shall remain, the property of the Government. The Contractor agrees to dispose of such containers as directed by the Contracting Officer. In the event that no instructions are received from the Contracting Officer within sixty (60) days of the date that each container is emptied, the Contractor may so advise the Commission and the Commission shall have 10 days to direct the disposition of the containers. If directions are not issued within this 10-day period, it shall be assumed that the containers have been abandoned and title to such containers shall pass to the Contractor.

- (2) The Contractor agrees to produce from the monazite furnished by the Commission crude thorium hydroxide and rare earths sodium sulfate conforming to the specifications set forth in Appendices C-3 and D-3 and to the guaranteed recoveries set forth in Article II - Specifications and Recovery.
- (3) The Contractor agrees to deliver the crude thorium hydroxide and rare earths sodium sulfate f.o.b. cars or trucks Contractor's plant where the monazite has been processed. Shipments shall be made by the Contractor in accordance with instructions of the Contracting Officer. Commission undertakes to give to Contractor shipping instructions at least one month in advance of anticipated deliveries of which it has been notified in writing. Unless otherwise authorized by the Contracting Officer crude thorium hydroxide shall be delivered in 44-gallon fibre drums with aluminum foil barrier construction to be in accordance with Consolidated Freight Classification 300 lb. net weight limit for shipment of thorium hydroxide, and rare earths sodium sulfate shall be delivered in 55-gallon steel drums meeting the following specifications: at least 18 gauge steel; full open head; bolted ring-type cover; corrosion resistant inner coating. The Contractor shall furnish all containers. Deliveries by the Contractor shall be commenced as early as practicable (but in no event later than the first day of the month which is twelve months after the first day of the month following execution of this contract by the Commission) and shall be continued in an approximately uniform manner, with final delivery not later than the date which is thirty months from the date which is the first day of the month following the execution of this contract by the Commission.

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- (4) For each short ton of monazite processed by the Contractor, the Commission agrees to pay the Contractor \$415.27 minus any adjustments as provided in the article of this contract entitled "Payments."
- (5) The Commission reserves the right to deliver to the Contractor prior to the first day of the month which is twenty-four months following the execution of this contract by the Commission up to 1,000 short tons of monazite in addition to that described in subsection 1 of this Article, and the Contractor agrees to process such additional monazite in accordance with the terms and conditions of this contract, except that the price is to be agreed upon; provided such monazite is received prior to such time.

ARTICLE II - SPECIFICATIONS AND RECOVERY

- (1) The crude thorium hydroxide delivered by the Contractor shall conform to the specifications set forth in Appendix D-3.
- (2) The Contractor agrees to recover and deliver as crude thorium hydroxide conforming to the specifications set forth in Appendix D-3 at least 95% of all the ThO_2 contained in the total amount of monazite furnished the Contractor, as determined pursuant to this contract and its appendices. The Contractor, at its option, may supplement the crude thorium hydroxide recovered from the monazite delivered by the Commission with crude thorium hydroxide obtained from other sources in order to deliver the percentage required by this section (2).
- (3) The rare earths sodium sulfate delivered by the Contractor shall conform to the specifications and the symbolic formula set forth in Appendix C-3.
- (4) The Contractor agrees to recover and deliver as rare earths sodium sulfate conforming to the specifications set forth in Appendix C-3 at least 95% of all the rare earths oxide contained in the total amount of monazite furnished the Contractor, as determined pursuant to this contract and its appendices. The Contractor, at its option, may supplement the rare earths sodium sulfate recovered from the monazite delivered by the Commission with rare earths sodium sulfate obtained from other sources in order to deliver the percentage required by this section (4).
- (5) If the Contractor recovers and delivers less than 85% of the rare earths oxide contained in the total amount of monazite furnished the Contractor, as determined pursuant to this Contract and its appendices,

The Contractor agrees to obtain from sources other than the Commission and deliver to the Commission sufficient rare earths sodium sulfate conforming to the specifications set forth in Appendix C-3 to make deliveries equal 85% of the rare earths oxide contained in the total amount of monazite furnished the Contractor, as determined pursuant to this contract and its appendices.

ARTICLE III - WEIGHING, SAMPLING AND ANALYSING

- (1) All monazite, crude thorium hydroxide and rare earths sodium sulfate delivered under this contract shall be weighed, sampled, analysed and the moisture content determined in accordance with the methods set forth in the appendices to this contract, or in accordance with method mutually agreeable to the Commission and the Contractor, and at the expense of the Contractor except as otherwise provided in the appendices to this contract.
- (2) Unless otherwise authorized by the Contracting Officer all weighing and sampling of monazite, crude thorium hydroxide and rare earths sodium sulfate shall be performed in the presence of a duly authorized representative of the Commission.

ARTICLE IV - PAYMENTS

- (1) Each month (following a month when monazite is processed) the Contractor shall submit a properly certified invoice for monazite, processing of which was completed during the preceding month. A provisional payment, at the rate stipulated in Article I, of ninety percent (90%) of each properly certified invoice shall be made upon receipt of each invoice. After the amount withheld from such provisional payments equals \$100,000, future provisional payments at the rate stipulated in Article I, of one hundred percent (100%) of each properly certified invoice shall be made upon receipt of each invoice, except as provided in paragraph 2(d) of this article. The balance due, with adjustments as provided herein, shall be paid upon completion of deliveries required by this contract and upon completion of all weighing, sampling, moisture determination and analysis as provided in Article III hereof. Any overpayment, tentatively determined, or any overpayment, finally determined, shall be refunded forthwith by the Contractor or deducted from future payments as the Commission may direct.
- (2) Reports: Upon completion or termination of this contract, the Contractor shall submit with respect to performance during the entire contract period, a report on (i) the quantity of monazite processed, (ii) the ThO₂ and rare earths oxide content of monazite processed, as determined pursuant to the appendices of this contract, and (iii) the quantities of crude thorium hydroxide and rare earths sodium sulfate removed by processing monazite and delivered to the Commission. In addition to the above-described

report, the Contractor shall submit, three months after the first of the month following the first delivery of monazite to the Contractor and at the end of each succeeding three-month period, a report, on a cumulative basis from inception of the contract, furnishing similar information, adjusted for work in process at the end of the period covered.

(3) Adjustments:

(a) If upon completion of deliveries required by this contract the total quantity of ThO_2 contained in the crude thorium hydroxide delivered to the Commission is less than 95% of the total ThO_2 contained in the monazite delivered to the Contractor, a deduction will be made in accordance with the following schedule:

| <u>Percent of ThO_2 Content</u>
<u>of Monazite Recovered</u>
<u>in Crude Thorium</u>
<u>Hydroxide</u> | <u>Deduction Per Unrecovered</u>
<u>Pound of ThO_2 Under 95%</u>
<u>Contained in Monazite if</u>
<u>Less than 95% is Recovered</u> |
|--|---|
| Less than 95% but
not less than 94% | \$2.50 |
| Less than 94% but
not less than 93% | \$3.00 |
| Less than 93% but
not less than 92% | \$3.50 |
| Less than 92% but
not less than 91% | \$4.00 |
| Less than 91% but
not less than 90% | \$4.50 |
| Less than 90% | \$5.00 |

The deduction provided above shall be made from any amounts otherwise due the Contractor and if such deduction exceed the amounts due the Contractor, the Contractor shall forthwith pay the difference to the Commission.

(b) If upon completion of deliveries required by this contract the total quantity of rare earths oxide contained in the rare earths sodium sulfate delivered to the Commission is less than 95% of the total rare earths oxide contained in the monazite

delivered to the Contractor a deduction will be made in accordance with the following schedule:

| <u>Percent of Rare Earths
Oxide Content of Monazite
Recovered in Rare Earths
Sodium Sulfate</u> | <u>Deductions Per Unrecovered
Pound of Rare Earths Oxide
Under 95% contained in
Monazite if Less than 95%
is Recovered</u> |
|---|--|
| Less than 95% but
not less than 94% | \$0.05 |
| Less than 94% but
not less than 93% | \$0.10 |
| Less than 93% but
not less than 92% | \$0.15 |
| Less than 92% but
not less than 91% | \$0.20 |
| Less than 91% but
not less than 90% | \$0.25 |
| Less than 90% but
not less than 85% | \$0.50 |

The deduction provided above shall be made from any amounts otherwise due the Contractor and if such deduction exceeds the amounts due the Contractor, the Contractor shall forthwith pay the difference to the Commission.

(c) In the event that any product delivered hereunder does not meet the specifications set forth in Appendices C-3 or D-3 of this contract the Commission may, in its discretion, accept such product at an appropriate reduction in price as may be agreed upon by the parties. If the parties fail to agree upon an appropriate reduction in price the Commission shall determine an appropriate reduction in price subject to the right of appeal by the Contractor pursuant to the article entitled "Disputes." The Commission shall pay promptly 90% of the price determined by it, which shall be on account of any price finally determined in the event of an appeal by the Contractor.

ARTICLE V - CHANGES

The Contracting Officer may at any time, by a written order, make changes in the general scope of this contract, in any one or more of the following: (i) method of shipment or packing; and (ii) place of delivery. If any such change causes an increase or decrease in the cost of, or the time required for, performance of this contract, an equitable adjustment shall be made promptly in the contract price or delivery schedule, or both, and the contract shall be modified in writing accordingly. Any claim by the Contractor for adjustment under this clause must be asserted within

30 days from the date of receipt by the Contractor of the notification of change; Provided, however, That the Contracting Officer, if he decides that the facts justify such action, may receive and act upon any such claim asserted at any time prior to final payment under this contract. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the article of this contract entitled "Disputes." However, nothing in this article shall excuse the Contractor from proceeding with the contract as changed.

ARTICLE VI - DISPUTES

Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. Within 30 days from the date of receipt of such copy, the Contractor may appeal by mailing or otherwise furnishing to the Contracting Officer a written appeal addressed to the Commission, and the decision of the Commission shall, unless determined by a court of competent jurisdiction to have been fraudulent, arbitrary, capricious, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence, be final and conclusive: Provided, That, if no such appeal to the Commission is taken, the decision of the Contracting Officer shall be final and conclusive. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

ARTICLE VII - ASSIGNMENT

- (1) Subject to section (2) of this article, neither this contract nor any interest therein nor claim thereunder shall be assigned or transferred by the Contractor, except as expressly authorized in writing by the Contracting Officer.
- (2) Pursuant to the provisions of the Assignment of Claims Act of 1940 (31 U. S. Code 203, 41 U. S. Code 15), if this contract provides for payments aggregating \$1,000 or more, claims for moneys due or to become due the Contractor from the Government under this contract may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment shall cover all amounts payable under this contract and not already paid, and shall not be made to more than one party,

except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Notwithstanding any provision of this contract, payment to an assignee of any claim under this contract shall not be subject to reduction or set-off, to the extent provided in said Act as amended.

ARTICLE VIII - EXAMINATION OF RECORDS

- (1) The Contractor agrees that the Commission and the Comptroller General of the United States or any of their duly authorized representatives shall have access to and the right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this contract until the expiration of three years after final payment under this contract unless the Commission authorize their prior disposition.
- (2) The Contractor further agrees to include in all his sub-contracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor involving transactions related to the sub-contract until the expiration of three years after final payment under this contract unless the Commission authorize their prior disposition. The term "subcontract" as used herein means any purchase order or agreement to perform all or any part of the work or to make or furnish any materials required for the performance of this contract, but does not include (i) purchase orders not exceeding \$1,000, (ii) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public, or (iii) subcontracts or purchase orders for general inventory items not specifically identifiable with the work under this contract.
- (3) Nothing in this contract shall be deemed to preclude an audit by the General Accounting Office of any transaction under this contract.

ARTICLE IX - INSPECTION OF CONTRACTOR'S ACTIVITIES, REPORTS

- (1) The Commission shall have the right to inspect at reasonable times all activities of the Contractor arising in the course of the work under this contract.
- (2) The Contractor shall make such reports to the Commission with respect to the Contractor's activities under this contract as the Commission may reasonably require from time to time.

ARTICLE X - SECURITY

- (1) Contractor's Duty to Safeguard Restricted Data and Other Classified Information. In the performance of the work under this contract the Contractor shall, in accordance with the Commission's security regulations and requirements, be responsible for safeguarding restricted data and other classified matter and protecting against sabotage, espionage, loss and theft, the classified documents, materials, equipment, processes, etc., as well as such other material of high intrinsic or strategic value as may be in the Contractor's possession in connection with performance of work under this contract. Except as otherwise expressly provided in the specifications the Contractor shall upon completion or termination of this contract transmit to the Commission any classified matter in the possession of the Contractor or any person under the Contractor's control in connection with performance of this contract.
- (2) Regulations. The Contractor agrees to conform to all security regulations and requirements of the Commission and the Commission agrees to reimburse the Contractor for all necessary and reasonable expenses incurred as a result of any changes in the security regulations and requirements relating to this contract.
- (3) Definition of Restricted Data. The term "Restricted Data," as used in this article, means all data concerning (1) design, manufacture or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category pursuant to section 142 of the Atomic Energy Act of 1954.
- (4) Security Clearance of Personnel. Except as the Commission may authorize, in accordance with the Atomic Energy Act of 1954, the Contractor shall not permit any individual to have access to Restricted Data until the designated investigating agency shall have made an investigation and report to the Commission on the character, associations, and loyalty of such individual and the Commission shall have determined that permitting such person to have access to Restricted Data will not endanger the common defense and security. As used in this paragraph, the term "designated investigating agency" means the United States Civil Service Commission or the Federal Bureau of Investigation, or both, as determined pursuant to the provisions of the Atomic Energy Act of 1954.
- (5) Criminal Liability. It is understood that disclosure of Restricted Data and other classified information relating to the work or services ordered hereunder to any person not entitled to receive it, or failure to safeguard any Restricted Data or any top secret,

secret, or confidential matter that may come to the Contractor or any person under the Contractor's control in connection with work under this contract, may subject the Contractor, his agents, employees, and subcontractors to criminal liability under the laws of the United States. (See the Atomic Energy Act of 1954, 68 Stat. 919. See also Title 18, U. S. C. Sec. 791-798 and Executive Order 10104 of February 1, 1950, 15 F.R. 597.)

- (6) Subcontracts and Purchase Orders. Except as otherwise authorized in writing by the Contracting Officer, the Contractor shall insert provisions similar to the foregoing in all subcontracts and purchase orders under this contract.

ARTICLE XI - SUBCONTRACTS

The Contractor shall not subcontract any part of the work it is obligated to perform under this contract except as authorized in writing by the Commission.

ARTICLE XII - LABOR

(1) Eight Hour Laws

This contract, to the extent that it is of a character specified in the Eight-Hour Law of 1912 as amended (40 U. S. Code 324-326) and is not covered by the Walsh-Healey Public Contracts Act (41 U. S. Code 35-45), is subject to the following provisions and exceptions of said Eight-Hour Law of 1912 as amended, and to all other provisions and exceptions of said Law:

No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the Contractor or any subcontractor contracting for any part of the said work, shall be required or permitted to work more than eight hours in any one calendar day upon such work, except upon the condition that compensation is paid to such laborer or mechanic in accordance with the provisions of this clause. The wages of every such laborer and mechanic employed by the Contractor or any subcontractor engages in the performance of this contract shall be computed on a basic day rate of eight hours per day; and work in excess of eight hours per day is permitted only upon the condition that every such laborer and mechanic shall be compensated for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay. For each violation of the requirement of this clause a penalty of five dollars shall be imposed upon the Contractor for each such laborer or mechanic for every calendar day in which such employee is required or permitted to labor more than eight hours upon said work without receiving compensation computed in accordance with this clause; and all penalties thus imposed shall be withheld for the use and benefit of the Government

(2) Walsh-Harley Public Contracts Act

To the extent that this contract is subject to the Walsh-Harley Public Contracts Act, as amended (41 U. S. Code 35-45), there are hereby incorporated by reference the representations and stipulations required by said Act and regulations issued thereunder by the Secretary of Labor, such representations and stipulations being subject to all applicable rulings and interpretations of the Secretary of Labor which are now or may hereafter be in effect.

(3) Convict Labor

In connection with the performance of work under this contract the Contractor shall not employ any person undergoing sentence of imprisonment at hard labor.

(4) Nondiscrimination

(a) In connection with the performance of work under this contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of race, religion, color, or national origin. The aforesaid provision shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of the non-discrimination clause.

(b) The Contractor further agrees to insert the provisions of section (4)(a) above in all subcontracts hereunder, except subcontracts for standard commercial supplies or raw materials.

ARTICLE XIII - PATENTS

- (1) Whenever any invention or discovery is made or conceived by the Contractor or its employees in the course of, in connection with, or under the terms of this contract, the Contractor shall furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed, and to determine the disposition of the title to and the rights under any application or patent that may result; provided, however, that the Contractor in any event, shall retain at least a sole (except as against the Government or its account), irrevocable, royalty-free license with the sole right

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to grant sublicenses, under said invention, discovery, application or patent, such license being limited to the manufacture, use, and sale for purposes other than use in the production or utilization of source material or values associated therewith, special nuclear material or atomic energy. Subject to the license retained by the Contractor, as provided in this paragraph, the judgment of the Commission on these matters shall be accepted as final; and the Contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.

- (2) No claim for pecuniary award or compensation under the provisions of the Atomic Energy Acts of 1946 and 1954 shall be asserted by the Contractor or its employees with respect to any invention or discovery made or conceived in the course of, in connection with, or under the terms of this contract.
- (3) Except as otherwise authorized in writing by the Commission the Contractor will obtain patent agreements to effectuate the purposes of paragraphs 1 and 2 of this article from all persons who perform any part of the work under this contract, except such clerical and manual labor personnel as will not have access to technical data.
- (4) Except as otherwise authorized in writing by the Commission, the Contractor will insert in all subcontracts provisions making this article applicable to the subcontractor and its employees.
- (5) Patent Indemnity

The Contractor agrees to indemnify the Government, its officers, agents, servants and employees against liability of any kind (including costs and expenses incurred) for the use of any invention or discovery and for the infringement of any Letters Patent (not including liability, arising pursuant to Section 183, Title 35, (1952) U.S. Code, prior to the issuance of Letters Patent) occurring in the performance of this contract.

ARTICLE XIV - TAXES

(1) Definitions

As used throughout this article, the following terms shall have the meanings set forth below:

- (a) The term "direct tax" means any tax or duty directly applicable to the completed supplies or services covered by this contract, or any other tax or duty from which the Contractor or this

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transaction is exempt. It includes any tax or duty directly applicable to the importation, production, processing, manufacture, construction, sale, or use of such supplies or services covered by this contract. The term does not include transportation taxes, unemployment compensation taxes, social security taxes, income taxes, excess-profits taxes, capital stock taxes, property taxes, and such other taxes as are not within the definition of the term "direct tax" as set forth above in this paragraph.

(b) The term "contract date" means the effective date of this contract if it is a negotiated contract, or the date set for the opening of bids if it is a contract entered into as a result of formal advertising.

(2) Federal Taxes.

Except as may be otherwise provided in this contract, the contract price includes all applicable Federal taxes in effect on the contract date.

(3) State or Local Taxes.

Except as may be otherwise provided in this contract, the contract price does not include any State or local direct tax in effect on the contract date.

(4) Evidence of Exemption.

The Commission agrees, upon request of the Contractor, to furnish a tax exemption certificate or other similar evidence of exemption with respect to any direct tax not included in the contract price pursuant to this article; and the Contractor agrees, in the event of the refusal of the applicable taxing authority to accept such evidence of exemption, (i) promptly to notify the Contracting Officer of such refusal, (ii) to cause the tax in question to be paid in such manner as to preserve all rights to refund thereof, and (iii) if so directed by the Contracting Officer, to take all necessary action, in cooperation with and for the benefit of the Government, to secure a refund of such tax (in which event the Commission agrees to reimburse the Contractor for any and all reasonable expenses incurred at its direction).

(5) Price Adjustment.

If, after the contract date, the Federal Government or any State or local government either (i) imposes or increases (or removes an exemption with respect to) any direct tax, or any tax directly applicable to the materials or components used in the

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manufacture or furnishing of the completed supplies or services covered by this contract, or (ii) refuses to accept the evidence of exemption, furnished under paragraph (4) hereof, with respect to any direct tax excluded from the contract price, and if under either (i) or (ii) the Contractor is obliged to and does pay or bear the burden of any such tax (and does not secure a refund thereof), the contract price shall be correspondingly increased. If, after the contract date, the Contractor is relieved in whole or in part from the payment or the burden of any direct tax included in the contract price, or any tax directly applicable to the materials or components used in the manufacture or furnishing of the completed supplies or services covered by this contract, the Contractor agrees promptly to notify the Contracting Officer of such relief, and the contract price shall be correspondingly decreased or the amount of such relief paid over to the Government. Invoices or vouchers covering any increase or decrease in contract price pursuant to the provisions of this paragraph shall state the amount thereof, as a separate added or deducted item, and shall identify the particular tax imposed, increased, eliminated, or decreased.

(6) Refund or Drawback

If any tax or duty has been included in the contract price or the price as adjusted under paragraph (5) of this article, and if the Contractor is entitled to a refund or drawback by reason of the export or re-export of supplies covered by this contract, or of materials or components used in the manufacture or furnishing of the completed supplies or services covered by this contract, the Contractor agrees that he will promptly notify the Contracting Officer thereof and that the amount of any such refund or drawback obtained will be paid over to the Government or credited against amounts due from the Government under this contract: Provided, however, That the Contractor shall not be required to apply for such refund or drawback unless so requested by the Contracting Officer.

ARTICLE XV - COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration the

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full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE XVI - OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE XVII - BUY AMERICAN ACT

The Contractor agrees that there will be delivered under this contract only such unmanufactured articles, materials and supplies (which term "articles, materials and supplies" is hereinafter referred to in this clause as "supplies"), as have been mined or produced in the United States, and only such manufactured supplies as have been manufactured in the United States substantially all from supplies mined, produced or manufactured, as the case may be, in the United States. The foregoing provisions shall not apply (i) with respect to supplies exempted by the Commission from the application of the Buy American Act (41 U. S. C. 10a-4), (ii) with respect to supplies for use outside the United States, or (iii) with respect to supplies to be delivered under this contract which are of a class or kind determined by the Commission not to be mined, produced, or manufactured, as the case may be, in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality, or (iv) with respect to such supplies, from which the supplies to be delivered under this contract are manufactured, as are of a class or kind determined by the Commission not to be mined, produced, or manufactured, as the case may be, in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality, provided that this exception (iv) shall not permit delivery of supplies manufactured outside the United States if such supplies are manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality. The Commission confirms that the product, crude thorium hydroxide, to be delivered by the Contractor hereunder, and the monazite from which that product and rare earths is derived and the rare earths extracted from monazite furnished by the Commission, are excepted from the terms of the "Buy American Act."

ARTICLE XVII - PROPERTY

- (1) Title to monazite delivered to the Contractor and to all materials extracted under this contract from such monazite shall be in the Government and shall remain in the Government throughout the

performance of all work hereunder. The Contractor may without accountability to the Commission dispose of gangue and other residue and effluent as the work progresses by any means other than sale or transfer to others (or by sale or transfer to others if the same is approved by the Contracting Officer) or may use or sell or transfer the effluent in other operations or products of the Contractor. If the Commission shall request and a mutually satisfactory method is available, the Contractor shall recover and deliver to the Commission uranium values contained in the effluent provided the Commission shall compensate the Contractor by a mutually satisfactory processing fee.

- (2) The Contractor shall be liable for loss or destruction of or damage to Government-furnished property except where such loss, destruction, or damage is due to any excepted peril, as hereinafter defined; provided, further, that notwithstanding the foregoing the Contractor shall be liable where such loss, destruction, or damage is due to any excepted peril through failure of the Contractor to comply with paragraph 3 or through the wilful misconduct or lack of good faith on the part of the Contractor's managerial personnel, as hereinafter defined. The term "excepted perils" shall mean: Fire; lightning; windstorm; cyclone; tornado; hail; explosion; riot attending a strike; civil commotion; vandalism and malicious mischief; aircraft or objects falling therefrom; vehicles running on land or tracks (excluding vehicles owned or operated by the Contractor or any agent or employee of the Contractor); smoke; sprinkler leakage; earthquake or volcanic eruption; flood, meaning thereby rising of rivers or streams; enemy attack or any action by the military, navy, or air forces of the United States in resisting enemy attack.

The term "Contractor's managerial personnel" shall mean the Contractor's directors, officers and any of its managers, superintendents, or other equivalent representatives who have supervision or direction of 1. all or substantially all of the Contractor's business; or 2. all or substantially all of the Contractor's operation at any one plant or separate location at which the contract is being performed; or 3. a separate and complete major industrial operation in connection with the performance of the contract; or 4. a separate and complete major construction, alteration or repair operation in connection with performance of the contract. The Government, at its discretion, may repair or replace Government-furnished material that has been lost or destroyed for which the Contractor is not liable. If the Contractor is not liable under this subparagraph for the loss or destruction of Government-furnished property, the amount of such property lost or destroyed shall be deducted prior to computing any price adjustment pursuant to Article IV or prior to computing the minimum delivery of rare earths oxide pursuant to Article II (5).

- (3) The Contractor shall take all reasonable precautions, as directed by the Contracting Officer, or in the absence of such directions in accordance with sound industrial practice, to safeguard and protect Government property in the Contractor's possession or custody. Special measures shall be taken by the Contractor in the protection of and accounting for any classified or special materials involved in the performance of this contract, in accordance with the regulations and requirements of the Commission.

- (4) Upon the happening of any loss or destruction of or damage to Government-furnished property in the possession or custody of the Contractor, the Contractor shall immediately inform the Commission of the occasion and extent thereof, shall take all reasonable steps to protect the property remaining; and shall, except to the extent that the Contractor is relieved of liability in accordance with paragraph 2, repair or replace, if and as directed by the Contracting Officer, the lost, destroyed, or damaged Government-furnished property, but shall take no action prejudicial to the right of the Government to recover therefor from third parties and shall furnish to the Government on request all reasonable assistance in obtaining such recovery.

ARTICLE XIX - TERMINATION FOR DEFAULT

- (1) The Commission may, subject to the provisions of paragraph (2) below, by written Notice of Default to the Contractor terminate the whole or any part of this contract in any one of the following circumstances:
- (i) if the Contractor fails to make delivery of the supplies or to perform the services within the time specified herein or any extension thereof; or

- (ii) if the Contractor fails to perform any of the other provisions of this contract, or so fails to make progress as to endanger performance of this contract in accordance with its terms, and in either of these two circumstances does not cure such failure within a period of 10 days (or such longer period as the Contracting Officer may authorize in writing) after receipt of notice from the Contracting Officer specifying such failure.
- (2) The Contractor shall not be liable for any damages or excess cost if any failure to perform the contract arises out of causes beyond the control and without the fault or negligence of the Contractor. Such causes include, but are not restricted to, acts of God or of the public enemy, acts of Government, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, inability to obtain essential equipment or materials, unusually severe weather, and defaults of subcontractors due to any of such causes unless the Contracting Officer shall determine that the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the Contractor to meet the required delivery schedule.
- (3) In the event the Commission terminates this contract in whole or in part as provided in paragraph (1) of this article, the Commission may procure, upon such terms and in such manner as the Contracting Officer may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the Commission for any excess costs for such similar supplies or services, Provided, that the Contractor shall continue the performance of this contract to the extent not terminated under the provisions of this clause.
- (4) If this contract is terminated as provided in paragraph (1) of this clause, the Commission, in addition to any other rights provided in this clause, may require the Contractor to transfer title (if title is not in the Government) and deliver to the Commission, in the manner and to the extent directed by the Contracting Officer, (i) any completed supplies, and (ii) such partially completed supplies and materials, parts, tools, dies, jigs, fixtures, plans, drawings, information, and contract rights (hereinafter called "manufacturing materials") as the Contractor has specifically produced or specifically acquired for the performance of such part of this contract as has been terminated; and the Contractor shall, upon direction of the Contracting Officer, protect and preserve property in possession of the Contractor in which the Government has an interest. The Government shall pay to the Contractor the contract price for completed supplies delivered to and accepted by the Commission, and the amount agreed upon by the Contractor and the Contracting Officer for manufacturing materials delivered to and accepted by the Commission and for the protection and preservation of property. Failure to agree shall be a dispute concerning a question of fact within the meaning of the clause

of this contract entitled "Disputes."

- (5) If, after notice of termination of this contract under the provisions of paragraph (1) of this clause, it is determined that the failure to perform this contract is due to causes beyond the control and without the fault or negligence of the Contractor pursuant to the provisions of paragraph (2) of this clause, such Notice of Default shall be deemed to have been issued pursuant to the clause of this contract entitled "Termination for Convenience of the Government," and the rights and obligations of the parties hereto shall in such event be governed by such clause.
- (6) The rights and remedies of the Government provided in this article shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

ARTICLE XX - TERMINATION FOR CONVENIENCE OF THE GOVERNMENT

- (1) The Commission may at any time terminate performance of all or part of the work under this contract for the convenience of the Government, by written notice to the Contractor stating the ground for termination. Such termination shall be effective in the manner and upon the date specified in said notice and shall be without prejudice to any claims which the Government may have against the Contractor. Upon receipt of such notice, the Contractor shall, unless the notice directs otherwise --
 - (a) complete processing of such monazite as is being processed at the time of the termination; immediately discontinue all other work and the placing of all orders for materials, facilities, and supplies in connection with the performance of this contract, except to the extent needed to complete processing of monazite in process as aforesaid;
 - (b) proceed to cancel promptly all existing orders and terminate all subcontracts insofar as such orders or subcontracts are related to this contract, except to the extent needed to complete processing of monazite in process as set forth in paragraph (a) above,
 - (c) assign to the Government in the manner and to the extent directed by the Commission all the right, title and interest of the Contractor under the terminated portion of the orders and subcontracts so terminated.
- (2) Upon such termination of performance of work under this contract for the convenience of the Government, full and complete settlement of all claims of the Contractor arising out of such termination

shall be made as follows:

- (a) The Government shall reimburse the Contractor for such further expenditures made after the date of termination for the protection of Government property, for the cost to the Contractor of terminating subcontracts and canceling orders as required by Article XX, and for such legal and accounting services in connection with the settlement of this contract as are required or approved by the Commission.
- (b) The Contractor shall be paid, according to the contract terms, the unpaid balance for products delivered in accordance with the contract terms to the date of termination, and for such products which were in process at the time of termination and which were completed pursuant to paragraph 1 (a) of this article and delivered in accordance with the contract terms.
- (c) The Commission shall promptly reimburse the Contractor for the capital cost to the Contractor of machinery, equipment, installations and plant (all of which is collectively referred to as plant) provided specially for the purposes of this contract as certified by the Contractor and audited and approved by the Commission which approval will not be unreasonably withheld, or 1.9 million dollars, whichever is the lesser, as reduced by (a) the capital cost of the plant or 1.9 million dollars, whichever is the lesser, divided by 7900 multiplied by the number of tons of monazite completely processed by the Contractor and (b) the agreed value of such plant at the date of termination. Failure to agree will be considered a dispute within the meaning of Article VI. In lieu of the agreed value of the plant or of a portion thereof, there shall be substituted the net proceeds of sale of the plant or such portion thereof, less the cost of dismantling the plant or such portion thereof, if the Commission and Contractor agree on such sale and the terms thereof. The dollar figure in this paragraph (c) assumes that the plant will be located at Baltimore, Maryland. In the event the plant is located at Sewaren, New Jersey, the amount of 1.9 million dollars shall remain the same.
- (d) The obligation of the Government to make any of the payments required by this article shall be subject to any unsettled claims in connection with this contract which the Government may have against the Contractor.
- (e) Any other provisions of this contract to the contrary notwithstanding, the Contractor and the Commission may agree upon the whole or any part of the amount or amounts which the Contractor is to receive upon and in connection with any termination pursuant to this article. Any agreement so reached shall be evidenced by a supplemental agreement to

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this contract which shall be final and binding upon the parties with regard to their respective claims against each other concerning this contract except as therein otherwise expressly provided.

- (f) The foregoing provisions of this article shall in no way affect or limit the rights which the Government may have as the result of default by the Contractor under this contract.

ARTICLE XXI - DEFINITIONS

(1) As used in this contract:

- (a) The term "Contracting Officer" means the person executing this contract on behalf of the Government and includes his successors or any duly authorized representative of any such person.
- (b) The term "Commission" means the United States Atomic Energy Commission or any duly authorized representative thereof, including the Contracting Officer except for the purpose of deciding an appeal under the article entitled "Disputes."

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the date and year first above written.

THE UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

Date of Signing by the Commission

July 18, 1955

James E. Shannon
Director, Division of Raw Materials

RARE EARTHS, INC.

Witnesses:

Pete J. Garino, President, R.E. BY Richard L. Storch Richard J. Mandle
Peter J. Colli, General Counsel TITLE: Vice Pres. Vice Pres.

Date of Signing by Rare Earths, Inc.

July 16, 1955

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I, Harry C. Helminger, certify that I am the Vice President of the corporation named as Contractor herein; that Richard W. Handberg who signed this contract on behalf of the Contractor was then President of said corporation; that said contract was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

IN WITNESS WHEREOF, I have hereto affixed my hand and seal of said corporation this 16th day of July, 1955.

Harry C. Helminger

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APPENDIX "A"

REPRESENTATION OF MONAZITE SAND TO BE
DELIVERED BY THE A.E.C. UNDER THIS CONTRACT

| Source | Lot Sand | | Rare Earth
Oxide | | Thorium
Oxide | |
|-----------------------------|-------------|---------------|---------------------|------|------------------|-----|
| | Ton | % Total Oxide | Tons | % | Tons | % |
| Brazil | 3831 | 66.5 | 2333 | 60.9 | 215.4 | 5.6 |
| Indian | 2171 | 69.6 | 1318 | 60.7 | 193.2 | 8.9 |
| Netherlands-
East Indies | 502 | 56.4 | 267 | 53.2 | 16 | 3.2 |
| Domestic | <u>1419</u> | 57.5 | <u>771</u> | 54.3 | <u>45.7</u> | 3.2 |
| | 7923 | | 4689 | | 470.3 | |

Average ThO_2 content $\frac{470.3}{7923}$ = 5.9%

Average Rare Earth Oxide $\frac{4689}{7923}$ = 59%

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APPENDIX "B-1"
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SAMPLING PROCEDURE

FOR

MONAZITE SAND

This procedure is based upon batch sampling; each batch equal to approximately 300 tons net, and assumes that the monazite sand is free flowing.

Weighing

Determination of the weight of the material will be made by either weighing the drums prior to dumping or by the use of a batch weigh hopper located immediately beyond the sampler, whichever is mutually agreeable. If a weigh hopper is used, the weight of the sample plus the weight of any spillage or dusting which may take place between the drum dumping point and the weigh hopper should be included in the total weight for the batch. If drums are used the net weight of material will be obtained by obtaining gross and tare weight for all the drums in the batch. Drums may be weighed individually or in groups on pallets.

Sampling

The material will be fed at a constant rate of flow out of a hopper to an automatic sampler. Either a Vezin or a Galliger type sampler will be satisfactory.

This sampler will be either a two or three stage sampler, and will take a sample of approximately 0.1% from the flow of material. This sample, weighing approximately 600 pounds, will be collected in a container which will be sealed. Care will be exercised to protect this sample from conditions which might affect its moisture content. This sample will be weighed as soon as it is taken.

Sample Preparation

After the entire sample has been taken, it should be mixed in a blender or rotating drum. A drum large enough to contain the gross sample and so constructed as to allow for both feeding into and out of, with tracks around its circumference to enable it to be rolled, and containing about 4 vanes on its inside to improve mixing, will be satisfactory.

1. Secondary Sample

After mixing, the gross sample will be fed at a uniform rate to a 10% single stage Vezin or Galliger type continuous sampler. The discard from this sampler should be temporarily held in reserve in case of loss of the official sample. An approximately 60 pound sample will, therefore, be obtained from this sampler.

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2. Official Moisture Determination

The 60 pound sample will be placed in suitable trays for drying, and dried to constant weight at $110^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for moisture determination. (The type of tray and the length of time required for this drying will be determined from mutual experience).

3. Grind to -20 Mesh

The 60 pound dried sample will then be ground in a mill so that not more than a trace will be retained on a U.S. Standard 20 mesh screen. Care will be exercised in this grinding to prevent excessive loss of dust.

4. Blending and Size Reduction

The -20 mesh, 60 pound sample will then be blended in V-type blender for $\frac{1}{2}$ hour. After blending, the sample will be cut in half (approximately) by emptying one leg of the V blender. The remaining sample will be blended and cut as above two more times. This will leave a sample of approximately 7.5 pounds in the blender. The discard sample will be sealed and held until a final analysis is agreed upon.

5. Grind to -150 Mesh

The 7.5 pound sample will then be ground in a ball mill to yield a particle size distribution of 90% through a U.S. Standard 150 mesh screen. (The grinding time required will be determined from experience).

6. Blending of Final Sample

The pulverized sample will then be placed in a blender and blended for $\frac{1}{2}$ hour.

7. Final Bottling of Sample

After blending, four (4) 8 ounce sample bottles will be half filled by withdrawing the material directly out of the blender. The sample bottles will be immediately sealed. These samples will be used for chemical analysis by the participating laboratories. The chemical analyses will be reported on a dry basis. Moisture at 110°C will also be reported by the laboratories. Each sample bottle will be appropriately identified and permanent records established.

8. Sample Distribution

One (1) sample will be forwarded to the Commission and one (1) retained by the contractor. The other two (2) will be held in reserve for referee, or as replacement in case of damage to the other samples.

Adequate reserve samples will be held by the contractor until agreement is reached on analysis. This reserve material will be the material from the other leg of the V-blender in #7.

APPENDIX "B-2"

ANALYTICAL PROCEDURE FOR THE
CHEMICAL ANALYSIS OF MONAZITE SAND

Principle

The dry ground sample is reacted with sulfuric acid. Thorium and the rare earths are separated from phosphates and sulfates by oxalate precipitations. Thorium is separated from the rare earths by repeated precipitations with hexamine and finally precipitated by oxalic acid and ignited to the oxides at 1000°C. The rare earths filtrates are precipitated by NH_4OH and finally separated as the oxalates.

Reagents Required

| | |
|-----------------------------------|--|
| Sulfuric acid | 96% H_2SO_4 |
| Oxalic Acid | 10% Solution |
| Oxalic Acid | 2% Solution |
| Hexamine (Hexamethylenetetramine) | 2% Water Solution |
| Ammonium Chloride | 5% Solution |
| Ammonium Chloride | 2% NH_4Cl ~ 10% NH_4OH |
| Ammonium Hydroxide | 28% Solution |
| Sodium Meta Bisulfite | Crystals |
| Gelatin | 1% Water Solution |
| HCl | 37% HCl |
| Oxalic Acid | 3% Solution |

Step I Procedure for the Determination of Moisture on the Ground Prepared Sample

Accurately weigh, in duplicate, 10 grams of sample in tared aluminum dishes. Dry to constant weight at 110°C and calculate the loss in weight as moisture. The average of results found here is to be used only for calculating the chemical analysis to the dry basis. This is not the moisture on the monazite sand as delivered.

Step II Procedure for Decomposition of Monazite Sand

In duplicate, accurately weigh 5 grams of the ground prepared sample and transfer to clean, dry 140 ml. porcelain casseroles. To each, add 15 ml. of c.p. H_2SO_4 and stir constantly to prevent caking as the temperature of the mixture is brought up to gentle evolution of SO_3 fumes. Cover the casserole with a watch glass and maintain the temperature at gentle fuming for $1\frac{1}{2}$ hours.

Note - Do not allow the temperature to go higher than is required to maintain gentle evolution of SO_3 fumes and do not bake to dryness, or formation of insoluble thorium pyrophosphates may occur. Stir frequently near the end of the reaction, as the mass becomes thick from the formation of the sulfates, to insure contact between the hot acid and the crystal-coated unreacted sand.

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Cool the casserole in a cold-water bath and add 40 ml. of cold water. Again cool below room temperature, while stirring, to dissolve the sulfates. Allow the heavy unreacted sand to settle and decant into a 250 ml. pyrex beaker. Wash 3 times with cool water by decantation and dry the unreacted matter by heating the casserole on a steam bath. Add 2 ml. of c.p. H_2SO_4 and repeat the digestion on the hot plate as before for an additional 1½ hours or until all the monazite is reacted. Cool and wash the remaining sample from the casserole into the 250 beaker containing the main solution. Add 1 ml. of 1% gelatin solution and stir to complete solution of the rare earth sulfates. Allow the siliceous matter to settle and decant to funnel fitted with a 11 cm #42 Whatman paper containing a small amount of paper pulp to aid filtration. Wash several times by decantation and transfer all the unreacted matter to the filter, washing until free of sulfates with cool water. Dry and ignite at 1000°C. Weigh as unreacted matter.

Note - This result is not to be reported and is found only to permit the analyst to know if a complete reaction has been accomplished. Duplicates should agree.

Collect the filtrate and washings in a 250 ml. volumetric flask, dilute to volume at room temperature, and mix.

Step III Separation of Thorium and Rare Earths from Phosphates and Sulfates

Transfer a 100 ml. aliquot (2 gram sample) of the sulfuric acid solution from Step II above to a 500 ml. separatory funnel. Add 400 ml. of water and allow this dilute solution to flow dropwise into a 800 ml. beaker containing 50 ml. (5 grams) of saturated solution of oxalic acid and 5 ml. HCl. Stir constantly on a magnetic stirrer during the addition of the sample. Rinse out the sample remaining in the separatory funnel, and add to the stirring solution. Continue stirring for 3 or 4 minutes, remove the magnet bar, rinse off with water, cover the beaker, and allow to stand at room temperature for at least 15 hours.

Filter through #40 Whatman 12½ cm paper, and wash free of sulfates with 2% oxalic acid solution. Transfer the residue to a porcelain dish (100 ml. size). Dry in oven at 110°C, ignite at 600°C to destroy the organic matter. Cool, add 25 ml. of HCl, cover with watch glass, and warm on top of a steam bath to complete solution. Hold until the final recovery from the filtrate is made. Collect the filtrate and washings in a liter pyrex beaker.

To the liter beaker containing the filtrates, add 20 ml. of HCl, and sufficient NH_4OH for precipitation. Heat to boiling, remove from the heat, and add 10% excess NH_4OH . Cover with watch glass and cool in the water bath, allowing the precipitate to settle. Filter thru #40 Whatman paper and wash with cool 2% NH_4Cl - 10% NH_4OH solution. Dissolve the precipitate with hot 1 + 1 HCl, washing the filter well with hot 5% HCl solution, and collecting the filtrates in a 300 ml. platinum dish. Evaporate the HCl solution to near dryness on the steam bath, then add 10 ml. HF (48%) and take to dryness. Wash down sides of the dish with a small amount of hot water, add 50 ml (1 + 7) HF and digest for a few minutes on the steam bath. Cool, and filter thru #42 Whatman paper. Wash the insoluble fluorides with (1 + 7) HF and finally with one washing of cool water. Transfer the filter paper and precipitate to a 100 ml. platinum

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dish. Dry and ignite at 475°C to destroy the organic matter. Cool, add 5 ml. of HNO_3 , 5 ml. of H_2SO_4 , and carefully heat until strong fumes of SO_3 are evolved. Cool, wash down the sides of the dish with cool water, and fume strongly again. Repeat fuming until all fluorides have been expelled. Cool, and using cool water, transfer the sample to a 250 ml. beaker, add 5 ml. of HNO_3 , 5 ml. HCl , and heat to boiling or until complete solution of all the sample. Precipitate with 1 + 1 NH_4OH and add 10% excess. Allow the solution to cool and the precipitate to settle. Filter thru #40 Whatman paper and wash with cool 2% NH_4Cl - 10% NH_4OH solution. Dissolve the precipitate with hot 1 + 2 HCl and combine this solution with the chloride solution from the oxalate separation, in a 400 ml. beaker.

Step IV Separation of Thorium from the Rare Earths

Heat the combined HCl solutions from Step III in a 400 ml. beaker to boiling. Dilute to 250 ml. with water, add 10 grams NH_4Cl crystals, .2-.3 gram sodium meta bisulfite and stir to solution. Add NH_4OH until a turbidity is formed (permanent), then add 1 + 1 HCl dropwise to dissolve the precipitate and 2 drops in excess. Add a pinch more of sodium meta bisulfite and stir to solution, and to complete reduction of Ce. Heat the solution to 60° - 70°C and remove from the heat. Now slowly add 2% hexamine solution until a turbidity appears, then about 5 ml. in excess. Stir well and allow to stand on the top of the covered steam bath (not over 70°C) for $\frac{1}{2}$ hour or until the precipitate settles completely. Add 1 ml. more of 2% hexamine solution to the clear supernatant solution. If no turbidity appears precipitation is complete. If turbidity does appear, add 2 or 3 more ml. of hexamine, stir and allow to settle. Filter through #40 Whatman paper and wash with 5% NH_4Cl solution, made just ammoniacal to methyl orange collecting the filtrate in a liter volumetric flask.

Dissolve the precipitate on the paper with 100 ml. of hot 1 + 2 HCl and wash the paper well with hot 5% HCl , collecting the solution in the original beaker. Repeat the hexamine precipitation twice more exactly as described above or until the final filtrate gives no precipitate when made strongly ammoniacal. Combine the filtrates in the liter volumetric flask and save for Step V.

Dissolve the final hexamine precipitate, as before, collecting the solution in a 250 ml. pyrex beaker. Evaporate to dryness on the steam bath. Add 25-30 ml. of saturated oxalic acid, allow to stand for 5-10 minutes, then dilute to 100 ml., cover with watch glass, and boil gently for 5 minutes. Allow to stand overnight at room temperature, and filter through #42 Whatman paper. Wash well with cool 2% oxalic acid solution.

Transfer paper and precipitate to a tared platinum crucible, dry, and ignite to constant weight at 1000°C. Weigh as ThO_2 and calculate the average of the duplicate results to dry basis, using the average moisture result found on the prepared sample in Step I.

Step V Determination of Rare Earth Oxides

Make to volume, the combined cooled filtrates and washings from the hexamine precipitations in Step IV, collected in the liter volumetric flask. Mix and transfer a 200 ml. aliquot (.4 gm. sample) to a 400 ml. beaker, heat to near boiling. Add c.p. NH_4OH to precipitation and 10% by volume in excess. Cool in water bath, allow the precipitate to settle, and filter through #40 Whatman paper. Wash with cool 2% NH_4Cl -10% NH_4OH solution. Discard the filtrate and dissolve the precipitate with hot 1 + 2 HCl, washing the paper free of sample, with hot 5% HCl. Collect the solution in a 250 ml. pyrex beaker. Evaporate to dryness on a steam bath. Add 25-30 ml. of saturated oxalic acid, allow to stand 5 - 10 minutes, then dilute to 100 ml., cover with watch glass and boil gently for 5 minutes. Allow to stand at room temperature overnight and filter through #42 Whatman paper, washing with cool 2% oxalic acid solution.

Transfer the paper and precipitate to a tared platinum crucible. Dry and ignite to constant weight at 1000°C .

Weigh as rare earth oxides and calculate the average of the duplicate results to the dry basis, using the average moisture result found on the prepared monazite sand sample in Step I.

Note I. Filtrations throughout this procedure may be speeded up by use of a small amount of filter paper pulp in the paper except for the first oxalate filtrations.

Note II. It is important to have present 5% of NH_4Cl during the hexamine separations.

APPENDIX "B-3"

PROCEDURE FOR RESOLVING

DIFFERENCES-MONAZITE SAND.

For each lot of monazite sand analyzed, each laboratory shall run duplicate analyses for the thorium oxide and rare earth oxide content of the sample. The analysis reported by each laboratory shall be the mean value of a duplicate set of analyses in which the assay for thorium oxide agree within 0.18%, or any other percent mutually agreed upon, and the assay for the rare earth oxide agree within 0.5% rare earth oxide, or any other percent mutually agreed upon. If the difference between the reported analysis of the commission and the reported analysis of the contractor does not exceed 0.18% thorium oxide and 0.5% rare earth oxide, the mean value of these analyses shall be accepted as final and binding on both parties.

If the difference exceeds 0.18% in the case of the thorium oxide content and/or 0.5% in the case of the rare earth oxide content, or any other percent or percents mutually agreed upon, one of the retained samples shall be submitted to a mutually acceptable umpire laboratory for umpire analysis of the thorium oxide content or the rare earths oxide content or both the thorium oxide content and the rare earths oxide content thereof. The mean of the analysis by the umpire and the analysis of the contractor or the commission, whichever is closer to the umpire analysis (or the analyses of both the contractor and the commission if they are equally distant from the umpire analysis) shall be final and binding on the parties to this contract. The cost of the umpire analysis shall be borne by the party whose determination is furthest from the analysis of the umpire. In the event that the umpire analysis is equidistant from the analysis of the contractor and the commission, the costs shall be equally divided between both parties.

APPENDIX "C-1"

SAMPLING PROCEDURE FOR
RARE EARTHS SODIUM SULFATESampling

The Rare Earths sodium sulfate will pass through a continuous sampler of the Vezir type. The sampler will be arranged so as to cut out a sample of approximately 0.5% of the total material flow.

One day's normal production of this material will be considered a batch. The sample from this total batch will be collected in a suitable container. This container will be sealed, properly labeled and stored in a location where the sample will not be subjected to contaminants or extreme changes in temperature.

Official Sample

The official sample for analysis (which will represent approximately 200 tons of material) will be obtained by compositing the daily batch samples. This official sample will be made up prior to the shipment of the material which it represents.

Sample Preparation

Each primary daily batch sample will be mixed by rolling prior to opening.

1. Secondary Sample

Each container of the primary sample will be sampled by passing the product through a Vezir type sampler of such design that the secondary composite sample will be approximately 5% of the primary samples.

2. Moisture Determination

The secondary sample will be placed in a suitable tray(s) for drying and dried to constant weight at $110^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for official moisture determination. (The length of time required for drying to be determined from mutual experience).

3. Grinding

The dried secondary sample will be ground so that not more than 5% will be retained on a U.S. Standard 100 mesh screen (or other fraction as mutually agreeable).

4. Blending and Bottling of Official Samples

The sample will then be transferred to a V-type blender and blended for $\frac{1}{2}$ hour. Four (4) samples of approximately $\frac{1}{2}$ pound each will then be taken by withdrawing the material directly out of the blender.

Each sample bottle will be approximately one half filled and bear appropriate identification. The sample bottle will be immediately sealed and permanent records established.

One (1) sample will be retained by the contractor, one (1) will be forwarded to the Commission and two (2) samples retained for reference. Adequate reserve samples will be held by the contractor until agreement is reached on analysis.

5. Weighing

The product stream of rare earths double sulphate from the sampler will be collected in the tared shipping drums, and the drums filled and closed. The drums will be weighed before and after filling on a scale equipped with a weight printing mechanism. The drum weight records will be printed on triplicate sets which are numbered in series to correspond with drum numbers. One drum weight record will be placed on top of the material in the drum, and one drum weight record furnished to the representative of the Commission when the material is shipped. The drums will be closed as soon as filled and appropriately identified. The official product weight will be the sum of the net weights of the drums shipped.

In the event that the Commission wishes to spot check drum weights, the following procedure will be used. The individual gross weights of the drums on every fifth pallet chosen at random (4 drums will be on each pallet) will be checked against their printed gross weight records. Should the sum of the gross check weights vary from the sum of the original printed gross weights by more than one-half percent (0.5%) all the drums will be check weighed before shipment and the weight of the shipment computed from the gross check weights.

6. Retention of Samples

Samples will be held by the contractor until agreement has been reached on analysis. Samples on hand after agreement on analysis will be added to subsequent production before sampling.

ANALYTICAL PROCEDURE FOR THE CHEMICAL ANALYSIS OF RARE EARTH SODIUM SULFATES

Principle

The sample is dissolved in 1 + 2 HCl, separated from sodium and sulfates by NH_4OH precipitation. Resolution in HCl and separation of thorium from the rare earths is made by precipitation with hexamine. Thorium is determined colorimetrically with the reagent thoron. Rare Earths are determined on the filtrates from the hexamine separations by precipitation first with NH_4OH , then as the oxalate, and ignition to the oxides at 1000°C .

Reagents Required

| | |
|-----------------------------------|---|
| Hydrochloric Acid | c.p. 37% HCl |
| Ammonium Hydroxide | c.p. 28% NH_4OH |
| Ammonium Chloride | c.p. Crystals |
| Hexamine (Hexamethylenetetramine) | 2% Solution in water |
| Sodium Meta Bisulfite | Crystals |
| Thoron Reagent | Sodium Thoronate .1% solution in H_2O |
| Thorium Nitrate | Reagent grade $\text{Th}(\text{NO}_3)_4$ |
| Oxalic Acid | Crystals |

Step I Determination of Moisture on Prepared Sample

Accurately weigh in duplicate, 10 gram sample in tared aluminum dishes. Dry to constant weight at 110°C , and calculate the loss in weight as moisture. This moisture result is not to be used for reporting purposes. It will be used only for calculating the chemical analysis to the dry basis.

Step II Determination of Thorium Oxide

Accurately weigh in duplicate, 2.5 grams of prepared sample and transfer to 250 ml. volumetric flasks, add 225 ml. of cool 1 + 2 HCl and shake to dissolution of the sample. Dilute to volume with water, mix and transfer a 100 ml. aliquot (1 gram sample) to a 400 ml. pyrex beaker. Add 100 ml. of water, 10 grams NH_4Cl , 2 ml. of aluminum nitrate solution containing 10 mg. Al per ml., and heat to boiling. Add NH_4OH to precipitation and 10% in excess. Mix and allow the precipitate to settle while cooling to room temperature. Filter thru #40 Whatman paper and wash with cool 2% NH_4Cl - 10% NH_4OH solution. Dissolve the ppt. with hot 1 + 1 HCl and wash paper free of sample with hot 5% HCl, collecting the solution in the original 400 ml. beaker. Dilute to 200 ml. volume, add 10 gms. NH_4Cl , and NH_4OH just to produce a slight permanent turbidity. Add 1 + 1 HCl, dropwise, to dissolve the precipitate and 2 drops in excess. Now add approximately

.3 grams of sodium meta bisulfite crystals and heat to 60 - 70°C. Remove from the heater, and while stirring, slowly add 2% hexamine solution until a turbidity is just produced and 2 ml. in excess. Allow to stand at 70°C for 30 minutes or until coagulation occurs. Add 1 ml. of 2% hexamine to the clear supernatant liquid. If no turbidity occurs, precipitation of thorium is complete. Stir, allow the precipitate to settle, and filter thru #40 Whatman paper. Wash with 5% NH_4Cl solution which has been made neutral to methyl orange indicator. Save the filtrate in a 600 ml. pyrex beaker for the determination of rare earths as directed in Step III.

Dissolve the precipitate on the filter with hot 1 + 2 HCl and wash the paper with hot 5% HCl and repeat the hexamine precipitation in the original beaker as directed before. Filter and wash as before adding the filtrate to the 600 ml. beaker containing the first filtrate.

Dissolve the precipitate with hot 1 + 1 HCl and wash the filter with hot 5% HCl. Collect the filtrate and washings in a 250 ml. volumetric flask. Cool to room temperature and dilute to volume. Mix and transfer a 25 ml. aliquot of the solution to a 50 ml. pyrex beaker. Adjust the pH of the solution to $1 \pm .5$ with NH_4OH and/or HCl, and transfer the solution to a 50 ml. volumetric flask. Add 10 ml. of 95% ethyl alcohol and 2 ml. of .1% water solution of thoron reagent. Dilute to volume with water, mix, and read the optical density of the solution in the Beckman Du Spectrophotometer at 545 nm wave length. From the calibration curve, determine the thorium content of the sample. Calculate to ThO_2 dry basis using the average moisture found in Step I. Prepare a standard calibration curve with each set of samples run by preparing a series of solutions containing zero-10-20-40-60 and 80 micrograms of thorium. Add to each, 10 ml. 75% ethyl alcohol, 2 ml. thoron reagent and 2 ml. HCl, and dilute to 50 ml. volume.

Step III Determination of Rare Earth Oxides

Heat the combined filtrates from the two hexamine separations contained in a 600 ml. beaker to near boiling and precipitate by addition of NH_4OH . Add 10% excess NH_4OH by volume and allow to cool in the water bath as the precipitate settles. Filter thru #40 Whatman paper, washing with cool 2% NH_4Cl - 10% NH_4OH solution several times.

Dissolve the precipitate with hot 1 + 2 HCl, collecting the solution in a 250 ml. pyrex beaker. Evaporate to dryness on a steam bath and add 30 ml. 10% oxalic acid solution. Allow to stand for 5 minutes, dilute to 100 ml. volume, cover with watch glass and boil gently for 5 minutes. Adjust volume to 100 ml. with water, cover and allow to stand overnight.

Filter thru #42 Whatman paper and wash with 2% cool oxalic acid solution. Dry in a tared platinum crucible, place in cool furnace and raise the temperature to 1000°C. Heat at 1000°C to constant weight, as Rare Earth Oxides. Calculate the results to dry basis, using the moisture determined in Step I as follows:

$$\frac{\text{Weight per cent as determined}}{100 - \text{per cent moisture on prepared sample}}$$

$$\times 100 = \text{Wt. \% Rare Earth}$$

Oxides on dry basis.

All analyses are to be made in duplicate and the average result is to be reported.

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APPENDIX "C-3"

SPECIFICATIONS OF RARE

EARTHS SODIUM SULFATE

The rare earths sodium sulfate delivered by the contractor shall not contain more than 1% moisture when dried at $110 \pm 5^{\circ}\text{C}$ to constant weight, shall meet the following specifications when assayed in accordance with the specified method, and shall conform to the symbolic formula set forth below

Rare earths expressed as the oxides,
when dried at $110 \pm 5^{\circ}\text{C}$ to constant
weight

42.0% min.

Thorium expressed as the oxide, dry
basis, when dried at $110 \pm 5^{\circ}\text{C}$ to
constant weight

0.25% max.

Formula - $\text{RE}_2 (\text{SO}_4)_3 \cdot \text{Na}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}$.

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APPENDIX "C-4"

PROCEDURE FOR RESOLVING DIFFERENCES

THORIUM AND RARE EARTHS OXIDE CONTENT

The analysis for rare earth oxide content and thorium oxide content reported by each laboratory shall be the mean of duplicate analyses for each lot of rare earth sodium sulphate delivered by the Contractor. The duplicate analyses used in computing the mean shall agree within 0.5% rare earths oxide, or any other percent mutually agreed upon.

If the analyses of the rare earths oxide content reported by the Commission and by the Contractor do not differ by more than 0.5% rare earths oxide, or any other percent mutually agreed upon, then the mean of the two reported determinations shall be accepted as final and binding on both parties.

If the difference between the two analyses is greater than 0.5% rare earths oxide or any other percent mutually agreed upon, then a retained sample shall be submitted to a mutually acceptable laboratory for umpire analysis of the rare earth oxide content,

The mean of the analyses of the umpire and the analysis of the Contractor or the Commission whichever is closer to the umpire analysis (or the analyses of both the Contractor and the Commission if they are equally distant from the umpire analysis) shall be final and binding on the parties to this contract. The cost of the umpire analysis shall be borne by the party whose determination is further from the analysis of the umpire. In the event that the umpire analysis is equally distant from the analysis of each party, the cost shall be divided equally by the parties.

If the mean of the Contractor's analysis and the Commission's analysis for thorium oxide content fails to meet the specifications a retained sample will be sent to the umpire if either party requests same. The mean of the analyses of the umpire and the analysis of the Contractor or the Commission whichever is closer to the umpire analysis (or the analyses of both the Contractor and the Commission if they are equally distant from the umpire analysis) shall be final and binding on the parties of this contract.

APPENDIX "D-1"

SAMPLING PROCEDURE FOR
THORIUM HYDRATE PRODUCT

The thorium hydrate product will be collected in a storage bin which will hold one day's production.

Daily Sampling

At the end of the production day the material in the storage bin will be discharged at a constant rate through a continuous sampler of the Vezin type. The sampler will be arranged to cut approximately 5% of the total flow as sample. This sample will be collected in a drum, sealed, properly labeled and stored in a location where the sample will not be subject to contaminants or extreme changes in temperature.

Composite Sample

The sample for analysis will be obtained by compositing the daily samples obtained from approximately 20,000 pounds production. This sample will be made up prior to the shipment of the material it represents. The gross sample will weigh approximately 1,000 pounds. The daily samples will be composited in the presence of a representative of the Commission.

Sample Preparation

Each drum of the total daily samples will be mixed by rolling prior to opening.

1. Secondary Sample

Each drum of the primary daily samples will be sampled by passing the material through a Vezin type sampler one after the other in succession until the entire gross sample has been sampled. The sample taken at this point will be approximately 5% of the total or approximately 50 pounds.

2. Moisture Determination

The 50 pound sample will be placed in a suitable tray for drying and dried to constant weight at $110^{\circ}\text{C} \pm 5^{\circ}\text{C}$, for moisture determination. (The length of time and temperature required for drying to be determined by experience).

3. Grinding to -100 Mesh

The dried sample will then be ground to 95% minimum through 100 mesh.

4. Blending and Bottling

The ground sample will be transferred to a V-type blender and blended for 1 hour. Four (4) one pound (approximately) samples will be removed from the blended sample. Each will be placed in a bottle, sealed immediately and appropriately identified.

One (1) sample will be retained by the Contractor, one (1) will be forwarded to the Commission and two (2) samples retained for reference. Adequate reserve samples will be held by the Contractor until agreement is reached on analysis.

5. Weighing

The main stream of thorium hydrate from the sampler will be collected in tared 55 gallon drums and the drums filled and closed. The drums will be weighed before and after filling on a scale equipped with a weight printing mechanism. The drum weight records will be printed on triplicate sets which are numbered in series to correspond to the drum numbers. One drum weight record will be placed on top of the material in the drum and one drum weight record furnished to the representative of the Commission when the material is shipped. The drums will be closed as soon as filled and tagged so as to show the date of production and identification with the corresponding sample.

The 20,000 pounds production which corresponds to the daily samples referred to under "Composite Sample" above will be shipped as a lot.

In the event that the Commission wishes to spot check drum weights, the following procedure will be used. The individual gross weights of the drums on every fifth pallet chosen at random will be checked against their printed gross weight records. Should the sum of the gross check weights vary from the sum of the original printed gross weights by more than one-half percent (0.5%) all the drums will be check weighed before shipment and the weight of the shipment computed from the gross check weights.

Samples will be held by the Contractor until agreement has been reached on analysis. The samples on hand after agreement will be added to subsequent production prior to sampling.

APPENDIX "D-2"

ANALYTICAL PROCEDURE FOR THE CHEMICAL

ANALYSIS OF THORIUM HYDROXIDE

Principle

The sample is dissolved in HNO_3 . Thorium and the rare earths are separated from sulfates and phosphates by oxalate precipitation. The oxalates are destroyed by ignition at 380°C . Thorium is separated from the rare earths by repeated precipitations with hexamine and reprecipitated as oxalates and ignited to ThO_2 at 1000°C . The separated rare earths are purified by NH_4OH and finally as the oxalates and ignited to the oxides.

C. P. Reagents Required

| | |
|-----------------------------------|-----------------------|
| Nitric Acid | Sulfuric acid |
| Oxalic Acid | Perchloric acid |
| Ammonium Hydroxide | Molybdic acid |
| Hydrochloric Acid | Brom cresol green |
| Hexamine (Hexamethylenetetramine) | Ammonium chloride |
| Ammonium Nitrate | Silver nitrate |
| Sodium Hydroxide | Quinine sulfate |
| Sodium Alizarin Sulfonate | Hydrogen peroxide |
| Phenolphthalein | Thorium nitrate |
| Sulfurous Acid | Monochloroacetic acid |
| Sodium Chloride | Hydrofluoric acid |
| Barium Chloride | |

Step I Determination of Moisture on the Dry Prepared Sample

Accurately weigh 10 grams, in duplicate, in tared weighing bottles and dry to constant weight at 110°C . Calculate the loss in weight as moisture.

The average moisture found here is to be used for calculating the chemical analysis to the dry basis. This is not the moisture of the product as shipped.

Step II Determination of the Nitric Acid Insoluble Matter

Accurately weigh, in duplicate, 2.5 grams of the dry prepared sample and transfer to 250 ml. pyrex beakers. To each, add 50 ml. of water and heat to boiling. Add 75 ml. of c.p. HNO_3 and boil gently for 60 minutes with watch glass cover in place during the digestion, to prevent evaporation of the acid. Cool, and filter thru a 11 cm Whatman #42 paper, washing free of acid with hot water. Dry, ignite at 1000°C to constant weight in a tared platinum crucible. Average the results and calculate the weight of the insoluble residue to the dry basis, using the average moisture found in Step I. Report as nitric acid insoluble matter. Collect the filtrates and washings in a 500 ml. volumetric flask, make to volume at room

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temperature, mix, and set aside for use in making the chemical analysis.

Step III Separation of Thorium and Rare Earths From Sulfates and Phosphates

Transfer a 50 ml. aliquot (.25 gram sample) of the solution contained in the 500 ml. volumetric flask from Step II to a 250 ml. pyrex beaker. Add 2 ml. of H_2SO_4 and evaporate to fumes of SO_3 , cool, wash down the sides of the beaker with water, and fume again to expel the nitric acid. Cool, wash down the sides of the beaker with cold water, and stir to solution. Transfer the cool solution to a separatory funnel, diluting the total volume to 200 ml. and allow the sample solution to flow dropwise into a 400 ml. beaker containing 25 ml. of 10% oxalic acid and 2 ml. HCl which is being stirred constantly by a magnetic stirrer. Allow to stand overnight at room temperature. Filter thru #40 Whatman paper and wash well with cool 2% oxalic acid solution. Dry the paper and precipitate, in a 250 ml. vycor beaker and ignite for 30 minutes at $380^\circ C$ to destroy oxalates. Cool, add 50 ml. HCl, 10 ml. 30% H_2O_2 and warm on top of covered steam bath for 1 hour, and then boil to expel the H_2O_2 . Hold for the recovery of the traces of thorium and rare earths as follows:

Precipitate the filtrate and washings from the oxalate precipitation with NH_4OH and heat to boiling. Add 10% excess NH_4OH , cool below room temperature, and filter thru #40 Whatman paper, washing with cool 2% NH_4Cl - 10% NH_4OH solution. Dissolve the precipitate with hot 1 + 2 HCl and collect the solution in a 300 ml. platinum dish. Evaporate the HCl solution to near dryness, add 10 ml. HF and evaporate to complete dryness. Wash down the sides of the platinum dish with warm water, add a few drops of HF and warm on the steam bath for 10 minutes. Cool, and filter thru #42 Whatman paper, washing the precipitate with cool water containing a few drops of HF per 100 ml. solution. Transfer the paper and precipitate to 100 ml. platinum dish, dry, and ignite at $475^\circ C$ to destroy the paper. Cool, add 2 ml. H_2SO_4 , 1 ml. HNO_3 , and fume strongly. Cool, wash down the sides of the dish with water, and again heat to fumes of SO_3 to expel fluorides. Cool, and using cool water, transfer the solution to a 250 ml. beaker. Add 5 ml. HCl, 1 ml. HNO_3 , and boil to complete solution. Add NH_4OH to precipitation and 10% in excess. Cool, and filter thru #40 Whatman paper washing with cool 2% NH_4Cl - 10% NH_4OH solution.

Step IV Separation of Thorium From the Rare Earths

Dilute the HCl solution of the oxides from the main oxalate precipitation in Step III to 100 ml. volume. Add 10 ml. of HCl and heat near to boiling. Now filter this hot solution thru the paper containing the NH_4OH precipitate. Collect the filtrate and washings in a 400 ml. beaker. Transfer the filter paper and any insoluble residue to a tared platinum dish, dry and ignite to constant weight at $1000^\circ C$. Deduct the weight of the filter paper ash. Any residue found at this point will most certainly be thorium oxide, and must be dissolved by fusion with potassium bisulfate, freed of sulfates by NH_4OH precipitation, dissolved with hot HCl and added to the main chloride solution in the 400 ml. beaker.

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Add 0.2 - 0.3 gram sodium meta bisulfite crystals and 10 grams of NH_4Cl . Add NH_4OH until a permanent turbidity is produced and then bring back in solution with 1 + 1 HCl adding dropwise. Add 1 drop HCl in excess and heat the solution to 60 - 70°C. Remove from the heat and add 2% hexamine solution slowly until a turbidity appears and then 5 ml. more. Warm at 70°C for 30 minutes or until the precipitate settles leaving a clear supernatant solution. Add 1 ml. more of 2% hexamine solution, and if no turbidity appears, precipitation is complete. Filter thru a #40 Whatman paper and wash with warm 5% NH_4Cl solution made just ammoniacal to methyl orange, collecting the filtrate in a liter beaker.

Dissolve the precipitate on the paper with 100 ml. hot 1 + 2 HCl and wash paper well with hot 5% HCl collecting the solution in the original beaker. Repeat the hexamine precipitation exactly as described above until the filtrate shows no precipitate when made strongly ammoniacal. Combine all the filtrates in the liter beaker and proceed as directed under Step V. Dissolve the final hexamine precipitate as before collecting the solution in a 250 ml. pyrex beaker. Evaporate to dryness on a steam bath, add 25 ml. saturated oxalic acid and allow to stand for 5 minutes, then dilute to 100 ml., cover with a watch glass, and boil gently for 5 minutes. Allow to stand overnight at room temperature and filter thru #42 Whatman paper. Wash well with cool 2% oxalic acid solution. Transfer the paper and precipitate to a tared platinum crucible, dry and place in a cool electric muffle furnace. Bring the temperature up to 1000°C and ignite to constant weight as ThO_2 . Calculate the average of the duplicate tests to dry basis using the average moisture result found in Step I.

Step V Determination of Rare Earths

Heat the combined filtrates from Step IV in the liter beaker to near boiling and add NH_4OH to precipitation and 10% in excess. Cool in water bath and allow the precipitate to settle. Filter thru #40 Whatman paper, wash with cool 2% NH_4Cl - 10% NH_4OH solution and discard the filtrate. Dissolve the precipitate with hot 1 + 2 HCl and wash the paper free of sample with hot 5% HCl . Collect the solution in a 250 ml. pyrex beaker and evaporate to dryness on a steam bath. Add 25 ml. saturated oxalic acid and allow to stand for 5 minutes, then dilute to 100 ml., cover with watch glass and boil gently for 5 minutes. Allow to stand overnight at room temperature, filter thru #42 Whatman paper, and wash with cool 2% oxalic acid solution.

Transfer the paper and precipitate to a tared platinum crucible. Dry and place in a cool muffle furnace. Bring the temperature up to 1000°C and ignite to constant weight. Weigh as rare earth oxides and calculate the average of the duplicate results to the dry basis, using the average moisture result found in Step I.

Note - All filtrations may be speeded up by adding a small amount of ashless paper pulp to the filter.

~~OFFICIAL USE ONLY~~Step VI Determination of Sulfates

In duplicate, accurately weigh 2.5 grams of the prepared sample and transfer to a 500 ml. volumetric flask. Add 25 ml. of HCl and boil until the volume is 10 ml. Dilute to 400 ml. with water, add 25 ml. of 10% oxalic acid solution, and heat to boiling. Allow to stand overnight at room temperature. Make to volume with water and mix. Filter thru a dry paper and transfer a 200 ml. aliquot (1 gram sample) to a 400 ml. beaker. Dilute to 250 ml. volume and heat to boiling. Add 10 ml. of 10% BaCl₂ solution, dropwise while stirring and digest on a steam bath until the precipitate settles completely. After 4 hours filter thru #42 Whatman paper and wash with water.

Dry in a tared platinum crucible and ignite to constant weight at 1000°C. Weigh as BaSO₄ and calculate the average weight, to SO₃.

$$\frac{\text{Weight of BaSO}_4 \times .343}{\text{Weight of sample (1 gm.)}} \times 100 = \text{SO}_3, \text{ weight } \%$$

Using the average moisture found in Step I, calculate to dry basis.

Step VII Determination of Phosphorus

Transfer a 50 ml. aliquot (.25 gm. sample) of the HNO₃ solution contained in the 500 ml. volumetric flask from Step II to a 250 ml. pyrex beaker. Add 15 grams of NH₄NO₃ and heat to 45°C in a constant temperature water bath. Add 25 ml. of ammonium molybdate solution, stir well and allow to stand in the constant temperature water bath for 30 minutes with stirring every 10 minutes. Filter thru #42 Whatman paper and wash free of acid with cool water. Return the precipitate and paper to the original beaker, add 50 ml. of water and slowly add standard alkali hydroxide solution, while stirring, until all the precipitate has dissolved and not more than 2 ml. of excess, if half normal alkali is used. Add 5 drops of phenolphthalein indicator solution and titrate the excess alkali present with standard HNO₃ solution (to the disappearance of the pink color).

$$\frac{(A R - B R) \times .3086}{\text{Weight of sample (.25 gm.)}} = \text{Phosphorus expressed as P}_2\text{O}_5, \text{ wt. } \%$$

When A = ml. standard alkali hydroxide added

B = ml. standard HNO₃ solution required

R = normality of standard solutions

Preparation of Ammonium Molybdate Solution

Dissolve 100 grams of MoO₃ in a mixture of 144 ml. NH₄OH and 271 ml. water. Cool and syphon slowly into a cool mixture of stirring 489 ml. HNO₃ and 1148 ml. water. Allow to stand overnight and filter just before use. Store in glass stoppered bottle.

~~OFFICIAL USE ONLY~~

Step VIII Determination of Chlorides

Chlorides are precipitated with silver nitrate and determined by measuring the scattered light caused by the particles in suspension, using the Fisher Photo Nephelometer with ultra violet light and quinine sulfate solution for generating fluorescence. Water used should be chloride free.

Standardization of Nephelometer

Use #440 filter on left side
Blank filter in center
430 + filter on right

Reagents required and preparation of Standard Curve.

.025% water solution of quinine sulfate
.1649 grams c.p. NaCl diluted to 1000 ml. (Solution "A")
each ml. contains .0001 gram chlorine
From the stock Solution "A" prepare a standard curve by placing into 100 ml. volumetric flasks 1 ml. of HNO₃ and to flask

- #1 Water only for blank
- #2 1 ml. of Solution "A" - containing .0001 gm Cl
- #3 2 ml. of Solution "A" - containing .0002 gm Cl
- #4 3 ml. of Solution "A" - containing .0003 gm Cl
- #5 5 ml. of Solution "A" - containing .0005 gm Cl

Turn on the ultra violet lamp and allow to warm up. Add 1 ml. of 1% silver nitrate to flask #5 containing .0005 gm chlorides, make to volume immediately and mix. Transfer the sample to the Half Black cell, place in the nephelometer, fill the other cell with the .025% quinine sulfate generating solution and balance the nephelometer at 100% transmission against the standard containing the .0005 gm chloride precipitation.

Then precipitate #4 in the same manner, record the reading, and continue on thru the series of standards and the blank. Deduct the blank reading from each of the standards and on linear graph paper, plot the net reading against gram of sample per 100 ml. volume. Draw the curve connecting the points.

Analytical Procedure

Balance the nephelometer with the #5 solution, prepared each time a new sample is run, and transfer an aliquot of the sample solution from Step II equivalent to .25 gm (50 ml.) to a 100 ml. volumetric flask. Add 1 ml. of 1% AgNO₃ solution, dilute to volume and mix. Immediately transfer the solution to a half black cell and determine the transmission of scattered light due to the sample. Record the reading and from the standard curve, determine the chloride content of the sample, deducting the reading found on the blank. Calculate to dry basis using the moisture found in Step I.

Step IX Determination of Fluorine

Transfer a 100 ml. aliquot (.5 gm sample) of the solution in the 500 ml. volumetric flask from Step II to a 250 ml. vycor beaker.

Make ammoniacal and evaporate to near dryness. Add 10 ml. of lime water and evaporate to complete dryness. Ignite the residue at 600°C to expel the ammonium nitrate and ammonium sulfate salts. Cool and transfer the residue to the fluorine distillation flask. Add 2 glass beads and 10 ml. of 60% perchloric acid. Attach the thermometer stopper, and place the flask in the constant temperature bath. Allow the temperature to reach 85°C and turn on the steam. Distill 175 ml. at 135°C into a 250 ml. beaker, keeping the distillate alkaline during the distillation by the dropwise addition of 0.1N NaOH. Neutralize with 5% NaOH solution to phenolphthalein indicator and evaporate the solution to less than 50 ml. volume. Transfer the sample solution to a 100 ml. tall form beaker, add 5 drops of .1% aqueous solution of sodium alizarin sulfonate indicator and neutralize with .1 normal acetic acid. Add 2½ ml. of monochloroacetic acid-sodium hydroxide buffer solution and titrate the fluorine with standard .01 normal thorium nitrate solution.

From the volume of thorium nitrate solution required, read the milligrams of fluorine present from the standard curve.

Calculate the average result to dry basis using the average moisture found in Step I.

Preparation of the Standard Curve

Prepare a standard curve with c.p. sodium fluoride, titrating aliquots containing .025 - .05 - .1 - .2 - .5 and 1.0 milligrams of fluorine with .01 normal thorium nitrate solution. Plot milliliters of .01 normal thorium nitrate solution against milligrams of fluorine. The curve is not a straight line and the same analyst should titrate the standards and samples.

~~OFFICIAL USE ONLY~~

APPENDIX "D-3"

SPECIFICATIONS OF

THORIUM PRODUCT

The crude thorium hydroxide product delivered by the Contractor shall have average moisture content of 15% and shall meet the following specifications when assayed in accordance with the specified method, after drying at $110 \pm 5^\circ\text{C}$ to constant weight, or when dried according to other mutually agreed upon conditions.

| | |
|-------------------------------|----------|
| ThO ₂ | 63% min. |
| Rare Earth Oxide | 8% max. |
| SO ₃ | 2% " |
| P ₂ O ₅ | 7% " |
| Insol. in HNO ₃ | 2% " |
| Cl | 0.1% " |
| F | 0.1% " |

~~OFFICIAL USE ONLY~~

APPENDIX "D-4"

PROCEDURE FOR RESOLVING
DIFFERENCES--THORIUM HYDRATE PRODUCT

The analyses for thorium oxide content and rare earth oxide, P_2O_5 , SO_3 , insolubles fluorine and chlorine impurities reported by each laboratory shall be the mean of duplicate analyses for each lot of thorium hydroxide delivered by the Contractor. The duplicate analyses used in computing the mean shall agree within 0.5% thorium oxide, or any other percent mutually agreed upon.

If the thorium oxide content of the crude thorium hydroxide product as reported by the Commission and the Contractor do not differ by more than 0.5% thorium oxide, or any other percent mutually agreed upon, then the mean of the two reported determinations shall be accepted as final and binding on both parties.

If the difference between the two analyses is greater than 0.5% thorium oxide, or any other percent mutually agreed upon, then a retained sample shall be submitted to a mutually acceptable laboratory for umpire analysis of the thorium oxide content.

The mean of the analyses of the umpire and the analysis of the Contractor or the Commission whichever is closer to the umpire analysis (or the analyses of both the Contractor and the Commission if they are equally distant from the umpire analysis) shall be final and binding on the parties to this contract. The cost of the umpire analysis shall be borne by the party whose determination is further from the analysis of the umpire. In the event that the umpire analysis is equally distant from the analysis of each party, the cost shall be divided equally by the parties.

If the mean of the Contractor's analysis and the Commission's analysis for impurities content fails to meet specifications, a retained sample will be sent to the umpire if either party requests same. The mean of the analyses of the umpire and the analysis of the Contractor or the Commission whichever is closer to the umpire analysis (or the analyses of both the Contractor and the Commission if they are equally distant from the umpire analysis) shall be final and binding on the parties to this contract.

THIS AMENDMENT, entered into and effective as of November 30, 1956, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government") acting through the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), RARE EARTHS, INC., a corporation of the State of New Jersey and W. R. GRACE & CO., a corporation of the State of Connecticut, having a place of business at Baltimore, Maryland:

WITNESSETH THAT:

WHEREAS, the Commission and Rare Earths, Inc., entered into Contract No. AT(49-6)-993 on July 18, 1955; and

WHEREAS, on the day and year first above written W. R. Grace & Co., sole shareholder of Rare Earths, Inc., dissolved Rare Earths, Inc., and succeeded to all of its outstanding rights, liabilities and obligations; and

WHEREAS, documentary evidence of the lawful dissolution of Rare Earths, Inc. has been furnished the Commission; and

WHEREAS, this amendment is authorized by and negotiated under the Atomic Energy Act of 1954 in the interest of the common defense and security;

NOW, THEREFORE, the parties hereto mutually agree as follows:

1. W. R. Grace & Co. hereby becomes a party to Contract No. AT(49-6)-993 in the place of Rare Earths, Inc. and undertakes to perform according to the terms and provisions thereof the work heretofore required to be performed by Rare Earths, Inc. and remaining unperformed on the effective date of this amendment.
2. Rare Earths, Inc., hereby waives any and all rights that it may have against the Commission or the Government under Contract No. AT(49-6)-993 and consents to the substitution of W. R. Grace & Co. as contracting party thereto in its place.
3. W. R. Grace & Co., as successor to Rare Earths, Inc., hereby succeeds to all of the rights and privileges and assumes all of the obligations and liabilities of Rare Earths, Inc. under Contract No. AT(49-6)-993 to the same extent as if W. R. Grace & Co. and not Rare Earths, Inc. had been the original contracting party with the Commission under the contract; and wherever the term "Rare Earths, Inc." appears in Contract No. AT(49-6)-993 the term "W. R. Grace & Co." shall be substituted therefor.

IN WITNESS WHEREOF, the parties hereto have executed this amendment as of the day and year first above written.

THE UNITED STATES OF AMERICA

WITNESSES:

Margaret H. Hall
James M. Creamer

By: UNITED STATES ATOMIC ENERGY COMMISSION

Title: James M. Creamer

Director, Division of Raw Materials
Date: January 16, 1957

WITNESSES:

R. S. Clark
Edith B. Schmincke

RARE EARTHS, INC.

By: Richard M. Mendle

Title: Director

Date: December 18, 1956

WITNESSES:

James W. Cook
Helen C. Baker

W. R. GRACE & CO.

By: M. G. Geiger

Title: Executive Vice President

Date: _____

I, R. S. Clark, certify that I am the Assistant Secretary of Rare Earths, Inc., a corporation named as a party herein; that R. M. Mendle who signed this amendment on behalf of Rare Earths, Inc. was then Director of said corporation; that said amendment was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

WITNESS my hand and the seal of said corporation.

(Corporate Seal)

R. S. Clark

R. S. Clark

I, M. C. Roop, certify that I am Assistant Secretary of W. R. Grace & Co., a corporation named as a party herein; that M. G. Geiger who signed this amendment on behalf of W. R. Grace & Co. was then Executive Vice President of said corporation; that said amendment was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

WITNESS my hand and the seal of said corporation.

(Corporate Seal)

M. C. Roop

M. C. Roop

*Agreement for
Amendment will
be made*

THIS AMENDMENT, entered into this 9th day of July, 1957, and effective as of September 21, 1956, by and between the UNITED STATES OF AMERICA acting through the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission") and W. R. GRACE & CO., a corporation organized under the laws of the State of Connecticut (hereinafter called the "Contractor"):

WITNESSETH THAT:

WHEREAS, by Amendment No. 1 effective November 30, 1956, subject contract was assigned to Contractor; and

WHEREAS, by Change Order No. 1, dated September 21, 1956, the Commission ordered the Contractor to alter the specifications for shipping containers for rare earths sodium sulphate; and

WHEREAS, Contract No. AT(49-6)-993 provides for an equitable adjustment in price in the event an ordered change causes an increase or decrease in the cost of performing the contract work; and

WHEREAS, it has been determined that Change Order No. 1 causes an increase in the cost of performing the work under Contract No. AT(49-6)-993; and

WHEREAS, it is now desired to modify Contract No. AT(49-6)-993 to provide for an appropriate increase in the contract price; and

WHEREAS, this amendment is authorized by and executed under the Atomic Energy Act of 1954;

NOW, THEREFORE, the parties hereto agree that Contract No. AT(49-6)-993 shall be and is hereby amended in the following particulars only:

(1) By deleting the specifications for the shipping containers for rare earths sodium sulphate set forth in paragraph (3) of ARTICLE I - SCOPE OF THE WORK and inserting the following specifications in lieu thereof:

"55 gallon, hot-dipped, galvanized steel drum made of 18-gauge steel with two rolling hoops which will permit the clearance of the clamp ring when the drum is rolled on its side and have full open-head with 12-gauge belt-type, clamp ring closure made airtight with a synthetic rubber gasket. In case the component parts of the drums are hot-dipped galvanized before assembly, the body of the drum shall be hot-dipped galvanized after the side seam is welded."

04716

(2) by adding the following paragraph (4) to ARTICLE IV-PAYMENTS:

"(4) In addition to all other payments provided for under this contract, and upon submission of a properly certified invoice, the Commission shall pay to the Contractor once each month a sum equal to the number of drums of rare earths sodium sulphate delivered hereunder during the previous month multiplied by either (i) Three Dollars and Ninety-Six Cents (\$3.96) or (ii) the difference between the actual cost to the Contractor of each such drum and Five Dollars and Seventy-Five Cents (\$5.75), whichever sum is smaller."

IN WITNESS WHEREOF, the parties hereto have executed this amendment on the day and year first above written.

WITNESSES:

THE UNITED STATES OF AMERICA

By: UNITED STATES ATOMIC ENERGY COMMISSION

Madge J. Halliday
Eva D. Petroch

[Signature]
Title: Director, Division of Raw Materials

WITNESSES:

W. R. GRACE & CO.

Elizabeth B. Griffin
David P. Bunt

By: [Signature]
Title: Executive Vice President

I, M. C. Roop, certify that I am the Assistant Secretary of the corporation named as Contractor herein; that M. G. Geiger who signed this amendment on behalf of the Contractor was then Executive Vice President of said corporation; that said amendment was duly signed for and on behalf of said Contractor by authority of its governing body and is within the scope of its corporate powers.

WITNESS my hand and the seal of said corporation.

[Signature: M. C. Roop]

(Corporate Seal)

Harold Davis went through all files
and determined this was the only
contract we had for the Monozite Plant
at Curtis Bay with the USAEC.

MJBerger 5/5/78

Copy No. 2

Contract No. AT(49-6)-993
Amendment No. 3
Date: November 16, 1959

SUPPLEMENTAL AGREEMENT

THIS AGREEMENT entered into this 16th day of November and effective as of January 31, 1958, by and between the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter referred to as the "Commission") and W. R. GRACE & CO., a corporation organized under the laws of the State of Connecticut (hereinafter referred to as the "Contractor").

WITNESSETH THAT:

WHEREAS, Contract No. AT(49-6)-993, effective July 18, 1955 (hereinafter referred to as "the Contract") was entered into between the Commission and Rare Earths, Inc. for the performance of certain work and services; and

WHEREAS, by Amendment No. 1, effective November 30, 1956, the Contract was assigned to Contractor; and

WHEREAS, by Amendment No. 2, effective September 21, 1956 the specifications of the Contract for shipping containers for rare earths sodium sulphate were altered; and

WHEREAS, it is now desired to further amend the Contract with respect to amounts of monazite to be delivered to Contractor by the Commission, size of delivery containers, final delivery date, and methods of weighing, sampling, and packaging; and

WHEREAS, this Amendment is authorized by and executed under the Atomic Energy Act of 1954, as amended, in the interest of the common defense and security;

NOW, THEREFORE, the parties hereto agree that the Contract as heretofore amended shall be and is hereby further amended in the following particulars only:

1. By deleting the words and figures "7900 short tons" set forth in paragraph (1) of Article I - SCOPE OF THE WORK and inserting the words and figures "997.61 short tons" in lieu thereof.

2. By deleting the specifications for the shipping containers for thorium hydroxide as set forth in paragraph (3) of Article I - SCOPE OF THE WORK and inserting the following specifications in lieu thereof:

"24-gallon fibre drums with aluminum foil barrier construction to be in accordance with Consolidated Freight classification, 300 pound net weight limit"

02753

3. By adding the following paragraph (5) to Article IV - PAYMENTS

"(5) Upon completion of delivery to the Commission of thorium hydroxide obtained from other sources as provided in Article II - SPECIFICATIONS AND RECOVERY there shall be deducted from any amounts otherwise due the Contractor a sum equal to the number of drums of thorium hydroxide obtained from other sources and delivered to the Commission multiplied by \$0.745, the difference in cost between 44 gallon drums and 24 gallon drums."

4. By inserting the following sentence at the end of the fifth (5th) sentence as amended of paragraph (3) of Article I - SCOPE OF THE WORK:

"All drums of rare earth sodium sulphate will contain 700 pounds net material."

5. By deleting from the last sentence of paragraph (3) of Article I - SCOPE OF WORK the words "the date which is thirty months from the date which is the first day of the month following the execution of this contract by the Commission" and inserting the date "June 1, 1960" in lieu thereof.

6. By deleting Appendix "C-1" and inserting the following in lieu thereof:

"Appendix 'C-1'
Sampling procedure for
Rare Earths Sodium Sulphate

"Rare earths sodium sulphate will be packed into the galvanized steel drums and stored pending inspection. In the presence of a Government inspector each drum will be opened and a gross sample will be taken using a grain trier 30 inches long and $\frac{1}{2}$ inch diameter with 9 openings. The gross sample will be riffled to form a composite sample for each lot. The composite sample will then be divided into four equal parts. One (1) part will be retained by the Contractor for analysis, one (1) part will be forwarded to the U. S. Atomic Energy Commission, New Brunswick, New Jersey for analysis and two (2) parts will be held by the Contractor for possible umpire analysis. Weighing of the drums will be witnessed by the Government inspector and the gross and tare weights as well as the lot number will be marked on each drum."

7. By deleting Appendix "D-1" and inserting the following in lieu thereof:

"Appendix 'D-1'
Sampling Procedure for
Thorium Hydrate Product

"Thorium hydroxide will be packed into the pre-numbered tared fibre drums. Samples for the plant control system will be taken during the packing. The drums will be immediately closed. Drums of product approved by the plant control system will be moved to a warehouse area set aside for this purpose. Accumulation of drums will go on until a minimum shipment weight has been reached at which time the Government inspector will be called in for the official gross weighing and sampling. Under the supervision of the Government inspector, each drum will be opened and a sample taken by pipe thief inserted to the full depth of the contents and with placement varied out from the top center so as not to take all samples from the same spot. The sample so taken will approximate 0.5% of the weight of the material and will be immediately placed in a clean container and the container closed. The drum opened for sampling will be immediately closed and weighed. The gross and tare weights will be marked on the drum. When all the drums in the shipment have been sampled, the sample will be thoroughly mixed by rolling for one-half hour. The blended sample shall be passed through crushing rolls set one-quarter inch apart. If the sample is essentially all minus one-quarter inch the crushing operation may be omitted. The blended, minus one-quarter inch sample will be cut down by passing through a Jones splitter and two samples of about 15 pounds each derived for moisture determination. The two 15 pound samples shall be weighed into a suitable tray for drying and dried to constant weight at $110^{\circ}\text{C} + 5^{\circ}$ for moisture determination. The two moisture contents so determined shall not be further apart than 0.5%. The two dried samples shall be blended together. After blending, four one-pound analytical samples will be taken and placed in sealed glass jars. One (1) sample will be retained by the Contractor for analysis, one (1) will be forwarded to the U. S. Atomic Energy Commission, New Brunswick, New Jersey for analysis, and two (2) will be held by the Contractor for possible umpire analysis."

IN WITNESS WHEREOF, the parties hereto have executed this amendment on the day and year first above written.

WITNESSES:

Loislie N. Clark
Bathina M. Bennett

WITNESSES:

A. Beyer
E. S. Ahlberg

THE UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

R. H. Faulkner
Acting Director
Title: Division of Raw Materials

W. R. GRACE & CO.

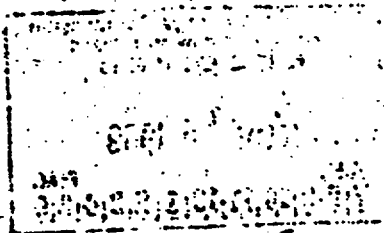
By: [Signature]
Title: Executive Vice Presidents

I, W. A. Case, certify that I am the Assistant Secretary of the corporation named as Contractor herein; that M. G. Geiger who signed this amendment on behalf of the Contractor was then Executive Vice President of said corporation; that said amendment was duly signed for and on behalf of said Contractor by authority of its governing body and is within the scope of its corporate powers.

WITNESS my hand and the seal of said corporation.

W. A. Case

(Corporate Seal)



GRACE

Davison Chemical Division

W. R. Grace & Co.
P.O. Box 2117
Baltimore, Maryland 21203

(301) 659-9000
Direct Dial (301) 659-9093

December 8, 1981

United States Nuclear
Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

Attn: Ms. Myu A. Campbell

Dear Ms. Campbell,

Enclosed are copies of the AEC contracts that we have found in our files. Please note that these contracts (AT-30-1-1037 dated November 2, 1950 and AT-49-6-993 dated July 18, 1955) are the only ones that we could find. The contract mentioned in earlier correspondence, dated May 26, 1948, is not in our possession. We have only found references to it in general correspondence.

We would also like to call your particular attention to the contractual language of Article 17, pages 15 and 16 providing that all monazite and all derivatives are, and shall at all times be, the property of the U.S. Government. This language has caused DOE to assume responsibility under this very contract for thorium waste at our Curtis Bay, Maryland plant.

We hope that the enclosed will be helpful to your study of the situation at Pompton Plains. Mr. Vierzba of Aerospace Corp. has obtained copies of all pertinent information in our files in his visit today for his report to the DOE.

Sincerely,



Armin Wille
Sr. Facilities Engineer

AW/cm

Enclosures

This document consists of 6 pages
No. 3 of 7 copies, Series A.

CONTRACT NO. AT(30-1)-1037

CONTRACT

CONTRACTOR AND ADDRESS:

RARE EARTHS, INC.
Paterson R. D. #1, New Jersey

CONTRACT FOR:

PURCHASE OF MATERIALS

ESTIMATED CONTRACT PRICE:

\$22,500.00

PAYMENT: To be made by:

Division of Disbursement, United
States Treasury Department, New
York, New York. Submit invoices to:
United States Atomic Energy Commission,
P. O. Box 30, Ansonia Station,
New York 23, New York

End

THIS CONTRACT, entered into this 2nd day of November, 1950, effective as of the 1st day of July, 1950, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), as represented by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter referred to as the "Commission") and RARE EARTHS, INC., a corporation organized and existing under the laws of the State of New Jersey, with its principal place of business in Paterson, R. D. #1, State of New Jersey, (hereinafter referred to as the "Contractor");

WITNESSETH THAT:

WHEREAS, the Commission desires to purchase, and the Contractor to sell, thorium oxide in the form of thorium fluoride sludge; and

WHEREAS, this contract is authorized by and executed under the Atomic Energy Act of 1946, in the interest of the common defense and security,

NOW, THEREFORE, the parties hereto do mutually agree as follows:

ARTICLE I - SCOPE OF THE WORK

1. The Government agrees to purchase up to 18,000 pounds of thorium oxide in the form of thorium fluoride sludge conforming to the specifications set forth in Article II of this contract, produced and delivered by the Contractor during the period from July 1, 1950 to and including June 30, 1951, at the unit price of One Dollar and Twenty-Five Cents (\$1.25) per pound of contained thorium oxide.

2. In consideration of the Government's agreement to buy, the Contractor agrees to sell any or all of such thorium oxide in such form at the unit price of One Dollar and Twenty-Five Cents (\$1.25) per pound of contained thorium oxide.

3. After delivery, the Government, through the Commission, will perform all weighing, sampling and assaying at its expense. The Contractor agrees to abide by the findings of the Government resulting from such weighing, sampling and assaying.

ARTICLE II - SPECIFICATIONS

The sludge delivered hereunder shall contain not less than fifty percent (50%) thorium oxide on a dry basis and not more than ten percent (10%) water; provided, however, that in the event that any lot or lots do not meet such specifications, the Commission may, in its discretion, accept such lot or lots at any appropriate reduction in the price as may be agreed upon by the parties. The Contractor shall endeavor in good faith, but shall not be so obligated, to increase the thorium oxide content of the sludge to 55%-60% and to decrease the water content thereof to five percent (5%) or less.

ARTICLE III - DELIVERY AND SHIPMENT

1. The thorium fluoride sludge shall be packed in plywood drums supplied by the Contractor. Each drum shall contain approximately 275 pounds of material. The drums shall be tarred on the outside. The cost of such drums is included in the unit prices set forth in Article I.

2. Delivery of the material shall be f.o.b., Contractor's Plant, Black Oak Ridge Road, Route No. 202, Wayne Township, Passaic County, New Jersey, during the period July 1, 1950 to June 30, 1951. Shipments shall be made by the Contractor as the Commission directs.

ARTICLE IV - PAYMENTS

The Contractor shall be paid upon submission of properly certified invoices or vouchers, or such other evidence as the Commission may request.

- (a) An amount equivalent to eighty percent (80%) of the price stipulated in Article I hereof, based upon the Contractor's statement of the reported net dry weight and assay of the thorium oxide so delivered.
- (b) The balance of any monies due and owing to the Contractor will be paid upon completion of the weighing, sampling and assaying of the thorium oxide by the Commission as provided in paragraph 3 of Article I of this contract. Any excess in payments to the Contractor shall be refunded to the Government, or in the discretion of the Commission, deducted from the amounts due or owing to the Contractor.

ARTICLE V - CHANGES

At any time, the Commission may, by written order, issue additional instructions, change the requirements as to shipping and packaging, and change the specification or composition of the material to be delivered in the performance of this contract. If such changes cause a material increase or decrease in the amount or character of the work, in the amount due the Contractor, or in the time required for the performance of this contract, an equitable adjustment shall be made and the contract shall be modified in writing accordingly. Any claim for adjustment under this Article must be asserted by the Contractor within ten (10) days from the date the change is ordered; provided, however, that the Commission may receive, consider and adjust any such claim at any time prior to the date of final settlement of this contract. A failure to agree mutually upon the adjustment to be made under this Article V shall constitute a dispute to be decided in accordance with Article VIII of this contract.

ARTICLE VI - NOTICE OF SHIPMENTS

In effecting deliveries under this contract by common carrier, the Contractor shall give the Commission prepaid notice of all shipments.

ARTICLE VII - ASSIGNMENT OR TRANSFER

Neither this contract nor any interest or claim relating to this contract, shall be assigned or transferred, except with the prior approval of the Commission in writing.

ARTICLE VIII - DISPUTES

Except as otherwise specifically provided in this contract, all disputes which may arise under this contract, and which are not disposed of by mutual agreement, shall be decided by a representative of the Commission duly authorized to supervise and administer performance of the work under this contract, who shall reduce his decision to writing and mail a copy thereof to the Contractor. Said decision shall be final and conclusive subject to the right of the Contractor to appeal as provided for in the sentence next following. Within thirty (30) days from receipt of such notice, the Contractor may appeal in writing to the Commission, whose written decision or that of its other designated representative or representatives or board shall be final and conclusive. Pending decision of any dispute, the Contractor shall diligently proceed with the performance of the work under this contract.

ARTICLE IX - DISCLOSURE OF INFORMATION

1. It is understood that disclosure of information relating to the work contracted for hereunder to any person not entitled to receive it, or failure to safeguard all top secret, secret, confidential and restricted matter that may come to the Contractor or any person under its control in connection with the work under this contract, may subject the Contractor, its agents, employees, and subcontractors to criminal liability under the laws of the United States. See the Atomic Energy Act of 1946 (Public Law 585 - 79th Congress). See also the provisions of an Act approved June 25, 1948, effective September 1, 1948, set forth in 18 U.S.C. 791-797; 18 U.S.C. 5, 11, 2388 and 3241; 50 U.S.C. 40 and 42.

2. The Contractor agrees to conform to all security regulations and requirements of the Atomic Energy Commission. Except as the Commission may authorize, in accordance with the provisions of the Atomic Energy Act of 1946, the Contractor agrees not to permit any individual to have access to restricted data until the Federal Bureau of Investigation shall have made an investigation and report to the Commission on the character, associations, and loyalty of such individual and the Commission shall have determined that permitting such person to have access to restricted data will not endanger the common defense or security. The term "restricted data" as used in this paragraph means all data concerning the manufacture or utilization of atomic weapons, the production of fissionable material, or the use of fissionable material in the production of power, but shall not include any data which the Commission from time to time determines may be published without adversely affecting the common defense and security.

3. The Contractor shall insert in all subcontracts under this contract, provisions similar to the text of this Article.

ARTICLE X - INSPECTION AND REPORTS

1. The Commission shall have the right to inspect in such manner and at such times as it deems appropriate all activities of the Contractor arising in the course of the work under this contract.

2. The Contractor shall make such reports to the Commission with respect to the Contractor's activities under this contract as the Commission may require from time to time.

ARTICLE XI - RESPONSIBILITY FOR SUPPLIES TENDERED

The Contractor shall be responsible for all materials covered by this contract until delivery to, and acceptance by, the Commission. The Contractor shall bear all risk with respect to such materials which have been rejected by the Commission.

ARTICLE XII - SUBCONTRACTS

The Contractor shall not subcontract any part of the work it is obligated to perform under this contract except as authorized in writing by the Commission; provided, however, that the word "subcontract", as used in this Article, shall not be deemed to include (a) any purchase of a standard commercial or catalog item, or (b) any purchase of a basic raw material, or (c) any purchase of supplies or services for the general operation of the Contractor's Plant.

ARTICLE XIII - COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that it has not employed any person to solicit or secure this contract upon any agreement for a commission, percentage, brokerage, or contingent fee. Breach of this warranty shall give the Government the right to annul the contract, or, in its discretion, to deduct from the contract price or consideration the amount of such commission, percentage, brokerage, or contingent fee. This warranty shall not apply to commissions payable by contractors upon contracts or sales secured or made through bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business.

ARTICLE XIV - OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE XV - EIGHT-HOUR LAW

To the extent that said law is applicable to this contract, the provisions of the Eight-Hour Law (Title 40, U. S. C. Secs. 324, 325, 325a, 326) shall apply hereto and they shall be deemed incorporated herein by reference.

ARTICLE XVI - DEFINITIONS

As used in this contract, the terms "United States Atomic Energy Commission", "Atomic Energy Commission" and "Commission" shall mean the United States Atomic Energy Commission or its duly authorized representative or representatives.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the day and year first above written.

THE UNITED STATES OF AMERICA

Witnesses:

Robert H. Moore
ROBERT H. MOORE
Washington, D.C.
(Address)

Charles P. Meitzger
CHARLES P. MEITZGER
51 Clinton Ave. Albany, N.Y.
(Address)

By: UNITED STATES ATOMIC ENERGY COMMISSION

H. B. Fay
H. B. FAY
AUTHORIZED REPRESENTATIVE OF THE
U. S. ATOMIC ENERGY COMMISSION

RARE EARTHS, INC.

By: Henry H. Mandel
Title: Pres.

I, Richard L. Stone, certify that I am the vice-president of the corporation named as Contractor herein; that Henry H. Mandel who signed this contract on behalf of the Contractor was then President of said corporation; that said contract was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

IN WITNESS WHEREOF, I have hereunto affixed my hand and the seal of said corporation this 16 day of Nov., 1950.

(Corporate Seal)

Richard L. Stone

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31 Pages
Appended
This document consists of 25
pages, No. 7 of 11. Series A.

47-6
CONTRACT NO. AT(29-6)-993

THIS CONTRACT, entered into this 18th day of July, 1955, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government") as represented by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission") and RARE EARTHS, INC., a corporation organized under the laws of the State of New Jersey (hereinafter called the "Contractor").

WITNESSETH THAT:

WHEREAS, the Government desires to have the Contractor perform certain work and services as hereinafter provided; and

WHEREAS, the Contractor is willing to install the facilities to perform his work and to furnish the services upon the terms and conditions hereinafter stated; and

WHEREAS, this contract is authorized by law, including the Atomic Energy Act of 1954;

NOW, THEREFORE, the parties hereto do mutually agree as follows:

ARTICLE I - SCOPE OF THE WORK

- (1) The Commission agrees to deliver to the Contractor f.o.b. cars or trucks at a plant in Sewaren, New Jersey, or a plant in Baltimore, Maryland, designated by the Contractor, approximately 7,900 short tons of monazite at the rate of approximately 600 tons per month, beginning seven months after the first day of the month following the execution of the contract by the Commission, or such earlier date as is mutually agreeable to the Contractor and the Commission. In the event of delay in any delivery of monazite the Commission shall, if requested by the Contractor, make a determination of the delay occasioned the Contractor thereby and shall grant to the Contractor a reasonable extension of time in respect of performance of this contract.

The Government shall not be liable to the Contractor for damages or loss of profit by reason of any delay in delivery of monazite, except that in case of such delay, upon the written request of the Contractor an equitable adjustment shall be made in the delivery dates, or price or both, and in any other contractual provision affected thereby, in accordance with the procedures provided for in the article entitled "Changes."

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It is mutually agreed by the Commission and the Contractor that this contract is entered into on the assumption that the total amount of all monazite delivered by the Commission will contain the average ThO_2 content and the average Rare Earth Oxide content set forth in Appendix A and that in the event the average ThO_2 content and/or the average Rare Earth Oxide content of such monazite is less than the averages set forth in Appendix A an equitable adjustment will be made in the provisions of this contract relating to deliveries by the Contractor, guaranteed recoveries, and deductions for failure to deliver guaranteed recoveries. It is agreed that any containers used in furnishing monazite to the Contractor are, and shall remain, the property of the Government. The Contractor agrees to dispose of such containers as directed by the Contracting Officer. In the event that no instructions are received from the Contracting Officer within sixty (60) days of the date that each container is emptied, the Contractor may so advise the Commission and the Commission shall have 10 days to direct the disposition of the containers. If directions are not issued within this 10-day period, it shall be assumed that the containers have been abandoned and title to such containers shall pass to the Contractor.

- (2) The Contractor agrees to produce from the monazite furnished by the Commission crude thorium hydroxide and rare earths sodium sulfate conforming to the specifications set forth in Appendices C-3 and D-3 and to the guaranteed recoveries set forth in Article II - Specifications and Recovery.
- (3) The Contractor agrees to deliver the crude thorium hydroxide and rare earths sodium sulfate f.o.b. cars or trucks Contractor's plant where the monazite has been processed. Shipments shall be made by the Contractor in accordance with instructions of the Contracting Officer. Commission undertakes to give to Contractor shipping instructions at least one month in advance of anticipated deliveries of which it has been notified in writing. Unless otherwise authorized by the Contracting Officer crude thorium hydroxide shall be delivered in 44-gallon fibre drums with aluminum foil barrier construction to be in accordance with Consolidated Freight Classification 300 lb. net weight limit for shipment of thorium hydroxide, and rare earths sodium sulfate shall be delivered in 55-gallon steel drums meeting the following specifications: at least 18 gauge steel; full open head; bolted ring-type cover; corrosion resistant inner coating. The Contractor shall furnish all containers. Deliveries by the Contractor shall be commenced as early as practicable (but in no event later than the first day of the month which is twelve months after the first day of the month following execution of this contract by the Commission) and shall be continued in an approximately uniform manner, with final delivery not later than the date which is thirty months from the date which is the first day of the month following the execution of this contract by the Commission.

Commission agrees to pay the Contractor \$415.27 minus any adjustments as provided in the article of this contract entitled "Payments."

- (5) The Commission reserves the right to deliver to the Contractor prior to the first day of the month which is twenty-four months following the execution of this contract by the Commission up to 1,000 short tons of monazite in addition to that described in subsection 1 of this Article, and the Contractor agrees to process such additional monazite in accordance with the terms and conditions of this contract, except that the price is to be agreed upon; provided such monazite is received prior to such time.

ARTICLE II - SPECIFICATIONS AND RECOVERY

- (1) The crude thorium hydroxide delivered by the Contractor shall conform to the specifications set forth in Appendix D-3.
- (2) The Contractor agrees to recover and deliver as crude thorium hydroxide conforming to the specifications set forth in Appendix D-3 at least 95% of all the ThO_2 contained in the total amount of monazite furnished the Contractor, as determined pursuant to this contract and its appendices. The Contractor, at its option, may supplement the crude thorium hydroxide recovered from the monazite delivered by the Commission with crude thorium hydroxide obtained from other sources in order to deliver the percentage required by this section (2).
- (3) The rare earths sodium sulfate delivered by the Contractor shall conform to the specifications and the symbolic formula set forth in Appendix C-3.
- (4) The Contractor agrees to recover and deliver as rare earths sodium sulfate conforming to the specifications set forth in Appendix C-3 at least 95% of all the rare earths oxide contained in the total amount of monazite furnished the Contractor, as determined pursuant to this contract and its appendices. The Contractor, at its option, may supplement the rare earths sodium sulfate recovered from the monazite delivered by the Commission with rare earths sodium sulfate obtained from other sources in order to deliver the percentage required by this section (4).
- (5) If the Contractor recovers and delivers less than 85% of the rare earths oxide contained in the total amount of monazite furnished the Contractor, as determined pursuant to this Contract and its appendices,

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The Contractor agrees to obtain from the Commission and deliver to the Commission sufficient rare earths sodium sulfate conforming to the specifications set forth in Appendix C-3 to make deliveries equal 85% of the rare earths oxide contained in the total amount of monazite furnished the Contractor, as determined pursuant to this contract and its appendices.

ARTICLE III - WEIGHING, SAMPLING AND ANALYSING

- (1) All monazite, crude thorium hydroxide and rare earths sodium sulfate delivered under this contract shall be weighed, sampled, analysed and the moisture content determined in accordance with the methods set forth in the appendices to this contract, or in accordance with method mutually agreeable to the Commission and the Contractor, and at the expense of the Contractor except as otherwise provided in the appendices to this contract.
- (2) Unless otherwise authorized by the Contracting Officer all weighing and sampling of monazite, crude thorium hydroxide and rare earths sodium sulfate shall be performed in the presence of a duly authorized representative of the Commission.

ARTICLE IV - PAYMENTS

- (1) Each month (following a month when monazite is processed) the Contractor shall submit a properly certified invoice for monazite, processing of which was completed during the preceding month. A provisional payment, at the rate stipulated in Article I, of ninety percent (90%) of each properly certified invoice shall be made upon receipt of each invoice. After the amount withheld from such provisional payments equals \$100,000, future provisional payments at the rate stipulated in Article I, of one hundred percent (100%) of each properly certified invoice shall be made upon receipt of each invoice, except as provided in paragraph 2(d) of this article. The balance due, with adjustments as provided herein, shall be paid upon completion of deliveries required by this contract and upon completion of all weighing, sampling, moisture determination and analysis as provided in Article III hereof. Any overpayment, tentatively determined, or any overpayment, finally determined, shall be refunded forthwith by the Contractor or deducted from future payments as the Commission may direct.
- (2) Reports: Upon completion or termination of this contract, the Contractor shall submit with respect to performance during the entire contract period, a report on (i) the quantity of monazite processed, (ii) the ThO_2 and rare earths oxide content of monazite processed, as determined pursuant to the appendices of this contract, and (iii) the quantities of crude thorium hydroxide and rare earths sodium sulfate removed by processing monazite and delivered to the Commission. In addition to the above-described

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report; the Contractor shall submit a report of the month following the first delivery of monazite to the Contractor and at the end of each succeeding three-month period, a report, on a cumulative basis from inception of the contract, furnishing similar information, adjusted for work in process at the end of the period covered.

(3) Adjustments:

(a) If upon completion of deliveries required by this contract the total quantity of ThO_2 contained in the crude thorium hydroxide delivered to the Commission is less than 95% of the total ThO_2 contained in the monazite delivered to the Contractor, a deduction will be made in accordance with the following schedule:

| <u>Percent of ThO_2 Content
of Monazite Recovered
in Crude Thorium
Hydroxide</u> | <u>Deduction Per Unrecovered
Pound of ThO_2 Under 95%
Contained in Monazite if
Less than 95% is Recovered</u> |
|--|---|
| Less than 95% but
not less than 94% | \$2.50 |
| Less than 94% but
not less than 93% | \$3.00 |
| Less than 93% but
not less than 92% | \$3.50 |
| Less than 92% but
not less than 91% | \$4.00 |
| Less than 91% but
not less than 90% | \$4.50 |
| Less than 90% | \$5.00 |

The deduction provided above shall be made from any amounts otherwise due the Contractor and if such deduction exceed the amounts due the Contractor, the Contractor shall forthwith pay the difference to the Commission.

(b) If upon completion of deliveries required by this contract the total quantity of rare earths oxide contained in the rare earths sodium sulfate delivered to the Commission is less than 95% of the total rare earths oxide contained in the monazite

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in accordance with the following schedule:

| <u>Percent of Rare Earths
Oxide Content of Monazite
Recovered in Rare Earths
Sodium Sulfate</u> | <u>Deduction: Per Unrecovered
Pound of Rare Earths Oxide
Under 95% contained in
Monazite if Less than 95%
is Recovered</u> |
|---|--|
| Less than 95% but
not less than 94% | \$0.05 |
| Less than 94% but
not less than 93% | \$0.10 |
| Less than 93% but
not less than 92% | \$0.15 |
| Less than 92% but
not less than 91% | \$0.20 |
| Less than 91% but
not less than 90% | \$0.25 |
| Less than 90% but
not less than 85% | \$0.50 |

The deduction provided above shall be made from any amounts otherwise due the Contractor and if such deduction exceeds the amounts due the Contractor, the Contractor shall forthwith pay the difference to the Commission.

(c) In the event that any product delivered hereunder does not meet the specifications set forth in Appendices C-3 or D-3 of this contract the Commission may, in its discretion, accept such product at an appropriate reduction in price as may be agreed upon by the parties. If the parties fail to agree upon an appropriate reduction in price the Commission shall determine an appropriate reduction in price subject to the right of appeal by the Contractor pursuant to the article entitled "Disputes." The Commission shall pay promptly 90% of the price determined by it, which shall be on account of any price finally determined in the event of an appeal by the Contractor.

ARTICLE V - CHANGES

The Contracting Officer may at any time, by a written order, make changes in the general scope of this contract, in any one or more of the following: (i) method of shipment or packing; and (ii) place of delivery. If any such change causes an increase or decrease in the cost of, or the time required for, performance of this contract, an equitable adjustment shall be made promptly in the contract price or delivery schedule, or both, and the contract shall be modified in writing accordingly. Any claim by the Contractor for adjustment under this clause must be asserted within

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tion of change; Provided, however, That the Contracting Officer, if he decides that the facts justify such action, may receive and act upon any such claim asserted at any time prior to final payment under this contract. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the article of this contract entitled "Disputes." However, nothing in this article shall excuse the Contractor from proceeding with the contract as changed.

ARTICLE VI - DISPUTES

Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. Within 30 days from the date of receipt of such copy, the Contractor may appeal by mailing or otherwise furnishing to the Contracting Officer a written appeal addressed to the Commission, and the decision of the Commission shall, unless determined by a court of competent jurisdiction to have been fraudulent, arbitrary, capricious, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence, be final and conclusive: Provided, That, if no such appeal to the Commission is taken, the decision of the Contracting Officer shall be final and conclusive. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

ARTICLE VII - ASSIGNMENT

- (1) Subject to section (2) of this article, neither this contract nor any interest therein nor claim thereunder shall be assigned or transferred by the Contractor, except as expressly authorized in writing by the Contracting Officer.
- (2) Pursuant to the provisions of the Assignment of Claims Act of 1940 (31 U. S. Code 203, 41 U. S. Code 15), if this contract provides for payments aggregating \$1,000 or more, claims for moneys due or to become due the Contractor from the Government under this contract may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment shall cover all amounts payable under this contract and not already paid, and shall not be made to more than one party,

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except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Notwithstanding any provision of this contract, payment to an assignee of any claim under this contract shall not be subject to reduction or set-off, to the extent provided in said Act as amended.

ARTICLE VIII - EXAMINATION OF RECORDS

- (1) The Contractor agrees that the Commission and the Comptroller General of the United States or any of their duly authorized representatives shall have access to and the right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this contract until the expiration of three years after final payment under this contract unless the Commission authorize their prior disposition.
- (2) The Contractor further agrees to include in all his sub-contracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor involving transactions related to the sub-contract until the expiration of three years after final payment under this contract unless the Commission authorize their prior disposition. The term "subcontract" as used herein means any purchase order or agreement to perform all or any part of the work or to make or furnish any materials required for the performance of this contract, but does not include (i) purchase orders not exceeding \$1,000, (ii) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public, or (iii) subcontracts or purchase orders for general inventory items not specifically identifiable with the work under this contract.
- (3) Nothing in this contract shall be deemed to preclude an audit by the General Accounting Office of any transaction under this contract.

ARTICLE IX - INSPECTION OF CONTRACTOR'S ACTIVITIES, REPORTS

- (1) The Commission shall have the right to inspect at reasonable times all activities of the Contractor arising in the course of the work under this contract.
- (2) The Contractor shall make such reports to the Commission with respect to the Contractor's activities under this contract as the Commission may reasonably require from time to time.

ARTICLE X - SECURITY

- (1) Contractor's Duty to Safeguard Restricted Data and Other Classified Information. In the performance of the work under this contract the Contractor shall, in accordance with the Commission's security regulations and requirements, be responsible for safeguarding restricted data and other classified matter and protecting against sabotage, espionage, loss and theft, the classified documents, materials, equipment, processes, etc., as well as such other material of high intrinsic or strategic value as may be in the Contractor's possession in connection with performance of work under this contract. Except as otherwise expressly provided in the specifications the Contractor shall upon completion or termination of this contract transmit to the Commission any classified matter in the possession of the Contractor or any person under the Contractor's control in connection with performance of this contract.
- (2) Regulations. The Contractor agrees to conform to all security regulations and requirements of the Commission and the Commission agrees to reimburse the Contractor for all necessary and reasonable expenses incurred as a result of any changes in the security regulations and requirements relating to this contract.
- (3) Definition of Restricted Data. The term "Restricted Data," as used in this article, means all data concerning (1) design, manufacture or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category pursuant to section 142 of the Atomic Energy Act of 1954.
- (4) Security Clearance of Personnel. Except as the Commission may authorize, in accordance with the Atomic Energy Act of 1954, the Contractor shall not permit any individual to have access to Restricted Data until the designated investigating agency shall have made an investigation and report to the Commission on the character, associations, and loyalty of such individual and the Commission shall have determined that permitting such person to have access to Restricted Data will not endanger the common defense and security. As used in this paragraph, the term "designated investigating agency" means the United States Civil Service Commission or the Federal Bureau of Investigation, or both, as determined pursuant to the provisions of the Atomic Energy Act of 1954.
- (5) Criminal Liability. It is understood that disclosure of Restricted Data and other classified information relating to the work or services ordered hereunder to any person not entitled to receive it, or failure to safeguard any Restricted Data or any top secret,

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secret, or confidential matter that may come to the Contractor or any person under the Contractor's control in connection with work under this contract, may subject the Contractor, his agents, employees, and subcontractors to criminal liability under the laws of the United States. (See the Atomic Energy Act of 1954, 68 Stat. 919. See also Title 18, U. S. C. Sec. 791-798 and Executive Order 10104 of February 1, 1950, 15 F.R. 597.)

- (6) Subcontracts and Purchase Orders. Except as otherwise authorized in writing by the Contracting Officer, the Contractor shall insert provisions similar to the foregoing in all subcontracts and purchase orders under this contract.

ARTICLE XI - SUBCONTRACTS

The Contractor shall not subcontract any part of the work it is obligated to perform under this contract except as authorized in writing by the Commission.

ARTICLE XII - LABOR

(1) Eight Hour Laws

This contract, to the extent that it is of a character specified in the Eight-Hour Law of 1912 as amended (40 U. S. Code 324-326) and is not covered by the Walsh-Healey Public Contracts Act (41 U. S. Code 35-45), is subject to the following provisions and exceptions of said Eight-Hour Law of 1912 as amended, and to all other provisions and exceptions of said Law:

No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the Contractor or any subcontractor contracting for any part of the said work, shall be required or permitted to work more than eight hours in any one calendar day upon such work, except upon the condition that compensation is paid to such laborer or mechanic in accordance with the provisions of this clause. The wages of every such laborer and mechanic employed by the Contractor or any subcontractor engages in the performance of this contract shall be computed on a basic day rate of eight hours per day; and work in excess of eight hours per day is permitted only upon the condition that every such laborer and mechanic shall be compensated for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay. For each violation of the requirement of this clause a penalty of five dollars shall be imposed upon the Contractor for each such laborer or mechanic for every calendar day in which such employee is required or permitted to labor more than eight hours upon said work without receiving compensation computed in accordance with this clause; and all penalties thus imposed shall be withheld for the use and benefit of the Government

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(2) Walsh-Harley Public Contracts Act

To the extent that this contract is subject to the Walsh-Harley Public Contracts Act, as amended (41 U. S. Code 35-45), there are hereby incorporated by reference the representations and stipulations required by said Act and regulations issued thereunder by the Secretary of Labor, such representations and stipulations being subject to all applicable rulings and interpretations of the Secretary of Labor which are now or may hereafter be in effect.

(3) Convict Labor

In connection with the performance of work under this contract the Contractor shall not employ any person undergoing sentence of imprisonment at hard labor.

(4) Nondiscrimination

(a) In connection with the performance of work under this contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of race, religion, color, or national origin. The aforesaid provision shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of the non-discrimination clause.

(b) The Contractor further agrees to insert the provisions of section (4)(a) above in all subcontracts hereunder, except subcontracts for standard commercial supplies or raw materials.

ARTICLE XIII - PATENTS

- (1) Whenever any invention or discovery is made or conceived by the Contractor or its employees in the course of, in connection with, or under the terms of this contract, the Contractor shall furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed, and to determine the disposition of the title to and the rights under any application or patent that may result; provided, however, that the Contractor in any event, shall retain at least a sole (except as against the Government or its account), irrevocable, royalty-free license with the sole right

to grant sublicenses, under said invention, discovery, application or patent, such license being limited to the manufacture, use, and sale for purposes other than use in the production or utilization of source material or values associated therewith, special nuclear material or atomic energy. Subject to the license retained by the Contractor, as provided in this paragraph, the judgment of the Commission on these matters shall be accepted as final; and the Contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.

- (2) No claim for pecuniary award or compensation under the provisions of the Atomic Energy Acts of 1946 and 1954 shall be asserted by the Contractor or its employees with respect to any invention or discovery made or conceived in the course of, in connection with, or under the terms of this contract.
- (3) Except as otherwise authorized in writing by the Commission the Contractor will obtain patent agreements to effectuate the purposes of paragraphs 1 and 2 of this article from all persons who perform any part of the work under this contract, except such clerical and manual labor personnel as will not have access to technical data.
- (4) Except as otherwise authorized in writing by the Commission, the Contractor will insert in all subcontracts provisions making this article applicable to the subcontractor and its employees.
- (5) Patent Indemnity

The Contractor agrees to indemnify the Government, its officers, agents, servants and employees against liability of any kind (including costs and expenses incurred) for the use of any invention or discovery and for the infringement of any Letters Patent (not including liability, arising pursuant to Section 183, Title 35, (1952) U.S. Code, prior to the issuance of Letters Patent) occurring in the performance of this contract.

ARTICLE XIV - TAXES

(1) Definitions

As used throughout this article, the following terms shall have the meanings set forth below:

- (a) The term "direct tax" means any tax or duty directly applicable to the completed supplies or services covered by this contract, or any other tax or duty from which the Contractor or this

transaction is exempt. It includes any tax or duty directly applicable to the importation, production, processing, manufacture, construction, sale, or use of such supplies or services covered by this contract. The term does not include transportation taxes, unemployment compensation taxes, social security taxes, income taxes, excess-profits taxes, capital stock taxes, property taxes, and such other taxes as are not within the definition of the term "direct tax" as set forth above in this paragraph.

(b) The term "contract date" means the effective date of this contract if it is a negotiated contract, or the date set for the opening of bids if it is a contract entered into as a result of formal advertising.

(2) Federal Taxes.

Except as may be otherwise provided in this contract, the contract price includes all applicable Federal taxes in effect on the contract date.

(3) State or Local Taxes.

Except as may be otherwise provided in this contract, the contract price does not include any State or local direct tax in effect on the contract date.

(4) Evidence of Exemption.

The Commission agrees, upon request of the Contractor, to furnish a tax exemption certificate or other similar evidence of exemption with respect to any direct tax not included in the contract price pursuant to this article; and the Contractor agrees, in the event of the refusal of the applicable taxing authority to accept such evidence of exemption, (i) promptly to notify the Contracting Officer of such refusal, (ii) to cause the tax in question to be paid in such manner as to preserve all rights to refund thereof, and (iii) if so directed by the Contracting Officer, to take all necessary action, in cooperation with and for the benefit of the Government, to secure a refund of such tax (in which event the Commission agrees to reimburse the Contractor for any and all reasonable expenses incurred at its direction).

(5) Price Adjustment.

If, after the contract date, the Federal Government or any State or local government either (i) imposes or increases (or removes an exemption with respect to) any direct tax, or any tax directly applicable to the materials or components used in the

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manufacture or furnishing of the completed supplies or services covered by this contract, or (ii) refuses to accept the evidence of exemption, furnished under paragraph (4) hereof, with respect to any direct tax excluded from the contract price, and if under either (i) or (ii) the Contractor is obliged to and does pay or bear the burden of any such tax (and does not secure a refund thereof), the contract price shall be correspondingly increased. If, after the contract date, the Contractor is relieved in whole or in part from the payment or the burden of any direct tax included in the contract price, or any tax directly applicable to the materials or components used in the manufacture or furnishing of the completed supplies or services covered by this contract, the Contractor agrees promptly to notify the Contracting Officer of such relief, and the contract price shall be correspondingly decreased or the amount of such relief paid over to the Government. Invoices or vouchers covering any increase or decrease in contract price pursuant to the provisions of this paragraph shall state the amount thereof, as a separate added or deducted item, and shall identify the particular tax imposed, increased, eliminated, or decreased.

(6) Refund or Drawback

If any tax or duty has been included in the contract price or the price as adjusted under paragraph (5) of this article, and if the Contractor is entitled to a refund or drawback by reason of the export or re-export of supplies covered by this contract, or of materials or components used in the manufacture or furnishing of the completed supplies or services covered by this contract, the Contractor agrees that he will promptly notify the Contracting Officer thereof and that the amount of any such refund or drawback obtained will be paid over to the Government or credited against amounts due from the Government under this contract: Provided, however, That the Contractor shall not be required to apply for such refund or drawback unless so requested by the Contracting Officer.

ARTICLE XV - GOVERNMENT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration the

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full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE XVI - OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE XVII - BUY AMERICAN ACT

The Contractor agrees that there will be delivered under this contract only such unmanufactured articles, materials and supplies (which term "articles, materials and supplies" is hereinafter referred to in this clause as "supplies"), as have been mined or produced in the United States, and only such manufactured supplies as have been manufactured in the United States substantially all from supplies mined, produced or manufactured, as the case may be, in the United States. The foregoing provisions shall not apply (i) with respect to supplies exempted by the Commission from the application of the Buy American Act (41 U. S. C. 10a-4), (ii) with respect to supplies for use outside the United States, or (iii) with respect to supplies to be delivered under this contract which are of a class or kind determined by the Commission not to be mined, produced, or manufactured, as the case may be, in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality, or (iv) with respect to such supplies, from which the supplies to be delivered under this contract are manufactured, as are of a class or kind determined by the Commission not to be mined, produced, or manufactured, as the case may be, in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality, provided that this exception (iv) shall not permit delivery of supplies manufactured outside the United States if such supplies are manufactured in the United States in sufficient and reasonable available commercial quantities and of a satisfactory quality. The Commission confirms that the product, crude thorium hydroxide, to be delivered by the Contractor hereunder, and the monazite from which that product and rare earths is derived and the rare earths extracted from monazite furnished by the Commission, are excepted from the terms of the "Buy American Act."

ARTICLE XVII - PROPERTY

- (1) Title to monazite delivered to the Contractor and to all materials extracted under this contract from such monazite shall be in the Government and shall remain in the Government throughout the

~~OFFICIAL USE ONLY~~

performance of all work hereunder. The Contractor may without accountability to the Commission dispose of gangue and other residue and effluent as the work progresses by any means other than sale or transfer to others (or by sale or transfer to others if the same is approved by the Contracting Officer) or may use or sell or transfer the effluent in other operations or products of the Contractor. If the Commission shall request and a mutually satisfactory method is available, the Contractor shall recover and deliver to the Commission uranium values contained in the effluent provided the Commission shall compensate the Contractor by a mutually satisfactory processing fee.

- (2) The Contractor shall be liable for loss or destruction of or damage to Government-furnished property except where such loss, destruction, or damage is due to any excepted peril, as hereinafter defined; provided, further, that notwithstanding the foregoing the Contractor shall be liable where such loss, destruction, or damage is due to any excepted peril through failure of the Contractor to comply with paragraph 3 or through the wilful misconduct or lack of good faith on the part of the Contractor's managerial personnel, as hereinafter defined. The term "excepted perils" shall mean: Fire; lightning; windstorm; cyclone; tornado; hail; explosion; riot attending a strike; civil commotion; vandalism and malicious mischief; aircraft or objects falling therefrom; vehicles running on land or tracks (excluding vehicles owned or operated by the Contractor or any agent or employee of the Contractor); smoke; sprinkler leakage; earthquake or volcanic eruption; flood, meaning thereby rising of rivers or streams; enemy attack or any action by the military, navy, or air forces of the United States in resisting enemy attack.

The term "Contractor's managerial personnel" shall mean the Contractor's directors, officers and any of its managers, superintendents, or other equivalent representatives who have supervision or direction of 1. all or substantially all of the Contractor's business; or 2. all or substantially all of the Contractor's operation at any one plant or separate location at which the contract is being performed; or 3. a separate and complete major industrial operation in connection with the performance of the contract; or 4. a separate and complete major construction, alteration or repair operation in connection with performance of the contract. The Government, at its discretion, may repair or replace Government-furnished material that has been lost or destroyed for which the Contractor is not liable. If the Contractor is not liable under this subparagraph for the loss or destruction of Government-furnished property, the amount of such property lost or destroyed shall be deducted prior to computing any price adjustment pursuant to Article IV or prior to computing the minimum delivery of rare earths oxide pursuant to Article II (5).

- (3) The Contractor shall take all reasonable precautions, as directed by the Contracting Officer, or in the absence of such directions in accordance with sound industrial practice, to safeguard and protect Government property in the Contractor's possession or custody. Special measures shall be taken by the Contractor in the protection of and accounting for any classified or special materials involved in the performance of this contract, in accordance with the regulations and requirements

~~OFFICIAL USE ONLY~~

- (4) Upon the happening of any loss or destruction of or damage to Government-furnished property in the possession or custody of the Contractor, the Contractor shall immediately inform the Commission of the occasion and extent thereof, shall take all reasonable steps to protect the property remaining, and shall, except to the extent that the Contractor is relieved of liability in accordance with paragraph 2, repair or replace, if and as directed by the Contracting Officer, the lost, destroyed, or damaged Government-furnished property, but shall take no action prejudicial to the right of the Government to recover therefor from third parties and shall furnish to the Government on request all reasonable assistance in obtaining such recovery.

ARTICLE XIX - TERMINATION FOR DEFAULT

- (1) The Commission may, subject to the provisions of paragraph (2) below, by written Notice of Default to the Contractor terminate the whole or any part of this contract in any one of the following circumstances:
- (i) if the Contractor fails to make delivery of the supplies or to perform the services within the time specified herein or any extension thereof; or

~~OFFICIAL USE ONLY~~

- (ii) if the Contractor fails to perform any of the other provisions of this contract, or so fails to make progress as to endanger performance of this contract in accordance with its terms, and in either of these two circumstances does not cure such failure within a period of 10 days (or such longer period as the Contracting Officer may authorize in writing) after receipt of notice from the Contracting Officer specifying such failure.
- (2) The Contractor shall not be liable for any damages or excess cost if any failure to perform the contract arises out of causes beyond the control and without the fault or negligence of the Contractor. Such causes include, but are not restricted to, acts of God or of the public enemy, acts of Government, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, inability to obtain essential equipment or materials, unusually severe weather, and defaults of subcontractors due to any of such causes unless the Contracting Officer shall determine that the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the Contractor to meet the required delivery schedule.
- (3) In the event the Commission terminates this contract in whole or in part as provided in paragraph (1) of this article, the Commission may procure, upon such terms and in such manner as the Contracting Officer may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the Commission for any excess costs for such similar supplies or services, Provided, that the Contractor shall continue the performance of this contract to the extent not terminated under the provisions of this clause.
- (4) If this contract is terminated as provided in paragraph (1) of this clause, the Commission, in addition to any other rights provided in this clause, may require the Contractor to transfer title (if title is not in the Government) and deliver to the Commission, in the manner and to the extent directed by the Contracting Officer, (i) any completed supplies, and (ii) such partially completed supplies and materials, parts, tools, dies, jigs, fixtures, plans, drawings, information, and contract rights (hereinafter called "manufacturing materials") as the Contractor has specifically produced or specifically acquired for the performance of such part of this contract as has been terminated; and the Contractor shall, upon direction of the Contracting Officer, protect and preserve property in possession of the Contractor in which the Government has an interest. The Government shall pay to the Contractor the contract price for completed supplies delivered to and accepted by the Commission, and the amount agreed upon by the Contractor and the Contracting Officer for manufacturing materials delivered to and accepted by the Commission and for the protection and preservation of property. Failure to agree shall be a dispute concerning a question of fact within the meaning of the clause

of this contract entitled "Disputes."

- (5) If, after notice of termination of this contract under the provisions of paragraph (1) of this clause, it is determined that the failure to perform this contract is due to causes beyond the control and without the fault or negligence of the Contractor pursuant to the provisions of paragraph (2) of this clause, such Notice of Default shall be deemed to have been issued pursuant to the clause of this contract entitled "Termination for Convenience of the Government," and the rights and obligations of the parties hereto shall in such event be governed by such clause.
- (6) The rights and remedies of the Government provided in this article shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

ARTICLE XX - TERMINATION FOR CONVENIENCE OF THE GOVERNMENT - .

- (1) The Commission may at any time terminate performance of all or part of the work under this contract for the convenience of the Government, by written notice to the Contractor stating the ground for termination. Such termination shall be effective in the manner and upon the date specified in said notice and shall be without prejudice to any claims which the Government may have against the Contractor. Upon receipt of such notice, the Contractor shall, unless the notice directs otherwise --
 - (a) complete processing of such monazite as is being processed at the time of the termination; immediately discontinue all other work and the placing of all orders for materials, facilities, and supplies in connection with the performance of this contract, except to the extent needed to complete processing of monazite in process as aforesaid;
 - (b) proceed to cancel promptly all existing orders and terminate all subcontracts insofar as such orders or subcontracts are related to this contract, except to the extent needed to complete processing of monazite in process as set forth in paragraph (a) above,
 - (c) assign to the Government in the manner and to the extent directed by the Commission all the right, title and interest of the Contractor under the terminated portion of the orders and subcontracts so terminated.
- (2) Upon such termination of performance of work under this contract for the convenience of the Government, full and complete settlement of all claims of the Contractor arising out of such termination

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shall be made as follows:

- (a) The Government shall reimburse the Contractor for such further expenditures made after the date of termination for the protection of Government property, for the cost to the Contractor of terminating subcontracts and canceling orders as required by Article XX, and for such legal and accounting services in connection with the settlement of this contract as are required or approved by the Commission.
- (b) The Contractor shall be paid, according to the contract terms, the unpaid balance for products delivered in accordance with the contract terms to the date of termination, and for such products which were in process at the time of termination and which were completed pursuant to paragraph 1 (a) of this article and delivered in accordance with the contract terms.
- (c) The Commission shall promptly reimburse the Contractor for the capital cost to the Contractor of machinery, equipment, installations and plant (all of which is collectively referred to as plant) provided specially for the purposes of this contract as certified by the Contractor and audited and approved by the Commission which approval will not be unreasonably withheld, or 1.9 million dollars, whichever is the lesser, as reduced by (a) the capital cost of the plant or 1.9 million dollars, whichever is the lesser, divided by 7900 multiplied by the number of tons of monazite completely processed by the Contractor and (b) the agreed value of such plant at the date of termination. Failure to agree will be considered a dispute within the meaning of Article VI. In lieu of the agreed value of the plant or of a portion thereof, there shall be substituted the net proceeds of sale of the plant or such portion thereof, less the cost of dismantling the plant or such portion thereof, if the Commission and Contractor agree on such sale and the terms thereof. The dollar figure in this paragraph (c) assumes that the plant will be located at Baltimore, Maryland. In the event the plant is located at Sewaren, New Jersey, the amount of 1.9 million dollars shall remain the same.
- (d) The obligation of the Government to make any of the payments required by this article shall be subject to any unsettled claims in connection with this contract which the Government may have against the Contractor.
- (e) Any other provisions of this contract to the contrary notwithstanding, the Contractor and the Commission may agree upon the whole or any part of the amount or amounts which the Contractor is to receive upon and in connection with any termination pursuant to this article. Any agreement so reached shall be evidenced by a supplemental agreement to

~~OFFICIAL USE ONLY~~

this contract which shall be final and binding upon the parties with regard to their respective claims against each other concerning this contract except as therein otherwise expressly provided.

- (f) The foregoing provisions of this article shall in no way affect or limit the rights which the Government may have as the result of default by the Contractor under this contract.

ARTICLE XXI - DEFINITIONS

(1) As used in this contract:

- (a) The term "Contracting Officer" means the person executing this contract on behalf of the Government and includes his successors or any duly authorized representative of any such person.
- (b) The term "Commission" means the United States Atomic Energy Commission or any duly authorized representative thereof, including the Contracting Officer except for the purpose of deciding an appeal under the article entitled "Disputes."

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the date and year first above written.

THE UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

Date of Signing by the Commission

July 18, 1955

James J. Thompson
Director, Division of Raw Materials

RARE EARTHS, INC.

Witnesses:

Peter J. Harris, President, R.E. BY: Richard L. Stueck Richard M. Merrill
Peter J. Harris, Vice President TITLE: Vice Pres. Vice Pres.

Date of Signing by Rare Earths, Inc.

July 16, 1955

~~OFFICIAL USE ONLY~~

~~OFFICIAL USE ONLY~~

I, Harry C. Helmsinger, certify that I am the Vice President
of the corporation named as Contractor herein; that Richard M. Randall and Richard
who signed this contract on behalf of the Contractor was then President
President of said corporation; that said contract was for
duly signed for and on behalf of said corporation by authority of its Stone
governing body and is within the scope of its corporate powers.

IN WITNESS WHEREOF, I have herunto affixed my hand and seal of
said corporation this 16th day of July, 1955.

Harry C. Helmsinger

~~OFFICIAL USE ONLY~~

CAL:CTE

February 27, 1956

File # 100-100000

Section 16 (a) of the United States Criminal Code, 18 U. S. C. Sec. 16, provides that a criminal offense is committed by any person who knowingly or recklessly communicates information to any department or agency of the United States as to any matter within its jurisdiction.

JUL 25 1956

Davison Chemical Company
Division of W. R. Grace & Co.
Baltimore 3, Maryland

Attn: Mr. Richard M. Mandle

Gentlemen:

This refers to your letter dated June 29, 1956 in which you expressed an interest in receiving 100 pounds of thorium bomb reduction residues.

We are enclosing for your information AEC source material regulations (10 CFR 40) and copies of Form AEC-2 which should be executed in triplicate, under oath or affirmation, and submitted to this office as your application for license to receive source material.

You may wish to include by reference the information contained in your letter of June 29.

Your request for license will be considered promptly upon receipt of a properly executed application.

Very truly yours,


Lyall Johnson
Chief, Licensing Branch
Division of Civilian Application

Enclosures:

1. 10 CFR 40
2. Form AEC-2 (4)

Bcc B. Schwartz, Prod

ITEM # 151

Source

B2/50

| | | | | | | |
|----|-----------|-------------|---------|--|--|--|
| 16 | OFFICE ▶ | CAL | CAL | | | |
| | SURNAME ▶ | Edwards:mdb | Johnson | | | |
| | DATE ▶ | 7/14/56 | 7/14/56 | | | |

7/15

DAVISON CHEMICAL COMPANY
DIVISION OF W. R. GRACE & CO.
BALTIMORE 3 • MARYLAND

June 29, 1956

Mr. Lyall C. Johnson
Chief Licensing Bureau
Civilian Applications
U. S. Atomic Energy Commission
1901 Constitution Avenue
Washington, D. C.

Gentlemen:

*Rec'd
7/10 TH
20 BS
7/9/56
HJ*

We have been advised that the Atomic Energy Commission has on hand at the Fernald, Ohio site large quantities of thorium bomb reduction residues. We also understand that these residues are to be disposed of, or moved.

Our company is interested in obtaining these residues from the Commission for processing. In order to evaluate, we request a 100 pound sample to be shipped to us at our plant,

Rare Earths, Inc.
c/o Davison Chemical Co.
Curtis Bay, Baltimore, Md.

Attention: Mr. R. M. Mandle.

Any questions concerning this should be directed to Mr. David P. Barrett, Davison Chemical Company, Baltimore 3, Maryland.

Very truly yours

Richard M. Mandle
Richard M. Mandle

RMM/bb

COPY: Mr. Nelson C. Sievering
Feed Materials Branch
Division of Production
U. S. Atomic Energy Commission

ITEM # 152

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655

✓
DAVISON CHEMICAL COMPANY

DIVISION OF W. R. GRACE & CO.
BALTIMORE 3 • MARYLAND

August 2, 1956

Mr. Lyall Johnson
Chief Licensing Branch
U. S. Atomic Energy Commission
1901 Constitution Ave.
Washington 25, D. C.

Attention: Mr. Charles Edwards

Dear Mr. Edwards:

We refer to our recent telephone conversation and your letter of July 25 concerning a license which would permit Rare Earths to obtain samples of various commission-owned thorium residues.

We now request that our License #R-132 be amended to permit Rare Earths to receive title to thorium in the form of metal scrap, sludges and residues, in addition to the monazite ore purchases now authorized. We believe this change will facilitate the present and future requests covered in our letter of June 29.

We appreciate your assistance in this matter.

Very truly yours,

Richard M. Mandle

Richard M. Mandle

Vice-President, Rare Earths, Inc.

RMM:hks

State of Maryland, City of Baltimore
Subscribed and sworn to before me this
2nd day of August, 1956.

Helen K. Shipper
Notary Public

August 2, 1956

ITEM # 153

CAL:RFB

SOURCE MATERIAL LICENSE
License No. R-132
Revision No. 1
Dated: August 15, 1956

Rare Earths, Inc.
c/o Davison Chemical Company
Division of W. R. Grace & Co.
Baltimore 3, Maryland

Attention: Mr. Richard M. Mandle
Vice President

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to:

- a. Unlimited quantities of raw source material (solely monazite sand) during the term of this license, from producers and distributors licensed by the Atomic Energy Commission and through importation, for processing at your Pompton Plains, New Jersey Plant and your Curtis Bay, Maryland Plant, and
- b. One-hundred pounds of thorium bomb reduction residues for experimental processing at your Curtis Bay, Maryland Plant.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of issuance of this license, you are required to maintain records of your inventories, receipts and transfers of raw and refined source material.

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire on April 1, 1957.

Enclosure:
Part 20

FOR THE ATOMIC ENERGY COMMISSION

| OFFICE ▶ | CAL | CAL | CAL | SIGNED |
|-----------|---------|----------|-------------------------|------------|
| | Borlik | CEdwards | LJohnson | and |
| SURNAME ▶ | Borlik | CEdwards | Lyall Johnson | Dispatched |
| DATE ▶ | 8/15/56 | 8/17/56 | Chief, Licensing Branch | |

ITEM #

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AUG 20 1956

Rare Earths, Inc.
 c/o Davison Chemical Company
 Division of W. R. Grace & Co.
 Baltimore 3, Maryland

Attention: Mr. Richard M. Mandle
 Vice-President

Gentlemen:

AEC Source Material License No. R-132, Revision No. 1 is enclosed.

Please note that the provision of your license which required the submission of reports to the AEC of inventories, processing and receipts and deliveries of raw and refined source material has been deleted. In lieu thereof your revised license requires that Rare Earths, Inc. maintain records of its inventories, receipts and transfers of raw and refined source material.

This letter constitutes your authorization to procure from the Commission, prior to the April 1, 1957 expiration date of your license, one hundred pounds of thorium bomb reduction Residues. For details regarding procurement of this material, you should communicate with Oak Ridge Operations Office, U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee, Attn: Dr. E. M. Roth.

C:Roth, OROO, w/lic.

F Sievering, PROD, w/lic.

M Mamm, INS, Lic. R-132, 4-1-56 appl. 2-27-56 ltr. from Mandle, 6-29-56
 AEC ltr. 7-25-56, ltr. from Mandle, 8-2-56, Lic. R-132-Rev. #1,
 AEC ltr. of authorization, 8-15-56

OF Musser, NMM, w/lic.

OC Ryan, FIN(2) w/lic.

E Steele, CA, w/lic.

Very truly yours,

Lvall Johnson

Chief, Licensing Branch

Division of Civilian Applications

SIGNED

and

21 Attached

Enclosure:

License No. R-132, Rev. No. 1

Document Room Copy Dispatched

by Document Transmittal No. 8-20

| | | | | | |
|------------|----------|----------|--|--------|-----|
| CAL | CAL | CAL | | ITEM # | 155 |
| Borlik/mjm | CEdwards | LJohnson | | | |
| 8/15/56 | 8/17/56 | 8/18/56 | | | |

DAVISON CHEMICAL COMPANY
DIVISION OF W. R. GRACE & CO.
BALTIMORE 3 MARYLAND

October 15, 1956

Mr. Eber Price, Director
Civilian Applications Division
U.S. Atomic Energy Commission
Washington, D. C.

Dear Mr. Price:

As we discussed by phone the Davison Chemical Company, Division of W. R. Grace & Co., is carrying out certain economic studies in connection with the design and construction of a solvent extraction plant to produce nuclear grade thorium oxide from crude thorium concentrates. In considering a potential plant location, one of the major factors consists of establishing with the various states involved exceptable specifications on the discharge of plant effluents into public streams. Since there has been little or not previous experience on the level of thorium that is permissible in streams, we would like to have the opinion of the Atomic Energy Commission on this matter. I understand from my discussion with you that we might expect an opinion prior to the time that we would actually file a request for a facilities license. Would you please advise me as to the steps that we would need to take in order to get established a specific specification on the concentration of thorium that is permissible for discharge into a stream. If this concentration could be expressed in terms of parts per million after dilution with the water in a river, it would then permit us to complete our evaluation of a number of plant sites with wide variances between maximum and minimum river flow.

I would be happy to come to Washington some time at your convenience and discuss our plans with you in more detail. Thank you for any assistance you may be able to give us in this matter.

Yours truly,

T. C. Runion

T. C. Runion
Reactor Materials

TCR:bld

cc: Mr. A.H. Paesler
Water Control Commission
State of Virginia
415 West Franklin Street
Richmond, Virginia

ITEM #

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Rare Earths, Inc.

AN AFFILIATE OF DAVISON CHEMICAL COMPANY, DIVISION OF W. R. GRACE & CO.

THORIUM, CERIUM AND RARE EARTHS

BOX 488 POMPTON PLAINS, N. J. • TERHUNE 5-3060

November 29, 1956

Mr. Lyall Johnson
Chief, Licensing Branch
United States Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D.C.

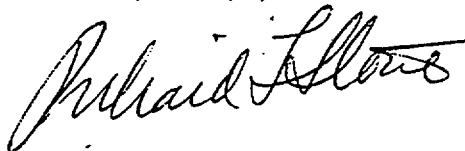
Dear Mr. Johnson:

Rare Earths, Inc., in conjunction with its affiliate, Davison Chemical Co., is planning the submission of a proposal to purchase from the Atomic Energy Commission uranium-magnesium fluoride slag for recovery of the contained uranium. Several persons will attend the Classified Technical Meeting in St. Louis on December 6, 1956, to aid in the formulation of our proposal.

To assist in our preparation, a 50 lb. sample of the uranium-magnesium fluoride slag is required and we hereby apply for a license to receive same and instructions for obtaining the sample.

Thank you for your assistance.

Very truly yours,



Richard L. Stone

RLS:MCB

ITEM #

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40-86

CABLE "RAREOX"

Rare Earths, Inc.

AN AFFILIATE OF DAVISON CHEMICAL COMPANY, DIVISION OF W. R. GRACE & CO.

THORIUM, CERIUM AND RARE EARTHS
BOX 488 POMPTON PLAINS, N. J. • TERHUNE 5-3060

December 21, 1956

Mr. Lyall Johnson
Chief, Licensing Branch
Division of Civilian Application
United States Atomic Energy Commission
Washington 25, D. C.

Subject: Source Material License No. R-132

Dear Mr. Johnson:

This letter is to advise that Rare Earths, Inc., Pompton Plains, New Jersey, a wholly-owned subsidiary of W. R. Grace and Co., New York, New York, is being liquidated and all personnel, facilities, materials and equipment are being transferred to and shall henceforth be an integral part of the Davison Chemical Co. Division of W. R. Grace and Co. The headquarters of the operation will be located at the Davison Chemical Co., Baltimore, Maryland, under Mr. David P. Barrett, General Manager, Rare Earths.

We therefore request that license no. R-132 be transferred to the name of the Davison Chemical Co. Division of W. R. Grace and Co. to include plants now operating at Pompton Plains, New Jersey, and at Curtis Bay, Maryland.

The scope of operations at Pompton Plains, New Jersey, and Curtis Bay, Maryland, is being expanded to include the processing, in addition to monazite sand, of various other thorium-containing source materials. We request that the amended Source Material License be issued to include both raw thorium-containing source material, such as monazite sand, thorite, etc., and refined thorium-containing source material, such as thorium bomb-reduction residues, thorium metal scrap and miscellaneous thorium-containing residues. It would also be advisable, in view of the expiration date of our present license, if the amended license can be issued for the full 1 year period from date.

If you require further information, please do not hesitate to contact the writer at Pompton Plains, New Jersey location. The new license, however, should be sent to

Mr. David P. Barrett
Davison Chemical Company
Division of W. R. Grace & Co.
Baltimore 3, Maryland

ITEM # 158

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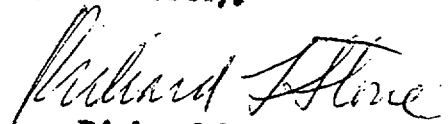
-Page 2 -

Mr. Lyall Johnson
Chief, Licensing Branch
United States Atomic Energy Commission

December 21, 1956

The courtesies of Mr. Edwards of your office are very much appreciated.

Sincerely,

A handwritten signature in cursive script, appearing to read "Richard L. Stone".

Richard L. Stone
Director, Rare Earths, Inc.

UNITED STATES
ATOMIC ENERGY COMMISSION

SOURCE MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954, and Title 10, Code of Federal Regulations, Chapter 1, Part 40, "Licensing of Source Material," and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, possess and import the source material designated below; to use such material for the purpose(s) and at the place(s) designated below; and to deliver or transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954 and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission, now or hereafter in effect, including Title 10, Code of Federal Regulations, Chapter 1, Part 20, "Standards for Protection Against Radiation," and to any conditions specified below.

| | | |
|------------------------------|---|--|
| Licensee | | 3. License No. |
| 1. Name | W. R. Grace & Company | SNB-334 |
| 2. Address | Research and Development Division
Washington Research Center
Clarksville, Maryland | 4. Expiration Date |
| | | June 30, 1964 |
| | | 5. Docket No. |
| | | 40-2810 |
| 6. Source Material | | 7. Maximum quantity of source material which licensee may possess at any one time under this license |
| Uranium & Thorium | | Sixteen hundred (1,600) pounds |

Attention: **Mr. F. T. Fitch**

CONDITIONS

8. Authorized use (Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.)

**For use at the licensee's facilities at Clarksville, Maryland and
Curtis Bay, Maryland in accordance with the procedures described
in the licensee's application dated June 15, 1961 as amended
June 26, 1961.**

CC: Docket Officer
Document Room
S/H
Compl. w/c appl

Dictator

Approved

For the U. S. ATOMIC ENERGY COMMISSION

Date of issuance

Donald A. Musshaw

Division of Licensing & Regulation

ITEM # 159

MAR 29 1962

19-4003-1

40-2810

78-456

W. E. Grace and Company
Washington Research Center
Clarksville, Maryland

Attention: Mr. F. W. Mitchell, Director
Analytical and Physical
Research Department

Gentlemen:

This refers to the inspection conducted on September 29, 1961, of your activities authorized under AEC Byproduct Material License No. 19-4003-1, Source Material License No. SMB-334, and Special Nuclear Material License No. SNM-417. There were no items of noncompliance noted for License No. SNM-417.

With respect to License Nos. 19-4003-1 and SMB-334, it appears that certain of your activities were not conducted in full compliance with the requirements of the AEC's "Standards for Protection Against Radiation," Part 20, Title 10, Code of Federal Regulations, in that:

LICENSE NO. 19-4003-1

1. Surveys were not made to determine the concentrations of Tritium in work areas and in air discharged to unrestricted areas, as required by Section 20.201(b), "Surveys."

LICENSE NO. SMB-334

2. Radiation surveys had not been conducted in the Uranium and Thorium storage room, as required by Section 20.201(b), "Surveys."

ITEM # 160

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B/159

MAR 29 1962

3. The container in which 3.6 kilograms of natural Uranium was stored in Room 225 was not labeled as required by Section 20.203(f)(2), "Caution signs, labels and signals."

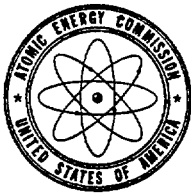
We have received copies of your letters dated October 6, 1961 and October 23, 1961 to the Compliance Division Office in New York City. It appears that the measures described in these letters are sufficient to correct the deficiencies described above. You are requested to take the necessary steps to assure that all licensed activities will be conducted in compliance with Commission regulations. These matters will be reviewed during the next inspection of your facilities. Should you have any questions, please do not hesitate to write us.

There were no other items of noncompliance noted as a result of this visit. We appreciate the cooperation given the AEC representative.

Very truly yours,

Eber R. Price
Assistant Director
Division of Licensing
and Regulation

Enclosure
10 CFR 20



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

APR 29 1964

IN REPLY REFER TO: 40-2810

W. R. Grace & Company
Research and Development Division
Washington Research Center
Clarksville, Maryland

Attention: Mr. F. T. Fitch

SUBJECT: NOTICE OF LICENSE EXPIRATION

Gentlemen:

Notice is given that Source Material License Number SMB-334 expires on June 30, 1964.

If you desire to continue your program using source material(s), an application for renewal of the license should be filed with this office. It is to your advantage to file such an application at least thirty (30) days before the expiration date of your existing license. The application should be submitted using Form AEC-2, enclosed, in accordance with the instructions provided with the form. Your program will then be covered by your existing license until action is taken on your application for license renewal. (Title 10, Code of Federal Regulations, Part 40, Section 40.43(b)). If an application is received less than 30 days prior to the expiration date of your license and cannot be processed before your existing license expires, this could result in your possessing source material without a valid license.

If you do not wish to renew your license, please complete the enclosed form "Certification of Status of Source Material Activities under United States Atomic Energy Commission Source Material License Number SMB-334", and return it to this office.

If you have obtained an amendment which has extended the expiration date of the above license or if a new license has been issued which supersedes the above license, please disregard this notice.

This notice of your license expiration is sent for your convenience and it should not be interpreted that similar notices will be sent in the future. The responsibility for timely submission of an application for license renewal remains with the licensee.

CC: Document Room
Div. of Compliance

Very truly yours,

Enclosures:
10 CFR, 20 & 40
Form AEC-2
"Certification. . ."

Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Materials Licensing

ITEM # 161

W. R. GRACE & CO.

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

File Copy

GRACE

Re: 40-2810

May 21, 1964

Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials Branch
Division of Materials Licensing
United States Atomic Energy Commission
Washington, D. C. 20545

Subject: Renewal of Source Materials License SMB-334

Dear Sir:

Form AEC-2 completed in quadruplicate for renewal of Source Materials License SMB-334 is enclosed. It is requested that this license be renewed for a two year period and again cover possession of 1600 lbs. of source material in the form of hydrates, oxides, and salts for research and development studies on nuclear fuels. Our activities and operations remain similar to those described in past applications (File 40-2810).

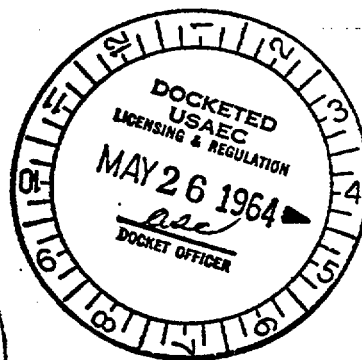
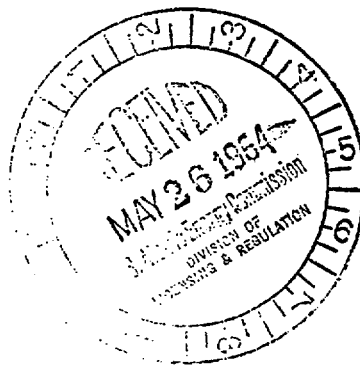
Please do not hesitate to contact me if we can be of any further assistance.

Sincerely,

F. T. Fitch

FTF:blb

Enclosure



COPY PROVIDED
COMPLIANCE

5/27/64

2848

ACKNOWLEDGED

ITEM # 162

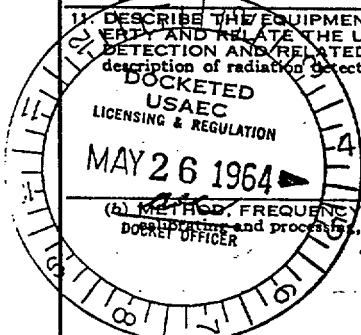
UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

File Copy

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

| | | | |
|---|--|---|--|
| 1. (Check one)
<input type="checkbox"/> (a) New license
<input type="checkbox"/> (b) Amendment to License No. _____
<input checked="" type="checkbox"/> (c) Renewal of License No. <u>SMB-334</u>
<input type="checkbox"/> (d) Previous License No. _____ | | 2. NAME OF APPLICANT
<u>Research Division, W. R. Grace & Co.</u> | |
| 4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
<u>Washington Research Center, Clarksville, Maryland</u>
<u>Research Division, W. R. Grace & Co., Curtis Bay, Maryland</u> | | 3. PRINCIPAL BUSINESS ADDRESS
<u>Washington Research Center, Clarksville, Maryland</u> | |
| 5. BUSINESS OR OCCUPATION
<u>Chemical Research</u> | 6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP | | (b) AGE |
| 7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED
<u>Basic laboratory research at the Washington Research Center and development work at Curtis Bay for the development of nuclear fuel materials. No production is involved.</u> | | | |
| 8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE | | | |
| (a) TYPE | (b) CHEMICAL FORM | (c) PHYSICAL FORM (Including % U or Th.) | (d) MAXIMUM AMOUNT AT ANY ONE TIME (in pounds) |
| NORMAL URANIUM | | | |
| URANIUM DEPLETED IN THE U-235 ISOTOPE | <u>UO₂Cl₂·6H₂O</u>
<u>oxides (hydrous)</u> | <u>Salts, solutions 5-53w/o</u>
<u>Sols, ceramics 5-88w/o</u> | <u>1000 lbs.</u> |
| THORIUM | <u>Th(NO₃)₄·4H₂O</u>
<u>oxides (hydrous)</u> | <u>Salts, solutions 5-42w/o</u>
<u>Sols, ceramics 5-88w/o</u> | <u>6000 lbs.</u> |
| (e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds) | | | <u>1600 lbs.</u> |
| 9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL HAZARDS ASSOCIATED WITH EACH STEP OF THOSE OPERATIONS.
<u>Wet chemical operations are used avoiding dust hazards. The Research Center uses experimental quantities of 50-1000 g. Process studies are made with less than 30 lb. quantities. Activities at both sites are modest in extent and quantities. Systematic efforts control the main hazard of area and personnel contamination in compliance with our policy of high safety standards, AEC, and state regulations.</u> | | | |
| 10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE THAT WILL BE REQUIRED OF APPLICANT'S SUPERVISORY PERSONNEL INCLUDING PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM (OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL).
<u>Laboratory Supervision-experienced Ph.D; Process development-experienced engineer. Dr. J. D. Moyer, Radiation Protection Officer, has Ph.D in chemistry, courses in radiochemistry and radiological health, 14 years radioisotope experience, and 4 years R.P.O. at this installation.</u> | | | |
| 11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE: (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air-monitoring and other survey equipment as appropriate. The description of radiation detection instruments should include the type of radiation detected and the range(s) of each instrument.)
<u>See supplemental sheet, Item 11a</u> | | | |
| (b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE (for film badges, specify method of processing and processing, or name supplier.)
<u>See supplemental Sheet, Item 11b</u> | | | |

ITEM # 163

16-70548-1

2848 B/162
(6)

Item 11a: Radiation Detection and Related Instruments

Sampling: Staplex Hi-volume Air Sampler, Model TF1A

Millipore Filter Corp., Air Pump, Model XX 60 000 000
and associated membrane filters.

Detection: Victoreen Cutie Pie Survey Meter, Model 740B, sensitivity
range 0-100 mr/hr. window thickness 0.0005 inches Mylar,
detects alpha, beta and gamma.

Tracerlab Survey Meters (2), Model SU-14, sensitivity range
0-25 mr/hr. or 0-50,000 cpm, window thickness less than
2 mg/cm², detect alpha, beta and gamma.

Eberline Instrument Corp. Gas Proportional Counter Model
PAC-3G, range 0-100,000 cpm., detects alpha.

Nuclear Measurements Corp. Windowless Gas Flow Proportional
counter, counts alpha, beta and gamma. Range 0-> 100,000 dpm.

Item 11b: Methods, Frequency and Standards Used in Calibrating Instruments
Listed in 11a.

Methods: The Victoreen Cutie Pie Survey Meter and the two Tracerlab
SU-14 meters are calibrated with a cobalt-60 sealed source
at various distances from the source.

The Tracerlab SU-14 meters and the Eberline PAC-3G alpha
counter are calibrated by holding a standard alpha source
as near as possible to the thin windows, simulating actual
surveying.

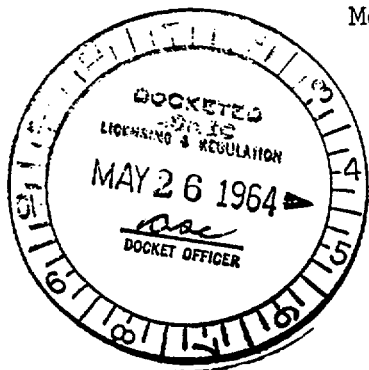
The Nuclear Measurements proportional counter is calibrated
by inserting standard alpha, beta, or gamma sources into
the chamber and counting at the proper voltage.

Frequency: All survey and counting instruments are calibrated at least
semi-annually with standard sources and tested for proper
operation with smaller check sources at each use.

Standards Used:

Alpha - National Bureau of Standards
Uranium Oxide source, Standard Sample No. 4903-201-7-2

Beta - Nuclear Chicago carbon-14 source Model R-20, calibrated
against National Bureau of Standards carbon-14 beta-ray
standard, Sample No. P4075.



Item 11b: Continued

Gamma - Tracerlab R-31, 5 mc. calibrated cobalt-60 source.

Tracerlab R-7, 7.1×10^{-4} mc calibrated cobalt-60 sources
are corrected for decay at each calibration.

Permanent records are maintained on all calibrations.

Film badges or dosimeters are not issued because of the low level of
beta and gamma radiation from the quantities of source material involved
in the operations.

Item 12b:

EMERGENCY PROCEDURES FOR WORK WITH SOURCE MATERIAL

The design of facilities and procedures are such that the spread of contamination would be minimized in the event of an accident involving source material. If an incident should occur in which source material is released, the following emergency procedures are to be followed:

1. Make a quick estimate of the situation and warn other occupants of the room. If any of the material is airborne, hold your breath and retreat immediately to a safe distance.
2. If you have time, do what you can to avoid the spread of contaminating material.
3. Remove contaminated clothing and put on a clean laboratory coat kept nearby for such emergency. Thoroughly wash exposed parts of your body.
4. Immediately notify the Radiation Protection Officer (RPO), Project Supervisor, and if fire is involved, the Fire Department. Call the Medical Office if medical attention is needed.
5. Evacuate and close off the room, but, unless it is unsafe, remain in the immediate area until you can be checked for contamination.
6. Notify personnel in adjacent areas of the condition. Evacuate these areas if there is any doubt of the spread of contamination.
7. If fire is involved, the project supervisor and the RPO will direct the fire department in an effort to avoid spread of contamination.
8. The Project Supervisor and the RPO will plan and direct decontamination consistent with safety and the nature of the accident. Waste disposal will be done in an acceptable manner.
9. The RPO will perform a survey of the entire area and those areas where contamination may have been carried. Operation will be resumed only after safety is assured, the operation reviewed, and corrective measures taken.
10. The Project Supervisor will make necessary reports to the assigned AEC Operations Office according to the regulations issued for this purpose.
11. Immediate bioassay and medical examination will be given to personnel involved in the accident.

Item 12c: Detailed Description of Radiation Survey Program and Procedures

Frequency

All work and storage areas are surveyed at least monthly for alpha contamination in air and on surfaces of benches, floors, desks, etc. Areas are surveyed periodically with an alpha survey instrument to detect fixed contamination.

Sampling

Air samples are taken by drawing a measured volume of air through filter paper impregnated with an antistatic agent.

Smear samples are collected by swiping impregnated filter paper over 1 ft.² areas.

Counting

Both air and smear samples are counted in the NMC windowless proportional counter at the voltage setting which measures only alpha activity.

Quantitation

Counting data are interpreted on the basis of the best available information on filtering efficiency of the paper, and absorption of alpha particles by the paper and dust. Activities are calculated to microcuries per cubic centimeter of air, and dpm/ft.² for smears.

Maximum Permissible Limits

Our maximum permissible limits are set at less than one-half the limits required or recommended in the following publications.

1. CFR, Title 10, Part 20, "Standards for Protection Against Radiation".
2. U.S.A.E.C. Dept. COO-12 (Rev.), "Health and Safety Considerations for Uranium Fuel Fabrication Facilities", by W. A. Brobst., Apr., 1, 1958.
3. U.S.A.E.C. Dept. ORNL-332 "Applied Health Radiation Survey Instrumentation" pp. 118-122.

Corrective action is required, and follow-up surveys made when contamination exceeds 50% of the MPL's set forth in these articles.

Effluent Wastes

We have a developed method for measuring contamination in solutions by evaporation of measured volume and counting alpha activity on planchets. However, this procedure is rarely used since company regulations prohibit the disposal of any source material into the sewage system.

Records

Permanent records are maintained for all surveys.

Bioassays

Each worker is given a urinalysis for source material semi-annually, with follow-up action and additional bioassay if the excretion rate exceeds 10% of the MPL recommended by the Health and Safety Div. of the U.S.A.E.C. Chicago Operations Office. Analyses are performed by Nuclear Science and Engineering Corporation, Pittsburgh, Pa. Results are incorporated in the workers permanent medical records. Each worker is also given a complete blood test semi-annually.

Shipment

Shipments of small experimental samples and waste source material are surveyed for gamma radiation and alpha contamination of surfaces. Packages are approved for shipment only if they meet the requirements of applicable postal or ICC regulations. Permanent records are maintained.

Item 13: Waste Products

(a) Quantity and Type of Radioactive Waste that will be Generated.

Wastes are generated in the course of the experimental work in the form of research samples, solutions, sols, and slurries. They correspond in quantity to the scale of the work, e.g., < 1000 g. for laboratory work and a few pounds for development work. They are stored and accumulated to the extent of up to several pounds before recovery.

(b) Detailed Procedures for Waste Disposal

The accumulated wastes are recovered as filter cake by precipitation with ammonia partially dried, and combined according to composition (uranium, thorium). They are packaged and stored until sufficient quantity (20-50 lbs.) to ship for recovery to W. R. Grace associated plants which process nuclear materials (e.g., Erwin plant, Tennessee, Nuclear Fuel Services, or Davison Chemical Co., Pompton Plains, N. Y.).

Form AEC-410
(1-51)UNITED STATES
ATOMIC ENERGY COMMISSION

SOURCE MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954, and Title 10, Code of Federal Regulations, Chapter 1, Part 40, "Licensing of Source Material," and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, possess and import the source material designated below; to use such material for the purpose(s) and at the place(s) designated below; and to deliver or transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954 and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission, now or hereafter in effect, including Title 10, Code of Federal Regulations, Chapter 1, Part 20, "Standards for Protection Against Radiation," and to any conditions specified below.

| | |
|---|---|
| <p style="text-align: center;">Licensee</p> <p>1. Name W. R. Grace & Company
Research Division</p> <p>2. Address Washington Research Center
Clarksville, Maryland</p> | <p>3. License No.
SMB-334</p> |
| | <p>4. Expiration Date
June 30, 1967</p> |
| | <p>5. Docket No.
40-2810</p> |
| <p>6. Source Material

Uranium - Thorium</p> | <p>7. Maximum quantity of source material which licensee may possess at any one time under this license

Sixteen hundred (1,600) pounds</p> |

CONDITIONS

8. Authorized use (Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.)
For basic laboratory research and development work for the development of nuclear fuel materials in accordance with the procedures described in the licensee's application dated May 21, 1964.
9. Authorized places of use: The address stated in Item 2 above and Research Division, Curtis Bay, Maryland.

Date of issuance

JUN 15 1964

For the U. S. ATOMIC ENERGY COMMISSION

* U. S. GOVERNMENT PRINTING OFFICE: 1962 O - 632985

Robert L. Layfield
Division of Materials Licensing

ITEM #

164

JUN 15 1964

DML:CEM
40-2810

W. R. Grace & Company
Research Division
Washington Research Center
Clarksville, Maryland 21029

Attention: Mr. F. T. Fitch

Gentlemen:

Enclosed is Source Material License No. SMB-334.

Very truly yours,

Robert L. Layfield
Source and Special Nuclear
Materials Branch
Division of Materials Licensing

Enclosure:
License No. SMB-334

DISTRIBUTION:
Doc. Room
Compliance
N. Doulos
Suppl.
State Health (Lic. only)
Br. & Div. RFs

6/16/64

| | | | | | |
|---------|-----------|--|--|--|--|
| DML | DML | | | | |
| CEM | RLayfield | | | | |
| 6/17/64 | 6/15/64 | | | | |

102
FOLIO REC-3

ITEM # 165

UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE

II-E

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

| | |
|--|--|
| 1. LICENSEE

W. R. Grace & Co.
Research Division
Clarksville, Maryland 21029 | 2. REGIONAL OFFICE

USAEC Division of Compliance
376 Hudson Street
New York, New York 10014 |
| 3. LICENSE NUMBER(S)

SMB-334 40-2810 | 4. DATE OF INSPECTION

September 17, 1965 (Reinspection) |
| 5. INSPECTION FINDINGS

<input checked="" type="checkbox"/> A. No item of noncompliance was found.

<input type="checkbox"/> B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA.
10 CFR 20.203(b) or 34.42

<input type="checkbox"/> C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA.
10 CFR 20.203(c) (1) or 34.42

<input type="checkbox"/> D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA.
10 CFR 20.203(d)

<input type="checkbox"/> E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL.
10 CFR 20.203(e)

<input type="checkbox"/> F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL.
10 CFR 20.203(f) (1) or (f) (2)

<input type="checkbox"/> G. Storage containers were not properly labeled to show the quantity, date of measurement, or kind of radioactive material in the containers. 10 CFR 20.203(f) (4)

<input type="checkbox"/> H. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)

<input type="checkbox"/> I. Form AEC-3 was not properly posted. 10 CFR 20.206(c)

<input type="checkbox"/> J. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b)

<input type="checkbox"/> K. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d)

<input type="checkbox"/> L. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained.
10 CFR 30.51, 40.61 or 70.51

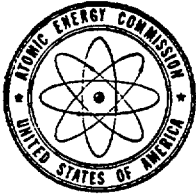
<input type="checkbox"/> M. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c)

<input type="checkbox"/> N. Records of inventories were not maintained. 10 CFR 34.26

<input type="checkbox"/> O. Utilization logs were not maintained. 10 CFR 34.27

<div style="text-align: right;"><i>James F. Brisson</i>
(AEC Compliance Inspector)</div> <div style="text-align: right;"><i>B/165</i></div> | |
| 6. LICENSEE'S ACKNOWLEDGMENT

The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.
<div style="text-align: right;">ITEM # <u>166</u></div> | |



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

IN REPLY REFER TO: DML:ND
40-2810

APR 26 1967

W. R. Grace & Company
Research Division
Washington Research Center
Clarksville, Maryland 21029

SUBJECT: NOTICE OF LICENSE EXPIRATION

Gentlemen: Attention: Mr. F. T. Fitch

Notice is given that Source Material License Number SMB-334 expires on June 30, 1967.

If you desire to continue your program using source material(s), an application for renewal of the license should be filed with this office. It is to your advantage to file such an application at least thirty (30) days before the expiration date of your existing license. The application should be submitted using Form AEC-2, enclosed, in accordance with the instructions provided with the form. Your program will then be covered by your existing license until action is taken on your application for license renewal. (Title 10, Code of Federal Regulations, Part 40, Section 40.43(b)). If an application is received less than 30 days prior to the expiration date of your license and cannot be processed before your existing license expires, this could result in your possessing source material without a valid license.

If you do not wish to renew your license, please complete the enclosed form "Certification of Status of Source Material Activities under United States Atomic Energy Commission Source Material License Number SMB-334", and return it to this office.

If you have obtained an amendment which has extended the expiration date of the above license or if a new license has been issued which supersedes the above license, please disregard this notice.

This notice of your license expiration is sent for your convenience and it should not be interpreted that similar notices will be sent in the future. The responsibility for timely submission of an application for license renewal remains with the licensee.

Supple

Dictator *[Signature]*

Very truly yours,

[Signature]

Enclosures:
10 CFR, 20 & 40
Form AEC-2

Approved

Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Materials Licensing

"Certification . . ."

ITEM # 167

W. R. GRACE & CO.

GRACE

RESEARCH DIVISION

Washington Research Center, Clarksville, Maryland 21029

May 26, 1967

Mr. Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Materials Licensing
USAEC
Washington, D. C. 20545

Docket No. 40-2810
Task No. T01
Docketed 5-29-67 D/R

Dear Mr. Nussbaumer:

RE: DML:ND
40-2810

Enclosed please find our application for renewal of Source Material
License Number SMB-334.

If you have any questions regarding this, please contact the under-
signed.

Yours very truly,

A. M. Gammill
A. M. Gammill
Security Officer

AMG:m

Enclosures



Copy Provided Confidential

cam
5/31/67

Cable - Gracerad

ITEM #

Tel (301) 531 - 5711

168

ACKNOWLEDGED

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TWX - 301 286 2168

8/167
(7)

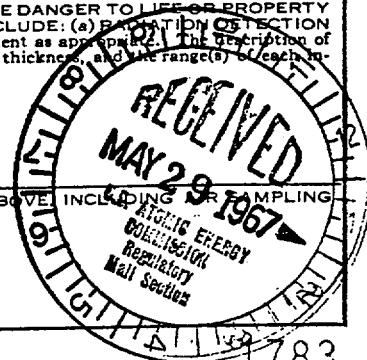
UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

Regulatory Supply File Cy.

| | | | |
|---|--|--|--|
| 1. (Check one)
<input type="checkbox"/> (a) New license
<input type="checkbox"/> (b) Amendment to License No. _____
<input checked="" type="checkbox"/> (c) Renewal of License No. <u>SMB-334</u>
<input type="checkbox"/> (d) Previous License No. _____ | | 2. NAME OF APPLICANT
Research Division, W. R. Grace & Co. | |
| 4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
Washington Research Center, Clarksville, Maryland
Research Division, W. R. Grace & Co., Curtis Bay, Maryland | | 3. PRINCIPAL BUSINESS ADDRESS
Washington Research Center, Clarksville, Maryland | |
| 5. BUSINESS OR OCCUPATION
Chemical Research | | 6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP
(b) AGE
5-29-67 2/2 | |
| 7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED
Basic laboratory research at the Washington Research Center and development work at Curtis Bay for the development of nuclear fuel materials. No production is involved. | | | |
| 8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE | | | |
| (a) TYPE | (b) CHEMICAL FORM | (c) PHYSICAL FORM (Including % U or Th.) | (d) MAXIMUM AMOUNT AT ANY ONE TIME (in pounds) |
| NATURAL URANIUM | | | |
| URANIUM DEPLETED IN THE U-235 ISOTOPE | $UO_2Cl_2 \cdot 6H_2O$, $UO_2(NO_3)_2 \cdot 6H_2O$, oxides (hydrous) | Salts, solutions 5-53w/o
Sols, ceramics 5-98w/o | 1000 lbs. |
| THORIUM (ISOTOPE) | $Th(NO_3)_4 \cdot 4H_2O$
oxides (hydrous) | Salts, solutions 5-42w/o
Sols, ceramics 5-98 w/o | 600 lbs. |
| (e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds)
1600 lbs. | | | |
| 9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES.
Wet chemical operations are used avoiding dust hazards. The Research Center uses experimental quantities of 50-1000 g. Process studies are made with less than 30 lb. quantities. Activities at both sites are modest in extent and quantities. Systematic efforts control the main hazard of area and personnel contamination in compliance with our policy of high safety standards, AEC, and state regulations. | | | |
| 10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE THAT WILL BE REQUIRED OF APPLICANT'S SUPERVISORY PERSONNEL INCLUDING PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM (OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL).
Laboratory Supervision-experienced Ph.D; Process development-experienced engineer. Dr. J. D. Moyer, Radiation Protection Officer, has Ph.D. in chemistry, courses in radiochemistry and radiological health, 16 years radioisotope experience, and 6 years R.P.O. at this installation. | | | |
| 11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9: INCLUDE: (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate); (b) THE DESCRIPTION OF RADIATION DETECTION INSTRUMENTS SHOULD INCLUDE THE INSTRUMENT CHARACTERISTICS SUCH AS TYPE OF RADIATION DETECTED, WINDOW THICKNESS, AND THE RANGE(S) OF EACH INSTRUMENT).
See supplemental sheet, Item 11a | | | |
| (b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE INCLUDING RADIATION DETECTION EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier).
See supplemental sheet, Item 11b | | | |



1783

Regulatory Suppl File Cy.

Item 11a: Radiation Detection and Related Instruments

Sampling: Staplex Hi-volume Air Sampler, Model TFIA

Millipore Filter Corp., Air Pump, Model XX 60 000 000
and associated membrane filters.

Detection: Victoreon Cutie Pie Survey Meter, Model 7HCB, sensitivity
range 0-100 mr/hr window thickness 0.0005 inches Mylar,
detects alpha, beta and gamma.

Tracerlab Survey Meters (2), Model SU-14, sensitivity range
0-25 mr/hr. or 0-50,000 cpm, window thickness less than
2 mg/cm², detect alpha, beta and gamma.

Eberline Instrument Corp. Gas Proportional Counter Model
FAC-3G, range 0-100,000 cpm., detects alpha.

Nuclear Measurements Corp. Windowless Gas Flow Proportional
counter, counts alpha, beta and gamma. Range 0-> 100,000 dpm.

Item 11b: Methods, Frequency and Standards Used in Calibrating Instruments
Listed in 11a.

Methods: The Victoreon Cutie Pie Survey Meter and the two Tracerlab
SU-14 meters are calibrated with a cobalt-60 sealed source
at various distances from the source.

The Tracerlab SU-14 meters and the Eberline FAC-3G alpha
counter are calibrated by holding a standard alpha source
as near as possible to the thin windows, simulating actual
surveying.

The Nuclear Measurements proportional counter is calibrated
by inserting standard alpha, beta, or gamma sources into
the chamber and counting at the proper voltage.

Frequency: All survey and counting instruments are calibrated at least
semi-annually with standard sources and tested for proper
operation with smaller check sources at each use.

Standards Used:

Alpha - National Bureau of Standards
Uranium Oxide source, Standard Sample No. 4903-201-7-2

Beta - Nuclear Chicago carbon-14 source Model R-20, calibrated
against National Bureau of Standards carbon-14 beta-ray
standard, Sample No. P4075.

Item 11b: Continued

Gamma - Tracerlab R-31, 5 mc. calibrated cobalt-60 source.

Tracerlab R-7, 7.1×10^{-6} mc calibrated cobalt-60 sources
are corrected for decay at each calibration.

Permanent records are maintained on all calibrations.

Film badges or dosimeters are not issued because of the low level of
beta and gamma radiation from the quantities of source material involved
in the operations.

Item 12b:

EMERGENCY PROCEDURES FOR WORK WITH SOURCE MATERIAL

The design of facilities and procedures are such that the spread of contamination would be minimized in the event of an accident involving source material. If an incident should occur in which source material is released, the following emergency procedures are to be followed:

1. Make a quick estimate of the situation and warn other occupants of the room. If any of the material is airborne, hold your breath and retreat immediately to a safe distance.
2. If you have time, do what you can to avoid the spread of contaminating material.
3. Remove contaminated clothing and put on a clean laboratory coat kept nearby for such emergency. Thoroughly wash exposed parts of your body.
4. Immediately notify the Radiation Protection Officer (RPO), Project Supervisor, and if fire is involved, the Fire Department. Call the Medical Office if medical attention is needed.
5. Evacuate and close off the room, but, unless it is unsafe, remain in the immediate area until you can be checked for contamination.
6. Notify personnel in adjacent areas of the condition. Evacuate these areas if there is any doubt of the spread of contamination.
7. If fire is involved, the project supervisor and the RPO will direct the fire department in an effort to avoid spread of contamination.
8. The Project Supervisor and the RPO will plan and direct decontamination consistent with safety and the nature of the accident. Waste disposal will be done in an acceptable manner.
9. The RPO will perform a survey of the entire area and those areas where contamination may have been carried. Operation will be resumed only after safety is assured, the operation reviewed, and corrective measures taken.
10. The Project Supervisor will make necessary reports to the assigned AEC Operations Office according to the regulations issued for this purpose.
11. Immediate bioassay and medical examination will be given to personnel involved in the accident.

Item 12c: Detailed Description of Radiation Survey Program and Procedures

Frequency

All work and storage areas are surveyed at least monthly for alpha contamination in air and on surfaces of benches, floors, desks, etc. Areas are surveyed periodically with an alpha survey instrument to detect fixed contamination.

Sampling

Air samples are taken by drawing a measured volume of air through filter paper impregnated with an antistatic agent.

Smear samples are collected by swiping impregnated filter paper over 1 ft.² areas.

Counting

Both air and smear samples are counted in the RSC windowless proportional counter at the voltage setting which measures only alpha activity.

Quantitation

Counting data are interpreted on the basis of the best available information on filtering efficiency of the paper, and absorption of alpha particles by the paper and dust. Activities are calculated to microcuries per cubic centimeter of air, and dpm/ft.² for smears.

Maximum Permissible Limits

Our maximum permissible limits are set at less than one-half the limits required or recommended in the following publications.

1. CFR, Title 10, Part 20, "Standards for Protection Against Radiation".
2. U.S.A.E.C. Dept. CDD-12 (Rev.), "Health and Safety Considerations for Uranium Fuel Fabrication Facilities", by W. A. Brobst., Apr., 1, 1958.
3. U.S.A.E.C. Dept. OHL-332 "Applied Health Radiation Survey Instrumentation" pp. 118-122.

Corrective action is required, and follow-up surveys made when contamination exceeds 50% of the MFL's set forth in these articles.

Effluent Wastes

We have a developed method for measuring contamination in solutions by evaporation of measured volume and counting alpha activity on planchets. However, this procedure is rarely used since company regulations prohibit the disposal of any source material into the sewage system.

Records

Permanent records are maintained for all surveys.

Bioassays

Each worker is given a urinalysis for source material semi-annually, with follow-up action and additional bioassay if the excretion rate exceeds 10% of the MPl recommended by the Health and Safety Div. of the U.S.A.E.C. Chicago Operations Office. Analyses are performed by Nuclear Science and Engineering Corporation, Pittsburgh, Pa. Results are incorporated in the workers permanent medical records. Each worker is also given a complete blood test semi-annually.

Shipment

Shipments of small experimental samples and waste source material are surveyed for gamma radiation and alpha contamination of surfaces. Packages are approved for shipment only if they meet the requirements of applicable postal or ICC regulations. Permanent records are maintained.

Item 15: Waste Products

(a) Quantity and Type of Radioactive Waste that will be Generated.

Wastes are generated in the course of the experimental work in the form of research samples, solutions, soils, and slurries. They correspond in quantity to the scale of the work, e.g., < 1000 g. for laboratory work and a few pounds for development work. They are stored and accumulated to the extent of up to several pounds before recovery.

(b) Detailed Procedures for Waste Disposal

The accumulated wastes are recovered as filter cake by precipitation with ammonia partially dried, and combined according to composition (uranium, thorium). They are packaged and stored until sufficient quantity (20-50 lbs.) to ship for recovery to W. R. Grace associated plants which process nuclear materials (e.g., Erwin plant, Tennessee, Nuclear Fuel Services, or Davison Chemical Co., Rampton Plains, N. Y.).

COPY

Form AEC-410
(1-61)UNITED STATES
ATOMIC ENERGY COMMISSION

SOURCE MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954, and Title 10, Code of Federal Regulations, Chapter 1, Part 40, "Licensing of Source Material," and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, possess and import the source material designated below; to use such material for the purpose(s) and at the place(s) designated below; and to deliver or transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954 and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission, now or hereafter in effect, including Title 10, Code of Federal Regulations, Chapter 1, Part 20, "Standards for Protection Against Radiation," and to any conditions specified below.

| | | |
|---|---|--|
| Licensee
1. Name W. R. Grace & Company
Research Division
2. Address Washington Research Center
Clarksville, Maryland 21209 | | 3. License No.
SMB-334, as renewed
4. Expiration Date
June 30, 1972
5. Docket No.
40-2810 |
| 6. Source Material

Uranium - Thorium | 7. Maximum quantity of source material which licensee may possess at any one time under this license

Sixteen hundred (1600) pounds | |

CONDITIONS

8. Authorized use (Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.)

For use in accordance with the procedures described in the licensee's application dated May 26, 1967.

9. Authorized places of use: The address stated in Item 2 above and the licensee's facility, Curtis Bay, Maryland.

09m
6/6/67
6/8/67

B/168

For the U. S. ATOMIC ENERGY COMMISSION

JUN 8 1967
 Date of issuance _____

* U. S. GOVERNMENT PRINTING OFFICE: 1962 O - 632985

Don F. Harmon
 Division of Materials Licensing

COPY

ITEM # 169

JUN 8 1967

DML:CEM
40-2610

W. R. Grace & Company
Research Division
Washington Research Center
Clarksville, Maryland 21029

Attention: Mr. A. M. Gammill
Security Officer

Gentlemen:

Enclosed is Source Material License No. SMB-334, as renewed.

Very truly yours,

DISTRIBUTION:

Document Room, w/encl.

State Health, w/encl. License only

Compliance, Reg. 1, w/encl.

N. Doulos, w/3 cys of license **Don F. Harmon**

Subject file, w/encl. **Source & Special Nuclear Materials**

Br. reading file, w/encl. **Branch**

Div. reading file, w/o encl. **Division of Materials Licensing**

Enclosure:

License No. SMB-334, as renewed

B/169
ITEM # 170

| | | | | | | |
|-----------|----------------|----------|--|--|--|--|
| OFFICE ▶ | DML | DML | | | | |
| SURNAME ▶ | CEMacDonald:jb | DFHarmon | | | | |
| DATE ▶ | 6/6/67 | 6/8/67 | | | | |

Rare Earths, Inc.

AN AFFILIATE OF DAVISON CHEMICAL COMPANY, DIVISION OF W. R. GRACE & CO.

THORIUM, CERIUM AND RARE EARTHS

BOX 488 POMPTON PLAINS, N. J. • TERHUNE 5-3060

December 21, 1956

Mr. Lyall Johnson
Chief, Licensing Branch
Division of Civilian Application
United States Atomic Energy Commission
Washington 25, D. C.

Subject: Source Material License No. R-132

Dear Mr. Johnson:

This letter is to advise that Rare Earths, Inc., Pompton Plains, New Jersey, a wholly-owned subsidiary of W. R. Grace and Co., New York, New York, is being liquidated and all personnel, facilities, materials and equipment are being transferred to and shall henceforth be an integral part of the Davison Chemical Co. Division of W. R. Grace and Co. The headquarters of the operation will be located at the Davison Chemical Co., Baltimore, Maryland, under Mr. David P. Barrett, General Manager, Rare Earths.

We therefore request that license no. R-132 be transferred to the name of the Davison Chemical Co. Division of W. R. Grace and Co. to include plants now operating at Pompton Plains, New Jersey, and at Curtis Bay, Maryland.

The scope of operations at Pompton Plains, New Jersey, and Curtis Bay, Maryland, is being expanded to include the processing, in addition to monazite sand, of various other thorium-containing source materials. We request that the amended Source Material License be issued to include both raw thorium-containing source material, such as monazite sand, thorite, etc., and refined thorium-containing source material, such as thorium bomb-reduction residues, thorium metal scrap and miscellaneous thorium-containing residues. It would also be advisable, in view of the expiration date of our present license, if the amended license can be issued for the full 1 year period from date.

If you require further information, please do not hesitate to contact the writer at Pompton Plains, New Jersey location. The new license, however, should be sent to

Mr. David P. Barrett
Davison Chemical Company
Division of W. R. Grace & Co.
Baltimore 1, Maryland

B/137
ITEM # 138

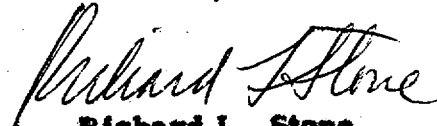
-Page 2 -

Mr. Lyall Johnson
Chief, Licensing Branch
United States Atomic Energy Commission

December 21, 1956

The courtesies of Mr. Edwards of your office are very much appreciated.

Sincerely,

A handwritten signature in cursive script, reading "Richard L. Stone". The signature is written in dark ink and is positioned above the printed name and title.

Richard L. Stone
Director, Rare Earths, Inc.

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

Rare Earths, Inc.
An Affiliate of Davison Chemical Company
Division of W. R. Grace & Son
Box 488
Pompton Plains, New Jersey

SOURCE MATERIAL LICENSE

License No. C-3623

Dated:

Attention: Mr. Richard L. Stone

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to fifty (50) pounds of refined source material* during the term of this license for use in experimental work relating to the recovery of uranium from magnesium fluoride scrap.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission. Except as herein provided, it is subject also to the provisions of the Commission's proposed regulations, published in the Federal Register July 16, 1955, Title 10, Code of Federal Regulations, Part 20, entitled "Standards for Protection Against Radiation" until such time as said proposed regulations or revisions thereof shall become effective regulations of the Commission. Notwithstanding Section 20.24(f) of said standards, labeling shall not be required for laboratory containers such as beakers, flasks and test tubes, used transiently in laboratory procedures during presence of the user.

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire on January 1, 1958.

Dictated *[Signature]*

Approved *[Signature]*

FOR THE ATOMIC ENERGY COMMISSION

9
Lyll Johnson
Chief, Licensing Branch
Division of Civilian Application

*uranium-magnesium fluoride slag

ITEM # 139

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

FEB 27 1957

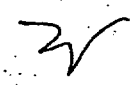
Rare Earths, Inc.
Paterson R.D. # 1
New Jersey

Gentlemen:

Enclosed is a copy of the AEC regulation, entitled "Standards For Protection Against Radiation", which establishes standards to be followed in handling radioactive materials which are subject to the licensing authority of the AEC. Source material such as you handle under your AEC license is included in this category of radioactive materials.

The effective date of this regulation is February 28, 1957 at which time your AEC source material license will become subject to its provisions.

Very truly yours,


Lyall Johnson
Chief, Licensing Branch
Division of Civilian Application

Enclosure:
10 CFR 20

ITEM # 140

B/139

EXHIBIT A
UNITED STATES ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE
HEALTH AND SAFETY DIVISION
70 COLUMBUS AVENUE
NEW YORK 23, N. Y.SAMPLE REQ. NO. **B**

1777

DATE SENT

DATE RECEIVED **12-2-59**DATE REPORTED **12-2-59**PLANT **R.E. N.J.**
MAILING ADDRESS **1000**TYPE OF SAMPLE **SMERR - AIR**
METHOD OF DETERMINATION **Alpha Count, Count**

| ROUTE RESULTS TO | | | ANALYZE FOR | | | | | | | RESULTS | | |
|------------------------------|-------|---------|--|-------------------------|--------------------|------------------------------|----------------------------|-------------|------------|-----------------|-----------|-----------|
| P. Klevin INSPECTION THORIUM | | | | | | | | | | d/m/yr | | |
| SAMPLE NO. | DATE | HOUR | SAMPLE DESCRIPTION | SAMPLING M ³ | | | SAMPLE TAKEN | TOTAL COUNT | COUNT TIME | COUNTS PER MIN. | | |
| | | | | RATE | TIME | TOTAL | | | | | | |
| T-235 | 11/25 | 3:30 PM | Rare Earth waste press area | 27.5 L/MIN | 34 MIN | 1935.0 L | | 11 | 15 | 0.56 | 2 | |
| | | | No operations in progress | | | | | | | | | |
| T-207 | 11/25 | 3:30 PM | Meso THORIUM area waste silica press | 27.5 L/MIN | 18 MIN | 495 L | | 124 | 15 | 8.04 | 60 | |
| | | | No operations in progress | | | | | | | | | |
| T-206 | 11/25 | 3:30 PM | Storage Area Hopper feeding to Ball mill | 32.5 L/MIN | 29 MIN | 942.5 L | | 80 | 15 | 5.13 | 20 | |
| | | | No operations in progress | | | | | | | | d/m | |
| T-299 | 11/25 | 3:30 PM | 4 m ² area off Hardings Ball mill casing (smear) | | 16 IN ² | 742.5 L | | 964 | 5 | 192.17 | 540/1000 | |
| T-201 | 11/25 | 3:30 PM | smear off Hand rail from grinding mill to storage | | | 8 IN ² | | 215 | 5 | 42.37 | 120 | |
| | | | | | | | | | | | ~240 d/yr | |
| T-202 | 11/25 | 3:30 PM | smear of floor by hopper from TH(OH) press (drum storage area) | | | 16 IN ² | | 568 | 5 | 112.77 | 370 | |
| | | | | | | | | | | | ~320 d/yr | |
| T-203 | 11/25 | 3:30 PM | waste silica press (miso H) (press sample of paper) | | | (sample paper size) (1 1/8") | | 347 | 5 | 68.77 | 790 | |
| T-204 | 11/25 | 3:30 PM | Rare Earth waste press from surface of wooden hopper body | | | 16 IN ² | | 941 | 16 | 58.18 | 160 d/yr | |
| COLLECTED BY: P. Klevin | | | | | | | ANALYZED BY: S.G. + A.O'B. | | | | | P. Klevin |

SURVEYOR TO RETAIN LAST COPY - RETURN ALL OTHERS TO HEALTH AND SAFETY DIVISION

IMPORT CERTIFICATE
(CERTIFICAT D'IMPORTATION)

(Declaration of Destination on Selected U. S. Imports)
(Déclaration de Destination concernant l'importation
aux Etats-Unis de certains Produits sélectionnés)

1. Name of U. S. importer or principal in the transaction

Address
(Street,
City,
Zone,
State)

DAVISON CHEMICAL CO.

Box 483

Pompton Plains, New Jersey

(Nom de l'importateur ou du commettant des Etats-Unis figurant dans la transaction.)

2. Foreign exporter's name and address (Nom et adresse de l'exportateur étranger)

Anglo-Oriental (Malaya) Limited

16 Barrack Road (P.O. Box 300)

**Kuala Lumpur, Selangor
Federation of Malaya**

3. Country of exportation (Pays d'exportation)

Malaya

4. Commodities to be imported (Produits devant être importés)

Monazite Sand

Import Certificate No. (Certificat d'importation No.)

NY 19431MA

Not valid unless official seal of Department of Commerce appears in this space. (Non valide à moins qu'un sceau officiel du Département du Commerce ne soit apposé dans cet espace.)

NOTE

Read instructions on the reverse side before completing and submitting this form. (Lire les instructions au verso avant de remplir et de présenter la présente formule.)

This certificate not acceptable to the Foreign Government unless presented within 90 days from date of certification by Department of Commerce official. (Le présent certificat ne sera pas accepté par le gouvernement étranger intéressé à moins d'être présenté dans les 90 jours qui suivront la date de la certification donnée par le fonctionnaire compétent du Ministère du Commerce.)

| Quantity
(Quantité)
(a) | Commodity description (See Special Instructions for Item 4)
Description des produits
(Consultez les instructions spéciales pour question 4)
(b) | Schedule A
number
(Numéro de la
liste A)
(c) | Total price and
point of delivery
(Prix total et
lieu de livraison)
(d) |
|-------------------------------|--|--|---|
| 17.9 long tons | Monazite Sand | 5930.300 | CIF-NEW YORK
\$ 6096.00 |

ITEM # 142

2/141

ITEM # 177

3638

YOUR ORDER NO. 1-2000

Halley, Ontario
Canada

Same

Ball

-28-

metal

Thorium Oxide, 99% pure

220 lbs gross

1-281

Radioactive Material

THORIUM OXIDE

MADE IN U.S.A.

ORDER NO. D-7000

100% pure

\$50/lb

Final Invoice - 220 lbs gross

shipment scheduled 7/8/57

Ship 27/80% - 1/50% metal losses

show "Based on receipt of 3/1"

Radioactive Labels on boxes

and export license - 1019-B

Canadian Import License - S.S. Order No. 90/1/57

TOTAL WEIGHT (LBS) 220 lbs gross

INVOICE NUMBER

MAKE ALL CHECKS PAYABLE TO DAVIDSON CHEMICAL COMPANY, DIVISION OF I. R. DUPONT & CO.

CLAIMS FOR LOSS OR DAMAGE MUST BE MADE IMMEDIATELY ON ARRIVAL OF GOODS

with shipment

Shipment to Davidson Chem from Tenn

9/5/57 - 1242 # Tho

10/1/57 - 1433 # Tho

11/25/57 - 2591 # Tho

12/12/57 - 1500 # Tho

Thors on hand

at present - 945 #

ITEM # 145

PBK
JRR

JRR

11/19/59
P.M.

TELEPHONE CALL FROM JOHN RUSSO, NEW JERSEY STATE DEPT. OF HEALTH

John Russo, New Jersey State Department of Health, called and asked for you but I took the call. He stated that on June 11, 1959 several members of his department were taking routine water samples in the Wayne-Pompton Plains area in New Jersey about 1/4 mile away from the Passaic Valley water shed. They noticed a milky white dispersion in the river, took some samples of it and had it analyzed. The alpha contamination was 3370 micro-microcuries per liter and the beta contamination was 1495 micro-microcuries per liter. Subsequent water samples taken at the same point (I believe he said ^{at a point} ~~where a brook and the Pompton River enter into the Passaic River~~) on November 5 revealed 6×10^{-5} microcuries per cc contamination. He also stated that other samples were taken on November 18 but had not been analyzed as yet. Approximately 1/4 mile away upstream is situated Rare Earths, Inc., affiliate of the Davison Chemical Company which ^(enclosed) is a Division of W. R. Grace & Son. A tour of this plant by Russo and his associates revealed that this company is processing monazite sand. He noted that they had approximately 9000 lbs. thorium oxide stored in their backyard and that when it rained, this material was being washed down into the river and probably resulting in the milky white slurry that was observed. He also stated that during a tour of the plant he noted that a milling operation was being performed and that thorium containing compounds were being heated under very high temperatures resulting in thoron gas.

B/146

ITEM # 147

He felt that we should take a look into this operation and I agreed.

He added that this company had been taken to court last year,
conf^victed and fined for general pollution of the area and the
river surrounding the plant.

Bob K. knows about this.

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee

Rare Earths, Inc.
Division of W. R. Grace & Co.
Pompton Plains, New Jersey

2. Date of inspection

November 25, 1959

3. Type of inspection Initial

4. 10 CFR Part(s) applicable

20 - 40

5. License number(s), issue and expiration dates, scope and conditions (including amendments)

License No.
R-196

Date
3/27/59

Exp. Date
3/31/60

Scope: Licensed to receive possession of and title to thorium-containing material from producers and distributors licensed by the AEC and through importation, for processing at your Pompton Plains, New Jersey and Curtis Bay, Maryland, plants.

Conditions: Required to maintain records of inventories, receipts and transfers of refined source material.

C-3623

12/13/56

1/1/58

Scope: Fifty (50) lbs. of refined source material (uranium-magnesium fluoride slag) during the term of this license for use in experimental work relating to the recovery of uranium from magnesium fluoride scrap.

Conditions: Compliance with Part 20.

R-132

8/25/56

4/1/57

(Continued)

6. Inspection findings (and items of noncompliance)

Rare Earths, Inc., a branch plant of Davison Chemical Co., a division of W. R. Grace & Co., is engaged in the manufacture of rare earth oxides from monazite sands containing 3 to 3.5% ThO₂ under license R-196. The licensee's facilities include an 8800 sq. ft. production area containing a ball mill, numerous filter presses and tanks, a waste treatment plant, and indoor and outdoor storage areas containing monazite sands (bags), drummed products and waste sludges. R. Handle, plant manager and RSO, is responsible for procurement of materials. Personnel protection clothing are worn by plant employees who have been briefed on radiological health and safety. No air dust or stack surveys have been made to date. Inadequate direct radiation surveys have been made in both the restricted and unrestricted areas. Personnel monitoring is accomplished through the issuance of weekly and 13-week film badges supplied by St. John X-Ray Co. No overexposures were found. Waste sludges and drums were stored in the unrestricted areas adjacent to the plant. Approximately 750 tons of sludge wastes were stored on the plant grounds. Inventory records showed a total of 16,645 lbs. of monazite sand and approximately 5000 lbs. of ThO₂ on hand. ThO₂ in barrels totalled approximately 5180 lbs. Waste disposal is accomplished by release of plant effluents to a storm sewer. Thorium contaminated monazite bags, wipes and wood have been incinerated on the plant grounds. Records of procurement, receipt, transfer, film badge, physical exams are maintained. Under license C-3623 a drum of 50 lbs. uranium magnesium scrap was procured. No work has ever been done on the material which is stored in the licensee's warehouse. Under license R-132 no work has been performed either at Pompton Plains or in the licensee's plant at Curtis Bay. All work under (Continued)

7. Date of last previous inspection

None.

8. Is "Company Confidential" information contained in this report? Yes ☒ No ☐
(Specify page(s) and paragraph(s))

Process description and layout - p. 2, 3, 4 (Item 11)

DISTRIBUTION:

4 cys. Div of Insp. Eq.
2 cys. Insp Div, NYOO

Paul B. Klevin

(Inspector)

Approved by:

Robert W. Kirkman, Director
New York

(Operations office)

January 25, 1960

(Date report prepared)

If additional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head format, leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under appropriate item.

use of monazite sand is 33% of all processing and will be gradually phased out. Mr. Peter Garino, a graduate chemist, acts as RSO. Garino took a two week course in methods of radiation detection, counting and surveys at the Grace Col Plant at Irwin Tennessee. Garino reports directly to Mandle, Plant Manager. Mandle stated a total of 14 employees, 7 production workers are located at the facility at Pompton Plains.

Facilities and Uses of Byproduct Material

3. The scope of the license was reviewed with Garino. The licensee is permitted to have Thorium in unlimited quantities for thorium ore processing.

4. Garino was noted to maintain a monthly inventory. The inventory as of 7/1/64 showed the possession of the following

4854 pounds Thorium (nat) in monazite sand;
3% enrichment

1005 pounds as thorium nitrate

58 pounds as thorium oxide

Garino stated the final product cerium oxide powder contains from 0.1 to 0.2% natural thorium.

Company Confidential Processing Methods

5. Garino described the manufacturing process as follows:

A. Monazite ore is received as #60 mesh and is reduced to #200 mesh in a closed circuit ball mill.

B. The 200 mesh material is placed in two tanks with concentrated sulfuric acid. *RT CONFIDENTIAL*

C. The mixture is heated with hydrofluoric acid and rare earths. *new*

D. The crystal mixture is filtered.

E. Crystals are removed by centrifuging.

F. The water removed from the crystals is above the level of the crystals. The water removed contains 99% of the thorium phosphate. *John Costello*

- G. The redissolved rare earth crystals, are further refined by treatment with sodium fluoride. This causes any remaining thorium to precipitate as thorium fluoride.
- H. The thorium fluoride and the thorium phosphate are considered waste products according to Mandle. He stated that in prior years there was a market for the waste materials which were sent to the American Potash Company for further refinement. Mandle stated there is no longer a market for refined natural thorium and thorium is considered as a waste product other than the small quantity retained in the optical polishing compound.
6. The facilities used consist of a separate room for ball mill operations which Garino stated creates the most dust. A storage area, a centrifuge area, a filter press area and numerous wooden tanks 12 feet high and 10-12 feet in diameter.
7. The rear of the licensee's property, open fields for a distance of 300 feet is used for burial of thorium wastes.
8. The inspector noted that in order to go from the second floor offices to the counting laboratory or to other offices a person had to pass over the open heating and decomposing area by means of a catwalk and enter the filtration area where thorium phosphate cake was being formed. The inspector also noted workmen wearing work clothes and shoes entering the offices as they went to various manufacturing areas. Mandle stated this was a bad arrangement, but that they were cramped for space.
9. Mandle stated that operating personnel, however, do remove their work clothing and work shoes when leaving the plant. He stated they wear respirators for the ball mill operations

ITEM 5 CONT'D

R-132 8/15/56 4/1/57

Scope: Licensed to receive possession of and title to:

- a) Unlimited quantities of raw source material (solely monazite sand) during the term of this license, from producers and distributors licensed by the AEC and through importation, for processing at your Pompton Plains, New Jersey Plant and your Curtis Bay, Maryland Plant, and
- b) One-hundred lbs. of thorium bomb reduction residues for experimental processing at your Curtis Bay, Maryland Plant.

Conditions: Required to maintain records of inventories, receipts and transfers of refined source material.

ITEM 6 CONT'D

license R-132 is being performed under license R-196.

The only items of noncompliance found during the course of the inspection of the aforementioned licenses are:

License R-196

X 20.102(b)(1)(2) - "Permissible levels of radiation in unrestricted areas" - in that levels of radiation exist at the outside storage and dump areas of such a magnitude that if an individual were continuously present in these areas, it could result in his receiving a dose in excess of 2 mrem in any one hour or could result in his receiving a dose in excess of 100 mrem in any seven consecutive days. (See item 14B and 15 of report details.)

X 20.201(b) "Surveys" - in that the radiation surveys conducted by the licensee have not fully evaluated the direct radiation hazard both in and out plant.
- in that no in or out plant air samples or stack air samples have been taken to date in order to evaluate the thoron and thorium concentrations originating from production operations and from storage of sludge materials.
- in that no water effluent sample surveys have been made by the licensee to determine status of compliance with Section 20.103.

(See items 14, 15 and 17 of report details.)

20.207 "Storage of licensed material" - in that the licensee stores in the unrestricted area adjacent to his production area approximately 750 tons of thorium bearing sludges which are not secured against removal. (See item 15 and 16 of report details.)

20.203(b) "Caution signs, labels and signals" - "Radiation areas" - in that radiation areas within and outside of the plant existed which required posting in accordance with this section (i.e., measurements taken at the locations at which approximately 30 drums each of Th(OH) and ThO₂ showed radiation readings from 7.5 to 12 mr/hr at 1', respectively, from these drums.) (i.e., at piles of sludge containing silica (mesothorium) and gray phosphate cake radiation levels found were 11 and 15 mr/hr at 1' from the piles, respectively.) (See items 14B and 18 of report details.)

20.203(e)(2) "Additional Requirements"

- in that the area outside the plant where approximately 30 drums of ThOH (approximately 500 lbs. per drum) were stored was not posted with any radiation caution sign or symbol.

- in that piles of sludge stored outplant which include waste treatment sludge, yttrium and reworked silica sludge, were not posted with any radiation caution, radioactive material sign or symbol.

(See items 16 and 18 of report details.)

20.203(f)(2)(4) "Containers"

- in that drums of ThO₂ and ThOH, each containing 500 lbs. of material, were not labeled with any caution sign, symbol, kind, or amount of material.

- in that 120 lb. bags of monasite sand containing from 3 to 3.5% of ThO₂ were not labeled with any caution, radioactive material sign and symbol and kind, and amount of material.

(See item 18 of report details.)

20.305 "Treatment or disposal by incineration"

- in that the licensee has periodically incinerated on his unrestricted plant ground bags, wipes and wood contaminated with thorium. (See item 19 of report details.)

20.301 "General requirement"

- in that the licensee has disposed of both soluble and insoluble effluent to a storm sewer without obtaining Commission approval as per Section 20.302. (See item 17 of report details.)

X 20.401(c) "Records of surveys, radiation monitoring and disposal"

- in that the records of surveys made by the licensee are incomplete in that no notation as to the instruments used or distances from source of radiation were available or were levels at sludge piles available, and specifically, the survey of March 27, 1959 did not record any measurements in units (mr/hr). (See item 14B and Exhibit B and C of report details.)

There were no items of noncompliance noted under licenses C-3623 or R-132.

PART 40 INSPECTION

Rare Earths, Inc.
Division of W. R. Grace & Co.
Pompton Plains, New Jersey

Date of Inspection: November 25, 1959

Persons Accompanying Inspector:

Mr. John Russo, New Jersey State Department of Health

Persons Contacted:

Richard Mandle, Plant Manager
Richard Stone, Sales Manager
D. Hubbard, Manager, Industrial Relations, Erwin Plant, Davison Chemical Company

DETAILS

License #R-196 (Items 9 thru 20)

9. Introduction

On November 19, 1959, John Russo, New Jersey State Department of Health, telephoned this office to inform us that on June 11, 1959, several members of his department were taking routine water samples in the Wayne-Pompton Plains area in New Jersey, when they noticed a milky dispersion in the Pequannock River. Samples taken and analyzed of this dispersion revealed alpha contamination of 3370 uuc/l and beta contamination of 1495 uuc/l. Russo stated that approximately 1/4 mile upstream from the sampling point is located Rare Earths, Inc., Division of W. R. Grace & Co. He stated that he and his associates toured the plant and found that the plant was processing monazite sand. He noted that there was approximately 9000 lbs. of ThO_2 stored in their backyard and when it rained this material was being washed down the river. He added that Rare Earths, Inc. had been taken to court last year, convicted and fined for general pollution of the area and the river surrounding the plant.

10. Organization and Procedures

Rare Earths, Inc., a branch plant of Davison Chemical Co., a division of W. R. Grace & Co., is engaged in the manufacture of rare earths oxide (Re_2O_3) from monazite sands containing from 3 to 3.5% thorium oxide.

Richard Mandle is the plant manager, while Richard Stone is the sales manager. Mandle reported that he is the radiological safety officer (RSO). Mandle stated he has had no formal training in radiation protection. He said he attended several lectures at Brookhaven in 1949 relative to rare earth processing and obtained information on radiation protection and monitoring. He noted that he attended a lecture on radiochemistry given by John Harley, HASL, NYOO.

D. Hubbard, Manager, Industrial Relations, Erwin Plant of Davison Chemical Co., a division of W. R. Grace Co., stated that he had come up to the Rare Earths plant for the first time on November 24, 1959 at the request of Mandle so that he (Hubbard) could be present during the inspection. Hubbard has a BA degree in physics and law degrees from Vanderbilt. He was employed as a health physicist for the Union Carbide & Carbon Co., in Oak Ridge, for approximately 12 years and for the AEC as a member of the OROC Inspection Division for approximately two years.

Mandle stated the plant was on a 24-hour day operation, and that the twenty-five employees were composed of seven production workers and ten office employees on an 8 to 4 shift, two production workers on a 4 to 12 shift, two workers on a 12 to 8 shift, and three maintenance men. No minors are employed.

11. Facilities and Uses

A two story brick building containing a production area (approximately 8000 square feet), three quality control labs (1200 square feet), and offices are located in Pompton Plains, New Jersey. The plant facilities are located on Black Oak Ridge Road (Rt. 202), a main thoroughfare. The production area consists of monazite ore storage, ball mill, filter press, rare oxide, chloride, and thorium refining areas. All layout of the plant is included in the licensee's file. Facilities for change lockers, laundry, and lunch room are available for the production personnel. Mandle wished to have the layout and process description treated as "business confidential". A waste treatment facility and several waste storage tanks, $\text{Th}(\text{OH})$ drum storage and several areas where process and waste sludges were stored in open piles are located outside the plant. Mandle supplied a brief description of the operations involved in the processing of Re_2O_3 from monazite sand. The process description which includes the location and type equipment used follows:

"FIRST OPERATION - Digestion of the Monazite (Sulfonation Reactor)

The first operation of the process involves digestion of the finely ground monazite sands with hot concentrated sulphuric acid. The rate of the reaction of monazite sand with sulphuric acid, or sulfonation, increases with finer particle size of the monazite sand and higher reaction temperatures. The reaction starts as a fluid mixture of the two components. As the reaction proceeds it gradually becomes more viscous and finally putty-like due to the formation of voluminous anhydrous rare earth sulfate crystals. The phosphate content of the monazite goes into solution as phosphoric acid. Further agitation will cause sufficient thinning of the mixture, to allow discharge from the cast iron reactor. The reaction may be considered complete at the end of 4 to 6 hours.

SECOND OPERATION - Crystallization (Tank 1, Centrifuge & Press 5)

The second operation involves the crude separation of the thorium sulfate from the rare earth sulfate. At the end of the sulfonation reaction, the hot charge is quenched in a tank containing recycled acid and wash streams from subsequent process steps. The wash streams contain sufficient water to dilute the free acid in the sulfonation to approximately 50% total acidity, and also provide water hydration for rare earth sulfates from sulfonation.

The hydrated rare earth sulfates form as a dense crystalline salt in a slurry of approximately 50% phosphoric sulphuric acid liquor. The thorium sulfate produced in the sulfonation is more soluble in this acid than the rare earth sulfates which permits a crude separation of thorium and rare earths.

The hydrated rare earth sulfates from the crystallization are pumped to a classifier to remove the finely ground non-monazite gangue and acids from the rare earth sulfates. The overflow from the classifier is filtered through a precoat filter to separate the gangue from the thorium-rich acid liquors. A portion of this filtered acid is removed for thorium separation and the remainder is recycled to the crystallizer tanks.

(33)

THIRD OPERATION - Rare Earth Removal from Acid Stream (Tank 24, Press 5A, Tank 15)

The thorium-rich acid liquors, or top acid, contain a small quantity of the original rare earths contained in the monazite. These rare earths are stripped from the acid by the addition of sodium sulfate which forms an insoluble acid rare earth double salt. This double salt contains some occluded thorium and therefore must be processed to properly distribute the rare earth and thorium values. The double salt is separated from its acid liquor, called stripped acid, by means of a drum filter. The acid rare earth double salt is converted to water insoluble rare earth hydroxide by treating it with boiling caustic soda. The caustic soda and soluble salts are removed by hot water washes and the thickened rare earth hydroxide is then mixed with the washed rare earth sulfate crystals in operation 6.

FOURTH OPERATION - Thorium Separation from Acid Stream (Tank 25, Press 5B, Tank 16, Filter 3)

The thorium is removed from the stripped acid by addition of either sodium fluoride or hydrofluoric acid which causes insoluble thorium fluoride to precipitate from the acid. The thorium fluoride is separated from the acid on a drum filter and the spent acid is sent to an acid dilution boot for the Superphosphate Plant. The thorium fluoride is then treated with caustic soda to convert the thorium fluoride to hydroxide. Sodium fluoride and free caustic are removed by water washing in the Shriver thickener. The washed product is then dried and packed as thorium hydroxide product.

FIFTH OPERATION - Removal of Acid from Crude Rare Earth Crystals (Centrifuge, Tank 19)

The hydrated rare earth sulfate crystals from the underflow of the classifier (operation 2) are filtered on a pan filter and counter-currently washed with the rare earth process wash liquors before these liquors are sent to the crystallizing tank. This operation serves to remove the bulk of the phosphoric acid and sulphuric acid from the rare earth crystals so that they may be dissolved in water in operation 6 with a minimum acid contamination since acid interferes with the thorium separation.

SIXTH OPERATION - Removal of Thorium from Rare Earths (Tank 19, Press 1, Tank 6)

The thickened rare earth hydroxide from operation 3 is mixed with the washed rare earth crystals from operation 5 and filtrate from operation 8. The rare earth values go into solution as neutral rare earth sulfates, and gangue and thorium remain insoluble as thorium phosphate. Complete removal of thorium from the rare earths is accomplished by maintaining the pH of this solution at 5.5. The phosphate cake is removed by filtration and the polished rare earth liquors are sent to the second crystallizing tank (operation 8).

SEVENTH OPERATION - Recovery of Thorium and Rare Earths from Gangue (Press 1, Tank 8, Press 6, Tank 21)

The thorium phosphate cake in operation 6 is combined with the gangue from the precoat drum filter in operation 2 and is countercurrently treated with a dilute sulphuric acid solution to solubilize the rare earth and thorium values leaving insoluble residues. These residues are of two types; one consisting of heavy minerals and unreacted monazite; the other consisting of finely divided silica, calcium sulfate, filter-aid, etc. The heavy minerals and monazite are recovered as the underflow of a cyclone classifier and the finely divided material is removed by filtration, and after washing is sent to the dump. The acidified rare earth and thorium liquors are recycled as washes through the crude rare earth crystal filter to the sulfonate crystallization tanks.

EIGHTH OPERATION - Formation of Rare Earth Double Sulfate
(Tank 6, Tank 3, Press 2, Tank 10, Press 7)

In the double sulfate precipitation tank, neutral rare earth sulfate liquors from operation 6 are treated with sodium sulfate to form rare earth double sulfates. This salt forms as a dense precipitate and is removed from the slurry by settling and filtration. The filtrate is collected and treated with soda ash to pH8, which causes the soluble yttrium earths to precipitate. The yttrium earths are filter pressed and stored, the filtrate from the operation goes to the plant waste.

The double salt may be treated with the following for the preparation of rare earth products:

- a) Hydrofluoric acid to give rare earth fluoride.
- b) Caustic soda to form rare earth hydroxide.
- c) Soda ash to form polishing powders.

Rare earth chloride, cerium products and didymium earths are produced from rare earth hydroxide. Heavy rare earths are recovered from yttrium residues."

12. Procurement Procedures and Control

R. Mandle is responsible for ordering monazite sand containing 3 to 3.5% thorium from producers and distributors licensed by the AEC. Mandle reported, to date, Lindsay Chemical Co., West Chicago, Illinois, and Baumhoff-Marshall, Inc., Boise, Idaho, have been his suppliers. Records of purchase orders from both companies are included in the licensee's file.

13. Instrumentation

At the time of inspection an inoperable Beckmann MI-5 beta-gamma survey meter was found to be on hand. Mandle stated that on several occasions a Victoreen alpha survey meter had been borrowed from Ledoux Co. Subsequent to the inspection, R. Stone contacted this office (December 28, 1959) and stated that the instrument has been repaired and that his company intends to procure additional instrumentation.

14. Radiological Procedures and Control

A. Instructions and Personnel Protection

According to Mandle, production workers have been orally briefed on radiological health safety by F. Nonemaker and himself. A copy of the lecture given to production workers by F. Nonemaker dated April 17, 1958 is included in the licensee's file. The lecture was attended by all workers who were required to sign the sheet of attendance. All production workers, according to Mandle, are equipped with orlon uniforms, respirators, gloves, and rubber overshoes.

B. Surveys

No air surveys for both thoron and thorium have been made to date by the licensee either in-plant or out-plant. No stack air surveys have been made to date. At the time of the inspection, little or no production operations involving the handling of monazite sands or packaging of

of ThO_2 and ThOH were in process. Three samples taken at the ReO_2 waste press area, mesothorium area, and monasite storage area showed thorium concentrations of 2, 60, and 20 alpha d/m/ M^3 , respectively. Smear samples taken at various locations inside the plant showed levels of 120 to 540 alpha d/m/100 cm^2 . A 1-1/8" Whatman filter paper pressed on waste silica press cake in the mesothorium area showed a concentration of 190 alpha d/m/1-1/8" filter paper sample. A copy of the air and smear results analyzed by HASL is included as Exhibit A in the report details.

Handle reported that two direct radiation surveys have been made to date. Records of surveys conducted on January 6 and March 7, 1959 are included as Exhibits B and C, respectively. Neither survey record includes the instrument used nor the distances from the sources of radiation. Only the January 6, 1959 survey expressed the results in mr/hr. The surveys did not include the radiation levels in the unrestricted outside storage dumps, where piles of yttrium sludge, silica waste (mesothorium containing material), waste treatment sludge and phosphate sludge were stored. The surveys did not include evaluation of $\text{Th}(\text{OH})$ drum storage area, where a measurement of 7.5 mr/hr was found at one foot from the drums using a GM survey meter. Other measurements taken by the inspector using a Juno alpha-beta-gamma survey meter #5666, and a Nuclear Measurements Corp. beta-gamma survey meter #5571, which were calibrated on November 4, 1959 are as follows.

| <u>LOCATION</u> | <u>JUNO</u> | <u>GM</u> |
|--|---|---|
| a. <u>Inside Plant</u> | | |
| 1. Waste silica press - contact with floor | 800 alpha d/m/100 cm^2 - 8 mr/hr gamma | |
| 2. Passageway to office next to press | 50,000 alpha d/m/100 cm^2 - 5 mr/hr gamma
15 mr/hr beta | |
| 3. Hand wheel between tank #2 and tank #6 | 6000 alpha d/m/100 cm^2 - 12 mr/hr gamma | |
| 4. Storage area | | 7 mr/hr at 1' from monasite storage bags -
1.5 mr/hr bkgd of storage area (waist high meas.) |
| 5. $\text{Th}(\text{OH})$ drum storage near tank #12 | | 7.5 mr/hr at 1' from drums |

| <u>LOCATION</u> | <u>JUNO</u> | <u>GM</u> |
|--|-------------|--------------------------------|
| b. <u>Out Plant</u> | | |
| 1. Gray Pile (Phosphate cake) | | 11 mr/hr at 1' from pile |
| 2. Silica and Mesothorium Piles | | 15 mr/hr at 1' from pile |
| 3. Yttrium Pile | | 1.5 mr/hr at 1' from pile |
| 4. Waste Treatment Sludge | | 1-2 mr/hr at 1' from sludge |
| 5. Background bet. Th(OH) drum storage and Yttrium sludge pile | | 1.3 mr/hr |
| 6. Th(OH) drum storage area (approximately 30 drums) | | 12 mr/hr at 1' from drums |
| 7. Primary mixing tank outside waste treatment plant | | 1.5 mr/hr at contact with tank |
| 8. Waste treatment plant (bkgd) | | 0.3 - 0.5 mr/hr |

C. Medical

Mandle stated the preoperational physicals and yearly physicals which include chest X-rays, blood, and check of physical well-being are provided for all plant employees. No urine analysis program is in effect.

D. Personnel Monitoring

Weekly film badges supplied by St. John X-Ray Laboratory, Califon, New Jersey, are provided employees. The badges also contain a film for a 13-week cumulative exposure. The weekly film badge results for 1958 and 1959 average 100 mr gamma or less while the beta exposures range up to 285 mrep. The 13-week cumulative exposures averaged approximately 1200 mrem. No dosimeters or ring badges are employed.

15. Storage and Security of Material

Initially, Mandle declared his entire plant and surrounding ground as his restricted area. However, after a tour of the plant and grounds, he noted that a 4' wooden fence surrounding his grounds did not completely enclose his plant grounds. He then said that his restricted area would be limited to his production plant and waste disposal which was located approximately 75' from the plant. The waste disposal plant was under lock and key. It was pointed out to Mandle that even if the 4' fence covered the entire rear portion of their plant grounds, no control or gated area was available to keep the public from entering the plant grounds, from the parking area, or from the unfenced opposite side of the plant, which is located on a main thoroughfare. Mandle agreed this was a correct statement. Stored on the unrestricted plant grounds were piles of thorium bearing sludges, i.e., yttrium sludge, silica sludge (mesothorium), phosphate sludge, and waste treatment sludge. Also stored outside the plant in the unrestricted area were over 30 drums of Th(OH). These drums contained an average of 500 lbs. of material. A radiation measurement made with a Juno showed 12 mr/hr at 1' from the Th(OH) drums.

16. Inventory

On hand as of November 15, 1959 was 16,645.4 lbs. of monazite or approximately 5000 lbs. of ThO_2 . ThO_2 residues in barrels totalled 5180 lbs. Thorium content of sludges stored on plant property are as follows:

- a) Ore tailings Langue (mesothorium) - 230 tons residue containing 8,200 lbs. of ThO_2 - located in Area G.
- b) Yttrium sludges - 200 tons residue containing 3000 lbs. of ThO_2 - located in Area H.
- c) Reworked sludges - 137 tons residue containing 2750 lbs. of ThO_2 - located in Area I.
- d) Waste treatment cake - 105 tons residue containing 1300 lbs. of ThO_2 - located in Area J.
- e) In process silica sludge - 30 tons residue containing 2700 lbs. of ThO_2 - located in Area H.
- f) In process thorium carbonate - 31 tons residue containing 3100 lbs. of ThO_2 - located in Area L.
- g) In process thorium Hydroxide - 15 tons residue containing 10,500 lbs. of ThO_2 - located in Area K.
- h) Refined yttrium concentrate - 20 tons residue containing 2700 lbs. of ThO_2 - located in Area M.

A copy of the facility layout which includes the locations of the production and waste treatment plants, sludge storage, and drainage trench constructed by the licensee is included as Exhibit D.

17. Waste Disposal

The waste treatment plant treats all liquid wastes issuing from the plant. The waste involved consists of wash water, floor washings and surface run-off from the adjacent plant property.

The process involves the use of an average of 35,000 gallons of water per day. All of the washes are discharged into a common 1000 gallon sump, equipped with two automatically controlled force pumps, which pump the waste to a retention tank. Each pump has capacity to handle the peak load, and is installed so that the second pump starts in case of extreme demand or failure of the first. Signals are installed in a control house to indicate the proper functioning of the pumps.

The retention tank has a capacity of 50,000 gallons, which provides 24 hours average retention of the wastes. In addition to the purpose of acting as a reservoir, or constant head installation, the tank provides means of diluting effluents of widely varying pH so that the automatic pH controlling equipment may function more efficiently. The incoming wastes flow through a distributing channel in the tank, and effluent, after initial settling, is removed from the midpoint of the tank and flows by gravity to a mixing tank. A draw-off is provided at the bottom of the tank to pump accumulated solids to the sludge filter press.

An 8000 gallon mixing tank, equipped with a gate agitator, receives effluent from the retention tank at its midpoint. A pH electrode assembly is in circuit with the mixing tank, and is electrically connected to a mechanically operated diaphragm valve. Two storage tanks are provided to feed either 50% sulphuric acid or 50% caustic soda solution through the automatic diaphragm valve to the mixing tank, as called for by the pH controller. Again, signals are provided to indicate proper functioning of the valve and chemical supply tanks as well as a recording chart which indicates the pH of the mixing tank. The mixing tank effluent is piped to a 2000 gallon Hardinge thickener at pH 5.8 - 6.2.

Mandle stated that no liquid effluent samples were checked by his company to determine the thorium concentration of the liquid effluent discharged to the storm sewer. He said the State had made some checks and that he was going to make arrangements with the State to analyze some water samples for him. No approval to dump liquid effluents into a storm sewer by the AEC was reported to be given his company.

The Hardinge thickener provides a clear overflow to a final clarification tank and adjusted to give a 20% solids underflow which is pumped to a sludge filter press in the control house.

The final clarification tank of 50,000 gallon capacity, provides an average 24 hours of retention time for the effluent before discharge from the system. The main function of this tank is to provide sufficient time for post precipitation of solids after pH adjustment. A draw-off is provided at the bottom of the tank to pump accumulated solids to the sludge filter press.

The sludge filter is of the plate and frame type, with a capacity of 6 cubic ft. of cake. Approximately 60 cubic feet of sludges, or 3500 lbs., are removed weekly. These sludges are hauled to a dump on the property.

The system was designed to operate automatically. Twelve man hours per day are devoted to the maintenance, cleaning and control of the operation. The entire operation is under the supervision of the plant chemist who checks the performance of the equipment, and samples prepared by the shift operator.

Mandle stated, and it was noted during the inspection, that a drainage ditch was under construction to collect run-off water from the hill surrounding the upper end of the licensee's grounds. Another drainage ditch is being constructed between the piles of sludge and the production and waste treatment plant. This, according to Mandle, would prevent run-off to the street.

Mandle said that on several occasions due to the fluctuation in pH, there were slug discharges to the storm sewer. This discharge consisted of both soluble and insoluble wastes (milky white dispersion noted in item 9 of report details).

A telephone conversation with John Russo, New Jersey State Dept. of Health, on January 18, 1960, revealed the following information with regard to release of soluble and insoluble effluent to the streams by the licensee. Russo said on January 17, 1957, a sample taken from the creek near the plant showed a thorium concentration of 6×10^{-5} uc/ml. On February 14, 1958, two samples of a milky white dispersion showed a concentration of suspended material amounting to 4700 uc/ml. and 419 uc/ml. On June 24, 1959, a sample containing soluble effluent revealed no activity in excess of instrument background while another sample (milky white dispersion) showed a concentration of 3886 uc/ml. On January 21, 1959, another dispersion sample showed a concentration of 3300 uc/ml. On November 10, 1959, an undissolved sample collected in the stream showed a concentration of 11,400 uc/ml. On November 21,

1959, another sample revealed a concentration of 5900 uuc/ml. Russo stated that since December 14, 1959, several samples run by his office showed concentrations less than instrument background. Russo stated that "Mandle has taken to watch the pH control, and therefore has had a better control of effluent release to the storm sewer".

18. Posting and Labeling

After being queried as to the relative cleanliness of the radiation signs, Hubbard noted that he had posted various areas inside and outside the plant with required caution signs and symbols just prior to the inspection. There were several areas in the plant and outplant in which radiation areas existed which were not posted. The areas in which over 30 odd drums of ThOH and about 30 drums of ThO₂ were stored were not posted with a sign denoting a radiation area. Each of the aforementioned drums contained over 500 lbs. of material. According to Mandle, radiation measurements made with a calibrated GM or Juno showed levels from 7.5 mr/hr to 12 mr/hr at 1' from the drums. The area in which over 30 drums of ThOH were stored outside the plant was not posted either with a caution, radiation material sign or the radiation area sign. The drums themselves were not labeled with a caution, radioactive material sign, amount, or type of material. Several hundred 120 lb. bags of monazite sand containing from 3 to 3.5% ThO₂ which were stored in the monazite storage area, were not labeled with any radioactivity sign or amount, or type of material. The storage area was properly posted with both a caution sign and symbol.

The piles of sludge such as the silica (mesothorium) and gray phosphate cake at which radiation measurements at 1' from the pile showed 11 and 15 mr/hr, respectively, were not posted with a radiation area or a caution, radioactive material sign. These piles contained approximately 200 tons of materials (4 tons ThO₂). Other piles of sludge stored outplant which include waste treatment yttrium and reworked silica sludge were not posted with any caution, radioactive material sign or symbol. Hubbard stated that he had run out of signs and noted that he was aware that these areas required proper posting. The entrances to the production and waste treatment plants were noted to be properly posted.

19. Incineration

Mandle stated that he periodically incinerated paper bags in which the monazite sand is shipped and wipes and wood contaminated with thorium. He added that he has not evaluated the hazard involved in the burning of these contaminated materials by taking air samples, soil samples, etc. during and after burning of the waste, respectively.

20. Records

Records of procurement, receipt, transfer, film badge, physical exams, were found to be in order. No records were maintained on waste disposal. Direct radiation survey records did not include the type of instrument used and did not, in the March 27, 1959 survey (Exhibit C), record the measurements in mr/hr. The survey records shown in Exhibit B and C did not completely evaluate the hazard due to storage of piles of radioactive sludge outside the plant, at which levels in excess of 10 mr/hr existed.

21. Other Part 40 Licenses

A. License C-3623

Under License C-3623, a 50 lb. drum of uranium-magnesium scrap was procured by R. Mandle for use in experimental work relating to the recovery of uranium from magnesium fluoride scrap. No work was ever performed according to Mandle. The 50 lbs. of material which was reportedly posted, was stored in the company storage warehouse. Records of receipt were available.

B. License R-132

According to Mandle, no work is in progress under license R-132, Davison's Pompton Plains or Curtiss Bay plants. All work at Pompton Plains is being performed under license R-196. No work under R-132 or R-196, according to Mandle, is being performed at the Curtiss Bay, Maryland, plant of Davison Chemical Co. Under R-132, Mandle stated that 100 lbs. of thorium bomb reduction residues had been transferred by him to the Davison Chemical Co. plant at Erwin, Tennessee.