

June 5, 1985

RADIATION SAFETY PROGRAM

SIGMA, SPRUCE DISTRIBUTION CENTER

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REG3 LIC30
24-16607-02 PDR

ALARA PHILOSOPHY

The management of Sigma Chemical Company, Inc. is committed to the policy of keeping individual and collective exposures As Low As Reasonably Achievable. The management has established the support necessary to administer a program that promotes the concept of ALARA.

An annual formal review of the Radiation Safety Program shall be conducted which will include the operating procedures, past exposures and a review of the corrective actions taken in the past and their effectiveness.

Modifications that were made at the time of need may have been performed as temporary measures to determine their effectiveness. Permanent modifications to operating procedures, equipment and facilities will be made where such changes will reduce exposures, unless, in our judgment, the cost is unjustified. Whenever modifications are recommended but not implemented, the reasons shall be documented.

The Radiation Safety Committee delegates enforcement authority to the Radiation Safety Officer for the ALARA program, and supports necessary assertion of the authority. The Radiation Safety Committee shall review and evaluate the ALARA efforts of the Radiation Safety Staff, the laboratory personnel, and the administration.

The Radiation Safety Officer shall review annually all operational elements of the ALARA program. A quarterly review is conducted of occupational exposures and investigations into determined elevated levels. All findings shall be documented and reported to the Radiation Safety Committee.

The Radiation Safety Officer shall ensure development of the ALARA program and promote its growth with the laboratory personnel.

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RADIATION SAFETY PROGRAM

General Procedure

1. Sigma Chemical Company is the licensee. Sigma Chemical Company delegates the responsibility for all work involving radioactive materials, equipment, disposal and storage set forth in the Standard Operating Procedure to the Radiological Safety Officer (RSO) and those named by the RSO.
2. The RSO may delegate to one or more persons (designated as radiation supervisors) the supervision of lab procedures and other radiation activities. The RSO may also select other personnel (not radiation supervisors) to assist with other radiation activities (e.g. receiving or maintaining inventory).
 - a) All work is done under the direct supervision of the RSO or his delegate.
 - b) Any delegate of the RSO must have sufficient training and/or experience to safely and confidently carry out the intended work.
 - c) Any delegate of the RSO must be cleared for work with radioactive material.

Purchasing

All orders for radioactive materials are placed through the Purchasing Department based on computerized general stock inventory requirements. The computer shall be programmed to assure that we are within the limits of our license at all times. Copies of all purchase orders will be sent to Shipping Department stamped "RADIOACTIVE MATERIAL".

Receiving

All radioactive materials will be held at the receiving area for the RSO or his delegate.

1. Upon receipt of the radioactive material, the RSO shall be contacted at once.
2. Packages containing radioactive materials will not be opened except by the RSO or his appointee.
3. Packages containing radioactive materials will not be moved from the receiving area except by the RSO or his appointee.
4. Necessary lot numbers, if required, will be assigned prior to the removal of materials from the receiving area.
5. If delivered by truck, all packages shall be monitored for radiation within 3 hours after receipt, or within 18 hours if received during non-working hours, before opening or moving from the receiving area.

Receiving (cont.)

6. If more than 0.01 μ Ci (22,000 disintegrations per minute) per 100 square centimeters are found on the external surface of the package, the RSO and the final delivering carrier should be notified immediately and the information telephoned or telegraphed to the Regulatory Operations, USNRC, 799 Roosevelt Road, Glen Ellyn, Illinois by the RSO, or company officer.
Day phone: (312)858-2660; night: (312)739-7711.

All by-product material received shall be appropriately overpacked and the overpack free of any radioactivity.

7. The individual container (bottle or ampule) will be appropriately overpacked and will remain in the shipping container, moved to the restricted area and stored in the same container, in refrigerator, until shipment.

SHIPPING

The overpacked items will be packed securely into a 7A shipping container before leaving restricted area.

EMERGENCY PROCEDURES

1. Emergency outside the radiation area:

When the alarm sounds for a plant emergency outside of the radiation area, return all radioactive material to its proper storage space and follow emergency procedure as described in Plant Emergency Manual.

2. Fire inside the radiation area:

- a) With radioactive material not directly involved--
If possible, return all radioactive material to proper storage space and follow emergency procedure as described in Plant Emergency Manual. Notify the RSO.
- b) With radioactive material directly involved--
Follow emergency procedure as described in Plant Emergency Manual. Notify the RSO.

3. Spill in the radiation area:

Special spill kit with absorbant, red ribbon, signs, protective clothing and gloves will be available outside of regulated area.

- a) Cordone off immediate area. Allow no traffic.
- b) Apply absorbant to prevent the spreading of spill. Leave area.
- c) Remove contaminated clothing and thoroughly wash skin with soap and water. Monitor possible areas of exposure to determine if any radioactive material has been spilled on skin. Put on protective clothing.

- d) Notify RSO and carry out the following under his surveillance:
- 1) Place absorbant material into plastic-lined container. Use care. Avoid contact with material.
 - 2) Pick up unabsorbed material by repeatedly scrubbing with soap and water. RSO to direct disposal of water.
 - 3) Perform a wipe test (see Wipe Test under Surveys, page 5). Contamination not to exceed 220 dpm/100 cm².
 - 4) Monitor area with a Geiger counter as appropriate.
 - 5) Air sample if required.
 - 6) Dispose of contaminated material as directed by the RSO.

STORAGE

All radioactive material shall be stored in a restricted area, the location to be designated by RSO. Cooler, freezer and room temperature storage should be available.

In event of loss or theft, the Safety Director, RSO and designated company officer shall be informed immediately. If a substantial hazard exists, notification shall be made to NRC.

MAINTENANCE AND HOUSEKEEPING IN THE RESTRICTED AREA

1. Written permission is required from the RSO before any maintenance or housekeeping activities can be performed in the restricted area.
2. Film badges or other personnel monitor are not required. Upon the request of the individual or the RSO the latter will determine if there has been any radioactive contact.
3. Before written permission will be issued, the RSO will
 - a) review with the Maintenance or Housekeeping foreman the type of work to be done.
 - b) determine that the restricted area is safe,
 - c) if equipment such as hood, exhaust system, drain, etc. is in need of repair, the RSO will pay special attention to the inside to assure it is free of any radioactive hazard.
4. Upon completion of the work, the RSO will inspect the area and approve the work.

POSTING OF NOTICES TO EMPLOYEES

The following notice will be posted at the entrance to the radiation area:

1. The original of Form NRC-3 "Notice to Employees."
2. The following notices shall be posted at the same location as the above:
 - a) A copy of the license and the conditions of the license are available for inspection by asking the RSO.
 - b) Standard Operating Procedures are available from the RSO.
 - c) Any notice from the Nuclear Regulatory Commission of violation of the rules and regulations involving work at this location.

WASTE DISPOSAL

We do not anticipate generating waste in this operation. In case of spill, disposal will be through a licensed NRC disposal company.

RADIATION HEALTH MONITORING AND RECORDS

Exposure of individuals to radiation in restricted areas.

1. All employees using the restricted area will be required to submit urine samples to the Medical Department the first day of every month.
2. Records of exposure will be kept in the Company Medical Department by the RSO.
3. The Medical Department will keep records of the accumulated dose for each individual.
4. In the event of an unforeseen high exposure (incidents) or over exposure, reports will be made as per 10CFR 20.403 and 405.
5. All records will be preserved indefinitely or until the Commission authorizes disposal.
6. Urine samples will be counted by Pathfinder Labs or other qualified individual authorized by the Radiation Safety Committee.
7. Previous exposure history will be included if available.
8. All radiation workers shall be aware and understand the special precautions concerning exposure during pregnancy, especially that the dose equivalent to the embryo or fetus from occupational exposure of the expectant mother should not exceed 0.5 rem and the reasons for the recommendation. The required information is available as USNRC Regulatory Guide 8.13. This guide is available to all laboratory personnel. It is also available to any other interested employee.

A pregnant laboratory worker should inform the Radiation Safety Staff of her condition at the earliest time. The employee's work assignment shall be reviewed and an evaluation shall be made to determine whether the employee should consider requesting modification of her work assignment.

When the employee's integrated exposure approaches 0.5 rem, a transfer or leave is mandatory.

9. Permissible exposure levels

a) Occupationally exposed individuals -

Control and safety procedures for restricted areas must be such that exposure of individuals over 18 years of age shall not exceed the following limitations in a calendar quarter:

1. whole body, head and trunk, active blood-forming organs, lens of eyes or gonads 1.25 rem
2. Hands, forearms, feet, ankles 18.75 rem
3. Skin of the whole body 7.50 rem

b) Non-occupationally exposed individuals -

The whole body exposure of members of the public who do not work with ionizing radiation and persons under 18 years of age is limited to 10% of the above listed limits.

SURVEYS

Surveys will be performed in the restricted area, and adjacent to the restricted area at least monthly or as experience requires.

Wipe Test

A wipe₂ will be taken randomly in the surveyed area to cover approximately 100 cm². All areas shall be maintained in a manner₂ so as to limit loose contamination levels to a maximum of 220 dpm/100 cm². All areas surveyed and found to be in excess of this level shall be cleaned₂ and resurveyed until the level is determined to be below 220 dpm/100 cm². All of the analysis shall be performed with the use of a liquid scintillation counter calibrated with commercially available traceable standards. The count per minute values will be adjusted mathmatically to accurately represent actual disintegrations per minute present in any sample analyzed for radiation safety purposes.

$$\frac{\text{Standard dpm value}}{\text{Observed cpm}} = \text{correction factor}$$

$$\text{Correction factor} \times \text{sample cpm value} = \text{sample dpm value}$$

Before the introduction of radioactive material to the storage area, a wipe test will be performed. These values will be used as "base line values." Maximum allowable dpm approximately 2 x base line value. If this limit is exceeded the RSO will supervise a clean-up procedure to bring the area into compliance.

We believe air sampling is not required since we are storing only overpacked packages of solid chemicals and no gases or volatile liquids.

DIRECTIVE FOR TRAINING

Before an individual can be cleared to work in a restricted area, he must receive training covering the following points. A written record will be kept to show that the individual has received the training and understands the subject matter covered.

1. The hazards of radiation exposure.
2. How and where radioactive material is stored.
3. Personal protection from radioactive hazards.
4. Function and maintenance of protective equipment
5. Survey instrument and the proper usage.
6. Review of 10 CFR applicable sections.
7. Instruction to report to RSO any condition which may lead or cause violation of the regulations.
8. Notice, instructions and reports to workers as outlined in Parts 19 and 20, 10 CFR.
9. General training in department operations and procedures.
10. Refresher course held as required, or at least annually.

GENERAL WORK PRACTICES

1. Practice good personal hygiene. Wash hands before smoking or eating.
2. No smoking is permitted in the restricted area.
3. No food or drink allowed in the restricted area.
4. Any slight accident or spill is to be reported immediately to Supervisor or RSO.
5. Any unsafe condition must be reported to Safety Department and RSO promptly.
6. Good housekeeping will be practiced at all times.

RECORD MANAGEMENT

The following records will be kept and audited annually by the RSO:

- 1) Receiving records and radiation levels observed.
- 2) Stock Records: C maximum number Ci of each isotope permitted at any time.
- 3) Personal exposure records and exposure history.
- 4) Shipping records, customer's license and expiration date of license.
- 5) Method of shipment.
- 6) Spills and breakage.
- 7) Disposal records.
- 8) Certification of 7A boxes (test results).
- 9) Export records
 - a) Quantity to customer
 - b) Name of country
 - c) Quantity to country
- 10) Training records
- 11) Instrument calibration record.
- 12) Survey records.

June 1985

Application for Material License
Sigma Chemical Co.

11) Waste Management

No waste will be generated. For spills in the radiation area:

- 1) Cordone off immediate area. Allow no traffic.
- 2) Apply absorbant to prevent the spreading of spill. Leave area.
- 3) Remove contaminated clothing and thoroughly wash skin with soap and water, Monitor possible areas of exposure to determine if radioactive material has been spilled on skin. Put on protective clothing.
- 4) Notify RSO and carry out the following under his surveillance:
 - a. Place absorbant material into plastic-lined container. Use care. Avoid contact with material.
 - b. Pick up unabsorbed material by repeatedly scrubbing with soap and water. RSO to direct disposal of water.
 - c. Monitor area with a suitable detection instrument.
 - d. Dispose of contaminated material as directed by RSO.

WCS:h1

CONTROL NO. 9137



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 20 1985

Sigma Chemical Corporation
ATTN: Mr. Walter C. Stern
Post Office Box 14508
Saint Louis, Missouri 63178, U.S.A.

REFUND OF APPLICATION FEE

1. BACKGROUND:

Check Received	June 13, 1985
Application Dated	June 5, 1985
Check Number	7484
Check Amount	\$290

2. REFUND:

Amount	\$ 60
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This refund is now being processed by the Office of Resource Management and will be sent as soon as possible.

3. REASON FOR REFUND:

Overpayment of application fee for application dated June 5, 1985 for License 24-24525-01, as specified in fee Category 3P(\$230) of Section 170.31, 10 CFR 170.

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Glenda Jackson
License Fee Management Branch
Office of Administration