Rockwell International

Atoms International Division
Rockwell Hanford Operations
Richland, WA 99352

950 5438

ROCKWELL HANFORD OPERATIONS 1978 RADIOLOGICAL IMPROVEMENT PROGRAM

D. S. Cunningham

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ROCKWELL HANFORD OPERATIONS'
1978 RADIOLOGICAL IMPROVEMENT PROGRAM

I. INTRODUCTION

This document describes the radiological improvement program (RIP) to be undertaken by Rockwell Hanford Operations during calendar year 1978. Actions taken in each facility to reduce exposure and to implement the Company's policy to conduct operations in a manner that assures radiation exposures to employees are maintained at the lowest levels reasonably achievable.

II. ORGANIZATION

Personnel of the Radiological Engineering Section are responsible for coordinating the overall program. Their principal responsibilities, with regard to this program, are to promote the development and implementation of effective plans by facility management and to provide technical support in carrying out these plans. The Manager, Radiological Engineering, is responsible for the continuation of the Company-wide documented radiological improvement program and for the issuance of program progress reports. Radiological Engineering personnel are assigned to each major Rockwell Hanford Operations facility where their responsibilities include providing technical support to Radiation Monitoring and facility personnel.

Radiation zone workers, those employees wearing multi-purpose dosimeters who exchange dosimeters either once a month or once a quarter, were divided into groups, based on their work locations, to provide a means of monitoring progress against facility goals. Table I shows the organization of these groups for program purposes and the functional organizations represented within each group.

Each of the department managers in the five groups has appointed an individual to take the lead in establishing the program for the group. These appointees are identified for program purposes as Radiological Improvement Engineers, (RIE's). The RIE is expected to take the lead in initiating action on related facility improvements outlined in the program plan. In addition, they review the status of implementation of the group's RIP plans and solicit the assistance of operating supervisors, specialists, radiation monitoring supervisors, process engineers, etc., to implement the program commitments. Participation of the RIE's in many facility meetings assures maintenance of awareness of program activities. Other important functions of the RIE's include auditing of program performance and evaluating program achievement with the facility manager and the radiological engineer assigned to the facility. Radiological Engineering will provide exposure reports to the RIE on a frequent basis to serve as a measurement of progress. Monthly reports will also be made at the Executive Safety Committee meetings to keep management informed of program progress and problem areas needing attention.

III. PLANS

Each of the five groups, through their RIE have developed plans for radiological improvement in 1978. The plans are facility-oriented and in each case represent facility management's commitment to provide consistent attention to radiation protection problems that will lead to positive action on problem situations. A more formal approach is thus promoted to keep the radiation exposure sustained by employees as low as reasonably achievable and to reduce the employee's risk of becoming contaminated. These plans are designed to initiate a vigorous effort to bring about radiological improvements and to provide a base for future improvement efforts. Collectively, the plans represent a renewal of the Company's commitment on employee protection. The specific plans for each group are presented in Appendix A. In implementing company-wide radiological improvement programs, a new posting system for radiation zones has been recommended to Department of Energy for approval. This system would better identify the radiological conditions inside the radiation zone, thus giving the workers additional safety information. Increased use of supplementary dosimetry methods will be utilized to provide a means of exposure control for specific jobs. Contamination control will be enhanced by the use of plastic containment devices designed to maintain contamination control on specific jobs.

IV. GOALS

The goals for 1978 are based on a ten percent reduction in the number of skin contaminations and in exposure, in man-rem, experienced in 1977. The goal for skin contamination is to not exceed 96, during calendar year 1978.

It is recognized that the total exposure is a function of the programs and projects which are undertaken by the Company. The goals for exposure for each group were established giving allowance for planned changes in program direction. The goals for Tank Farms, Plutonium Operations, and Purex are greater than the exposures recorded in 1977. The increase in exposure will result from increased program requirements. The goals for 1978 are:

<u>ORGANIZATIONS</u>	<u>MAN-REM</u>
Laboratories	80
Fission Products Operations	60****
Tank Farms	190*
Plutonium Operations	175**
Purex	50***
Unassigned	180
<u>Total Company</u>	<u>735</u>

*Includes 40 man-rem allowance for diversion box decontamination.

**Includes 60 man-rem allowance for decontamination work, repackaging and increased inventorying requirement.

***Includes 40 man-rem allowance for additional manpower and work in preparation for startup.

****Includes 5 man-rem allowance for activating 4th B Plant ventilation filter.

TABLE I

GROUP COMPONENTS	RADIOLOGICAL IMPROVEMENT ENGINEER	COGNIZANT RADIOLOGICAL ENGINEERING REPRESENTATIVE
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Analytical Laboratories
222-S Laboratories
234-5 Laboratories
Purex Laboratories
Technical Liason and Services
Standards Laboratory
Chemical Sciences

Laboratories

T. D. Kerns

R. P. Shaw

S. I. Anderson

Fission Product Processing
Waste Encapsulation
Maintenance, Waste Processing
and Encapsulation

Fission Products
Operations

A. J. Low

R. D. Anderson

Tank Farm Operations
Tank Farm Support
Tank Farm Processing
Tank Farm Surveillance
Tank Farm Maintenance

Tank Farms

J. A. Swenson

D. W. Reisenweaver

Plutonium Operations
Product Handling and
Special Services
Plutonium Processing
Nuclear Materials Control
Z Plant Maintenance

Plutonium
Operations

R. W. Benton

M. C. Lidke

Purex Operations
Purex Maintenance

Purex

P. E. Alley

R. D. Anderson

APPENDIX A

SPECIFIC GROUPS PLANS FOR 1978

I. LABORATORIES

- A. Several projects will be undertaken to improve radiological conditions. Projects which will reduce personnel exposure are:
 - 1. installing an inductively-coupled plasma spectrophotometer (ICP) to replace a major part of the analyses now done with an Atomic Absorption unit. The ICP will allow a more remote operation.
 - 2. clean out equipment and waste from 1-F cubicle to reduce inventory of radioactive materials.
 - 3. install Mettler specific gravity meters and institute automatic Amperometric Assay of plutonium in the Standards Laboratory to make both more remote.
 - 4. install new sample storage units with added shielding and single container selection process.
 - 5. renovating the D-5 cave by increasing shielding and adding remote specific gravity measurement capability.
- B. Increased shielding for radioactive materials will be available through:
 - 1. installation of mortise block to reduce exposure in 1-F cubicle cleanout.
 - 2. use of Kernsberg samplers for high exposure samples.
 - 3. use of minipigs and atomic absorption dilution carriers.
- C. Improvements in decontamination facilities in 222-S and 202-A will provide for remote and semi-remote operation and thus will improve both contamination and exposure control.
- D. Laboratory remodeling in 234-5 will improve radiological conditions. The remodeling includes:
 - 1. Room 131A, glovebox will replace open-faced hoods.
 - 2. Room 154A, glovebox will be added.
 - 3. Room 144, will be rearranged to speed sample flow.
- E. Process information meetings will be attended by laboratory supervision and coordinators who will evaluate sample schedules periodically to reduce size and frequency of sampling to conform to ALARA philosophy.

II. FISSION PRODUCTS OPERATIONS

- A. Flushing of the 291-B Exhaust Duct will be improved by scheduling and conducting prejob planning meetings with all concerned personnel who will perform the job. These meetings will emphasize the need for conserving personnel exposure.

- B. Process supervisors will accompany the process samplers on a once-a-week basis for the purpose of reviewing sampling techniques. They will submit recommendations for improvements to the group manager for changes which will achieve a reduction in personnel exposure.
- C. Sampling equipment, used at B Plant, in the 225-B Building, will be improved to minimize exposure to personnel. New sample carriers will be used, which will reduce exposure by having more effective shielding. Equipment for handling this equipment by semi-remote means has been fabricated.
- D. Improved manipulator boots are being obtained, to effect a reduction in frequency of boot changes to reduce personnel exposure.
- E. A stainless steel floor will be installed in the hot manipulator shop of the 225-B Building which will improve decontamination and reduce personnel exposure.
- F. Supplementary dosimetry equipment (self-reading) will be required for personnel who are assigned to jobs where there is a potential for high radiation exposure so they can effectively maintain their exposure to a minimum.

III. TANK FARMS

- A. During calendar year 1978, Tank Farm Operations will begin implementation of the following operating techniques to reduce personnel exposure:
 - 1. New techniques for the removal of sludge cables and similar equipment from underground storage tanks will be used. The method involves use of a mechanical device which reels the sludge weight into a shielded metal containment. The equipment has been successfully tested in 1977.
 - 2. New techniques are being developed for the removal of major pieces of equipment (i.e., pumps) from underground storage tanks. Design effort will be directed toward producing portable equipment which will be capable of remotely flushing the surfaces of, fabricating the surfaces of, and placing a containment around, equipment being removed from a tank. This same device will be designed to provide shielding to personnel involved in this operation.
 - 3. The use of shielding to reduce exposure in diversion box work will be applied. Portable shielding materials will be used wherever practicable. In addition, specialized shielding equipment will be designed and built wherever it is cost-effective. An example of specialized shielding equipment is a shield to allow operating supervisors to observe the work as it progresses without receiving unnecessary exposure.

4. A training program will be implemented to increase the awareness of personnel to the importance of reducing the time spent in radiation zones. This program will be used in addition to the Radiation Worker Training Program to emphasize the specialized radiation work practices Operations personnel will use in their daily work.
- B. To reduce exposure on a long-term basis, and to reduce risk of release to the environment, Tank Farm Operations is committed to a program of improving the radiological condition of the diversion boxes in the tank farms. The work required to implement this program will cause additional exposure for 1978 calendar year, but will result in reduced exposure for all subsequent activity in these boxes and should result in a net savings of exposure over a five-year period.

The diversion boxes that will be decontaminated in calendar year 1978 are as follows:

- 151ER - Located at east end of cross-country lines. Used for routes out of B, BX, and BY Farms.
- 151BXR - Serves B-Farm complex and salt well route out of B-Farm. Box has a great deal of unnecessary equipment in it.
- 151S - Box serves cross-country route, D-8 transfers from Redox, railroad tankers unloading and will be used for pressure tests.
- 151CR - Box serves sluicing waste routes from B Plant and transfers from C and will be used for pressure tanks.
- 153C - Box serves evaporator feed routes from C-Farm sluicing waste routes and will be used for pressure tests.
- 153U - Box serves D-8 transfer from Redox, railroad tanker unloading, 15-1 transfers from T-Plant and will be used in pressure testing.
- 153TX - Will be used for routes of TX-Farm and will be used for pressure tests.

Approximately 40 man-rem of exposure will be required to clean out these boxes. This exposure is justified by the reduced exposure required for future entries into the boxes, and by the reduced risk of release to the environment.

IV. PLUTONIUM OPERATIONS

- A. Increased use of leaded hood gloves will be implemented to reduce hand and whole body gamma exposure.

- B. General decontamination and cleanup of three specific rooms (166, 227, and 230) will be accomplished to lower background dose rates and to reduce the potential for skin contamination and internal deposition.

The use of lead aprons and temporary shielding will be investigated and implemented as deemed appropriate. It is expected that these exposure control methods will reduce personnel exposures.

V. PUREX

During the calendar year 1978, Purex will make the following improvements in order to apply the concepts of ALARA:

- A. Improvements will be made to the process sample hoods in the 202-A Building sample gallery that will achieve a reduction in personnel radiation exposure. Three of these improvements are listed below:
1. Stainless steel liners will be installed in the sample hoods which will permit ease of decontamination thereby allowing less time to be spent cleaning up spills of radioactive material.
 2. Improvements will be made to the sample flush system to effect a reduction in the radiation dose rate at the sample port.
 3. Semi-remote equipment for the cleaning of the internal surfaces of the sample hood will be designed and fabricated. This equipment will allow decontamination of the sample hood at a lower radiation dose rate to personnel.
- B. Improvements will be made to selected equipment within the 202-A Building sample gallery which will achieve a reduction in personnel radiation exposure. Two of these improvements are listed below.
1. Shielding of an improved design will be installed on the Purex Acid Header which will effectively reduce the radiation exposure to personnel.
 2. Improved shielding will be designed and fabricated for the repair of sampling equipment. Procedures for the use of this equipment which will emphasize the reduction of personnel exposure will be written and implemented.
- C. Improvements will be made to M-Cell and Hot Shop equipment which will effect a reduction in personnel radiation exposure.
1. Improvements in the design of M-Cell decontamination equipment will be made to achieve a reduction in personnel exposure.
 2. As much equipment as feasible will be scheduled for decontamination by T Plant.
 3. More effective and meaningful criteria will be developed to assist management in evaluating the need for expending personnel exposure in repairing equipment where disposal by burial may be more expedient.