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ACRONYMS AND ABBREVIATIONS

ASME	American Society of Mechanical Engineers
CDHS	California Department of Health Services
D&D	Decontamination and Decommissioning
DOE	Department of Energy
DOE/SF	Department of Energy - San Francisco Field Office
DOS	Dioclyl Sebacate
DOT	Department of Transportation
EPA	Environmental Protection Agency
ERWM	Environmental Restoration and Waste Management
ETEC	Energy Technology Engineering Center
HEPA	High Efficiency Particulate Air
ICE	Independent Cost Estimate
NRC	Nuclear Regulatory Commission
NTS	Nevada Test Site
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
QA	Quality Assurance
R/A	Radioactive
RCRA	Resource Conservation Recovery Act
RI	Rockwell International
RIHL	Rockwell International Hot Laboratory
RMDF	Radioactive Material Disposal Facility
SS	Santa Susana
SSFL	Santa Susana Field Laboratory

ANNUAL REPORT ROCKWELL INTERNATIONAL
HOT LABORATORY DECOMMISSIONING GFY 1992

1.0 INTRODUCTION AND SUMMARY

This document presents a summary of the activities conducted during GFY 1992 on decontamination and decommissioning of the Rockwell International Hot Laboratory (RIHL). This is a multi-year program to decontaminate the RIHL facility to levels that allow release for unrestricted use and subsequent demolition of the structure. The facility consists of four rectangular hot cells, abutted by decontamination rooms. These areas are surrounded by a building structure that provides an operating gallery in front, a service gallery in the rear, and contiguous operation support, mockup, and administrative offices. The hot cells and decontamination rooms are constructed of dense and reinforced concrete, respectively. All surfaces of the hot cells and the floors of the decontamination rooms are clad with steel. The original layout of the facility is shown in Figure 1-1. In-cell equipment was remotely operated from the operating gallery using manipulators, and other remote controls. Access into the cells is from the service gallery, located at the rear of the hot cells. The decontamination rooms are located between the cells and service gallery. In these rooms, equipment was decontaminated and packaged. The decontamination rooms also serve as contamination control areas between the cells and the service gallery. Connected with the service gallery was a hot manipulator repair room for servicing low-level, radioactively contaminated equipment. The facility ventilation system causes air to flow from the radioactively uncontaminated areas toward the areas of highest contamination potential, through roughing filters and high-efficiency particulate filters, and finally out a 54-in. outside diameter, 73-ft high stack (above grade). The ventilation ducts are installed in the basement directly below the hot cells.

All areas of the RIHL facility will require decontamination and/or verification that radiation levels are below limits for release for unrestricted use. Completion of this effort constitutes the primary activities of the decommissioning program. The RIHL was last used in GFY1987 and all Special Nuclear Material, tools and equipment were removed prior to GFY 1992. GFY1992 represents the beginning of the major decontamination effort in the cells. The basic approach has been to decontaminate the areas of highest contamination levels first to minimize personnel exposure and to reduce the background radiation which will allow detection of lower level contamination areas.

The following decontamination methods were or are being utilized. Foam cleaning is used in conjunction with localized brushing with detergent to remove surface contamination. The liquids are drained off through the facility drain system to

Rockwell International Hot Laboratory, Building 020

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FIGURE 1-1

the facility holdup tank. When the liquids in the holdup tank reach 50% full level, the liquids are pumped out and transported to an evaporator at the Radioactive Material Disposal Facility (RMDF). The solids are packaged and disposed as R/A waste. Scabbling or grit blasting is used to remove contaminated epoxy paint. The grit blasting material is then cleaned-up and the area is vacuumed. The material is put into 55-gallon drums and disposed as R/A waste. The steel liners were further decontaminated by grit blasting and hand grinders to remove residual surface contamination and paint. The steel liners are being cut with oxyacetylene torch and removed as sections. Any areas of concrete that have contamination will have the surface layer removed by chipping hammers, scabblers, and/or grinders as deemed best. Any deep penetration of contamination requires scarfing, core drilling, or jack hammering to reduce the contamination to allowable limits. In general, methods are being selected to minimize the quantity of waste generated and personnel radiation exposure.

During GFY1992 the following major tasks were accomplished:

1. 83% of the hot cell steel liners were removed;
2. All hot cell front face through and serpentine tubes removed by core drilling:
214 5 - inch diameter
108 9 - inch diameter;
3. Operating gallery cell face decontamination completed;
4. Three 65k lb steel shield doors and two 25k lb doors removed; and
5. The effort was replanned to meet budget, DOE, EPA, NRC and California Health and Safety requirements.

The task accomplished 96% of its planned goals at a cost of 98.5% of budget. The cell liner removal, which is more difficult than expected, is the only task behind schedule.

2.0 PROGRAM PLANNING ACTIVITIES

2.1 Program Planning

Task replanning to accommodate varying budgets, changes in requirements and various program audits required a substantial manpower expenditure.

GFY1992 started with an expected budget of \$3,410K, but this was reduced to \$2,092K and the year actually started with this budget. This 39% reduction was followed by a 29% increase in December 1991 to \$2,692K. Major replanning was required to accommodate the changes.

Regulatory requirements that must be met on the program include: Nuclear Regulatory Commission (NRC), Occupational Safety and Health Agency Administration (OSHA), Environmental Protection Agency (EPA) (including clean air and water acts), Department of Transportation (DOT), American Society of Mechanical Engineers (ASME) Quality Assurance, and California Department of Health Services (CDHS), and local regulations. The hierarchy of documents which have been prepared in response to these requirements is presented in Figure 2-1. Prior to August 1991, RIHL D&D planning assumed the NRC was going to reduce their criteria on acceptance levels for surface contamination. This assumption was based on NRC's draft NUREG/CR-5512 "Residual R/A Contamination from Decommissioning", January 1990. NUREG/CR-5512 used a dose based pathway analysis criteria instead of a surface contamination criteria, the effect of which would have significantly reduced the RIHL decontamination effort. However, NRC instructed Rockwell to disregard the NUREG/CR-5512 surface contamination levels in August 1991. This, coupled with a better knowledge of actual contamination levels and the extent of contamination in the RIHL and other regulatory changes resulted in major changes in the RIHL decontamination effort. Table 2-1 summarizes the major changes of this type which occurred in GFY 1992. These changes all required replanning in conjunction with the budget changes mentioned above.

2.2 Program Changes

In addition to the replanning effort, substantial manpower was expended in attending meetings, reviews, audits; responding to data requests; and in preparing the application to ship R/A waste to NST.

Document Chart for Hot Laboratory D&D

FIGURE 2-1

Table 2-1
Changes Requiring Replanning

1.	Removal of Radioactive Drain System
2.	Removal of Through Tubes and Storage Tubes by Core Drilling
3.	Removal of Shielding Doors
4.	Removal of Steel Liners
5.	Recycling of Lead Shielding
6.	Handling Mixes Wastes
7.	Hot Laboratory Demolition

2.2.1. Effect of Having to Remove Drain System

RIHL D&D Planning assumed that the radioactive (R/A) drains and support drains could be decontaminated in situ using mechanical honing followed by electropolishing. Final Survey of the drains was to have been conducted using a special radiation probe which fits inside the drains. The three process approach for in situ decontamination was in final demonstration when it was concluded that the acid being used for electropolishing had been added to the EPA hazardous materials list; use of the process would have generated mixed hazardous waste which is forbidden. It was also concluded that the insitu R/A survey results would not be acceptable to the NRC because of the inability for 100% verification as claim; the person conducting the insitu R/A survey would not be able to verify the absence of cracks or penetrations through the line resulting in the surface being surveyed. In order to insure no contamination remains the drains must be removed from the concrete (and re-bar structure) and disposed of as R/A waste at a considerable increase in costs. The drains are buried 3 to 4 feet under the concrete floor as well as being underneath the 3 1/2 foot thick cell walls.

2.2.2 Removal of Through Tubes & Storage Tubes by Core Drilling

RIHL D&D Planning assumed that the through tubes that penetrate the thick concrete structure of the hot cell faces and the storage tubes buried in the cell floors and support pillars could be decontaminated in situ using electropolishing similar to that proposed for the drain systems. Since the electropolishing process would generate mixed waste, an alternate means of removing the contamination had to be found. The most cost effective alternative was to use diamond core drilling to remove the entire tube, see Section 3.2 for a description of this process. The decontamination of the above tubes was to have occurred during FY91, but was delayed until an alternate to electropolishing could be agreed upon.

2.2.3. Removal of Heavy Shielding Door

RIHL D&D Planning assumed that the 9 heavy shielding doors to the hot cells and decontamination rooms could be cleaned in situ. The doors are, however, on tracks which are close to the walls with limited access to door jams, wheels and some portions of the back of the door. This prevents the doors, jams and wheels from being decontaminated to NRC release requirements and also restricts visual access during survey. Therefore, it was decided to remove the heavy doors from the facility and transport them to the RMDF where they would have unrestricted access for decontamination and surveying, see Section 3.3 for a description of the removal process.

2.2.4. Removal of Steel Liners from Hot Cell

RIHL D&D Planning assumed that the 1/4 inch thick steel liners in the hot cells could be decontaminated in situ and left for removal during demolition. However, the liners had been breached during the hot cells operating life and significant contamination was found behind the liners in selected areas during decontamination in Cell 1. In order to meet the requirement that any area suspected of being contaminated be completely exposed for meter survey requires that the steel liner be completely removed from the hot cells. The contaminated concrete behind the liners must also be removed and shipped to burial. The steel liners, which were used as the forms for pouring the concrete are welded to heavy steel stiffeners which make liner removal very difficult, see Section 3.1 for a description of this process.

2.2.5. Recycling Lead Shielding

RIHL D&D Planning assumed that the radioactive contaminated lead could be disposed of as normal radioactive waste. The EPA has designated lead as a hazardous material (even though it is used in fishing sinkers, crystal, glass, etc.) and when contaminated with radioactive material it becomes a mixed waste which requires special treatment. Over 80,000 pounds of lead was used in the hot laboratory as shielding. All lead must now be separated into R/A contaminated and non-contaminated waste streams. The contaminated lead must then be sent to a certified reprocessor to decontaminate the lead before disposal.

2.2.6. Handling Mixed Waste

The EPA and California EPA (which has taken over the EPA responsibilities in California) continues to add materials to the list of designated hazardous materials, reduce the concentration levels of compounds specified as toxic, and modify the methods that must be used to sample and analyze for hazardous materials. The hazardous waste list has been expanded to include paint, oils, asbestos, etc. that are found in many older commercial items. These items become mixed waste when removed from R/A contaminated areas in the RIHL. Special planning must be established as each new item is encountered.

2.2.7. Hot Laboratory Demolition

The RIHL will be demolished to assure there is no activity remaining in or under the building. The RIHL will be demolished by a subcontractor once the building has been decontaminated, all surveys have been completed, and the building has been released for unrestricted use by the NRC. NRC release is scheduled to occur at the end of February, 1995. Prior to facility release, Facilities Engineering and Purchasing will award a subcontract for the actual demolition and the subcontractor will start mobilization. Demolition will begin in March 1995, and will be complete in June. Once the building debris has been removed from the

site, a final survey by an independent source from Oak Ridge will be conducted. When the site has been released the remaining hole will be filled with clean dirt and the site will be graded.

2.3 External Meetings and Reviews

Table 2-2 presents a listing of external meetings and reviews related to D&D activities.

2.4 Data Requests

Table 2-3 presents a list of miscellaneous data requests related to RIHL D&D activities. This effort is in addition to the Application to Ship Radioactive Waste to the Nevada Test Site, this effort will be discussed in Section 2.2.

Table 2-2 EXTERNAL MEETINGS AND REVIEWS

Date	Purpose
October 9, 1991	Independent Cost Estimate (ICE) Review; at RI-SS with ICE Team.
November 21, 1991	OMB Site Overview/Cost and Schedule Approach; at RI-SS with DOE and OMB.
December 2-3, 1991	Review of regulatory drivers for RIHL decontamination; at DOE-SF with DOE-SF and OMB.
December 13, 1991	Briefing on radiation related issues; at RI SS with CDHS (5 people) and DOE-SF.
December 17, 1991	NRC Inspection by Chuck Hooker, NRC Region V.
January 1992	Review of Operations and radiation safety; at RIHL with Kim Wong, CDHS.
March 26, 1992	Information tour; at RIHL with Clayton Pittligio of NRC. Result: D&D Plan needs to be updated.
May 11, 1992	DOE Mid-Year Review; at Oakland with DOE.
July 27, 1992	NRC Inspection by Mile Cillis, NRC Region V.
August 4-6, 1992	Review of RIHL application to ship to Nevada Test Site; at RI-SS with NTS personnel. Result: An extensive number of documents need to be revised and records need to be organized.
November 4, 1992	DOE Year End Review; at Pleasanton with DOE.

Table 2-3 DOE Data Requests

1. OMB Support	Review of DOE ERWM Programs
2. ICE Support	Provided 5 Year Plan
3. Tiger Team Support	Assessment of Cost and Schedule Impact
4. Activity Data Sheets	Provided DOE Support Contractor Management Data

2.4.1. Office of Management and Budget (OMB) Support

OMB conducted a review of DOE ERWM Programs in the October-November 1991 period, and the D&D of the RIHL was included in the review process. At the request of the DOE Program Manager, ERWM questionnaires were filled out and provided to DOE-SF for incorporation into the submittal to OMB. Two external meetings were also conducted in support of this task, see Table 2-2.

2.4.2 Independent Cost Estimate (ICE) Support

DOE requested Rockwell to provide information on the cost of the RIHL D&D. This was part of a DOE effort to develop an independent cost estimate for the Environmental Restoration and Waste Management 5 year plan. One external meeting was also conducted in support of this task, see Table 2-2.

2.4.3 Tiger Team Support Summary

Although the Tiger Team Audit was performed in GFY 1991, assessment of costs and schedule impact was not completed until GFY 1992. This task consisted of assessing the cost impact of 4 separate tasks: 1. Tiger Team meetings and action lists; 2. Hold on Building Operations; 3. Effect of Tiger Team on D&D productivity; and 4. Transfer of ETEC Tiger Team support to RIHL D&D.

2.4.4 Activity Data Sheets

DOE-SF and Dames & Moore (DOE support contractor) were provided updated Activity Data Sheets for the RIHL D&D. The updated sheets reflect the funding projections contained in the new estimate to complete proposal.

2.5 Waste Shipments to the Nevada Test Site

2.5.1 Introduction

Rockwell has been shipping waste to the Nevada Test Site (NTS) for over 30 years. The NTS has, however, issued a new set of requirements and criteria in the Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements Document (NVO-325), Revision 1 dated June 1, 1992 which Rockwell must meet before receiving approval to ship to NTS. The revised NVO325 requires that the radioactive (R/A) waste be treated like a manufactured product which requires extensive quality assurance, environmental, health physics overview and inspection of the process during the generation of the product. This overview and inspection is above and beyond that previously required as described in the four (4) tasks described below.

Rockwell submitted Revision A to the Application to Ship Radioactive (R/A) Waste to the NTS on March 24, 1992. This application was structured to meet our

interpretation of the NVO-325 Revision 1 document. In response to our submission, NTS conducted a Pre Audit Visit to the RIHL Waste Certification program on August 4-6, 1992. During the pre audit, NTS pointed out deficiencies in our old procedures relative to the new NVO-325 Revision 1 requirements. NTS required that the waste records be easily retrievable and protected from damage or loss. The records must be filed by shipment and container number to improve retrievability and a fireproof vault must be used to store records. Waste must be handled, stored, and shipped in a manner that will not alter the certification status which requires more independent overview. Individual waste bags must be tagged, identified and controlled prior to loading into shipping containers. Waste bags must be segregated and controlled as to radioactivity, mixed, and non radioactive/Hazardous waste pending chemical analysis and/or characterization.

Waste containers packaged prior to 1990 do not meet all of the requirements of NVO-325 Rev 1 and will probably all have to be opened, resorted, and repackaged to the new requirements prior to shipment to NTS. An action plan is being developed.

Lot followers/travelers must accompany each waste container. All process documents must be revised to reflect Resource Conservation Recovery Act Environmental Protection Agency (RCRA-EPA) requirements. Current RI shipping containers being used do not meet new NTS size requirements. The lot followers for each container must contain the volume percent, weight percent, and isotope type in mCi. Each individual shipping container must be tracked from the time it is purchased to when it is shipped full of RA waste to NTS. Log books must be kept for maintaining records of samples, the location of collecting, date, time of collection, personnel taking samples, and sample number. All records produced during waste generation and characterization must be traceable and verifiable. Calibration and quality control procedures for gamma spectrometers must be fully implemented. All personnel must be trained in meeting the requirements of NVO-325.

2.5.2 Revising Procedures to meet NVO-325 Revision 1

The old Rockwell procedures for conducting decontamination and demolition work contained requirements for Health Physics overview to protect the health and safety of the personnel and the environment; and Quality Assurance to assure work was performed in accordance with approved procedures through inspections and periodic audits. However, the NTS pre audit showed that the above overview must be expanded to meet the new requirements. As a result of the pre-audit, Rockwell began to rewrite the procedures with a team of individuals from the participating line organizations. Twenty documents had to be rewritten, and released to incorporate the NVO-325 Revision 1 requirements and the resulting manufacturing

lot follower/traveler approach to generating and packaging the radioactive waste from the RIHL.

2.5.3 Training of Personnel to meet NVO-325 Rev. 1

All personnel involved in the actual hands on D&D activity must be trained to be cognizant of the new requirements of NVO-325. Records of the training must be maintained and be available for NTS audit as part of the approval to ship request and subsequent audits.

2.5.4 Packaging of New R/A Waste to New Procedures

The NVO-325 Revision 1 document requires that the waste and the waste boxes be tracked with a manufacturing type traveler document which contains specific hold points and be signed off by Radiation Protection & Health Physics Services (RP&HPS), Quality Assurance, and Environmental Protection. The documentation must be expanded to include certification of isotope concentrations in the various waste types with each box and from where specifically the waste originated within the building. Quality Assurance Engineering coverage has been increased to assure that the record files are being maintained in accordance with NVO-325. This includes the auditing of all participating line organizations. Inspection must sign off at specific hold points on the traveler to assure that 1) acceptable containers are being used 2) Lot follower waste descriptions are accurate, and 3) Tamper proof seals are applied. Participation of Environmental Protection has been added to the program to assure that RCRA - EPA and State of California requirements for mixed and hazardous waste are met.

2.5.5 Repackaging of R/A Waste

A total of 139 containers were packaged to the old procedures and many, if not all, of them will probably not be accepted by NTS since they do not meet the structural and/or procedural requirements of NVO-325 Rev 1. Options on how the packaging requirements are to be met are still being developed. Some containers will probably have to be opened and repackaged to meet procedural requirements, but for structural requirements, it will be less costly and safer if the existing containers can be placed in new containers which meet all the NVO-325 Rev 1 structural requirements.

3.0 DECONTAMINATION ACTIVITIES

This section presents a summary of the decontamination activities performed during GFY1992.

3.1 Hot Cell Liner Removal

Entering GFY1992 paint removal from the cell liner had been completed in Cells 1 through 3 and was ongoing in Cell 4, see Figure 3-1 for cell location. Removal of hot spots in and behind the cell liner in Cell 1 was started in November 1991. Oxy-acetylene torches, see Figure 3-2, were used to cut the liner away in pieces to remove hot spots in the liner and to gain access to the concrete (area) behind the liner. By January 1992, a decision was made to remove all cell liners based on the preliminary work in Cell 1, where widespread contamination was found behind the cell liner.

Cell liner removal is a slow and tedious task. The liner was used as the forms for pouring the concrete shield wall behind the liner. The liner, which served as a gas barrier to limit nitrogen leakage during hot cell operation, is welded to horizontal and vertical stiffeners embedded in the concrete, see Figures 3-3 and 3-4. Removal requires the torch cutting of individual pieces, the size of the stiffener spacing 1'3" x 2'6", out of the liner, see Figure 3-5.

This is a slower than expected process; but between January and the end of GFY 1992, essentially all of the liner had been removed from the walls and ceiling in Cells 1, 2 and 3 and ~ 90% of the liner had been removed in Cell 4. This represents an area of about 4900 ft², Cells 1 - 2 are 1040 ft² each, Cell 3 is 1220 ft², and Cell 4 is 1790 ft² (90% complete). The floor liner removal in all 4 cells is to be done last after the wall/ceiling removal and decontamination, described in this section, and the core drilling described in Section 3.2.

After liner removal, the cell will be surveyed to detect remaining hot spots, see Figure 3-6. Many of the hot spots are associated with penetrations, which are removed as described in Section 3.2; the balance are removed by clearing and/or chipping away the concrete, see Figure 3-7. The cell and decon room floor liners and the steel liner on one wall of the decon rooms will be removed in GFY 1993.

ROCKWELL INTERNATIONAL HOT LABORATORY

- 16,000 SQUARE FEET
- 4 HOT CELLS (MULTI MEGACURIE)
- OPERATING GALLERY
- 4 DECONTAMINATION ROOMS
- SERVICE GALLERY
- CONTAMINATED EQUIPMENT STORAGE AREA
- MECHANICAL TEST LABORATORY

FACILITY

- MOCK UP AREA-SAME SIZE AS CELL
- SUPPORT ASSEMBLY SHOP
- CHANGE ROOM
- PHOTO LABORATORY
- OFFICE AREA
- BASEMENT WITH ABSOLUTE FILTER SYSTEM
- CASK HANDLING EQUIPMENT (UP TO 50 TON, 30 FEET LONG)

- SAMPLE STORAGE DRAWERS
- CELL WINDOWS
- FUEL TRANSFER DRAWERS
- FUEL TRANSFER PORTS
- FLOOR STORAGE HOLES

FIGURE 3-1

HOT CELLS

- CELL WALLS: 42 INCH THICK DENSE CONCRETE
- CELLS ARE INTERCONNECTED
- CELLS CAN BE INDEPENDENTLY OPERATED WITH NITROGEN ATMOSPHERE, < 4% OXYGEN
- CELL 1 & 2 - 16 FT x 10 FT x 17 FT HIGH
- CELL 3 - 20 FT x 10 FT x 17 FT HIGH
- CELL 4 - 33 FT x 10 FT x 17 FT HIGH
- WINDOWS - 24 INCHES x 19 INCHES x 42 INCHES THICK

CELL EQUIPMENT

- 6,000 POUND HOIST
- C R L MODEL 8 MANIPULATORS
- GENERAL MILLS OR P A R MANIPULATORS
- KOLLMORGEN PERISCOPES
- AIR CONDITIONING
- CLOSED LOOP WATER SYSTEM
- NITROGEN PURGE SYSTEMS
- THRU TUBES

Rockwell International
Atomic International Division

Cell Liner Removal

FIGURE 3-2

Cell 1 Wall After Liner Removal

FIGURE 3-3

Cell 2 Front Wall After Liner Removal

FIGURE 3-4

Liner Partially Removed From Cell 2 Ceiling

FIGURE 3-5

SC92C-23-10
(ETEC 8/16/92 P383053) M570

Cell 1 Front Wall After Liner Removal Showing Hot Spots

FIGURE 3-6

Removal of Hot Spots in Concrete Behind Liner of Cell 1

FIGURE 3-7

5-in. x 42-in. Cores From Cell No. 1

FIGURE 3-8

3.2 Core Drilling Operations

As noted in Section 3.1 and illustrated in Figure 3-6 many of the cell penetrations contained hot spots. Core drilling was selected as the means to eliminate penetration hot spots. Core drilling of penetrations was an added task selected along with liner removal after the extent of the cell contamination was learned. In this technique the penetration liner (pipe) and surrounding concrete are removed on one piece, see Figure 3-8. This allows relatively easy removal of the contaminated pipe and any surrounding contaminated concrete.

The core drilling equipment is illustrated in Figure 3-9 and a core drilling operation is shown in Figure 3-10. The core drilling was done from the outside of the cell in the operating gallery and the core was removed from inside the cell, see Figure 3-11 and 3-12. Two core drill sizes were used: a 5 inch diameter size for straight penetrations; and a 9 inch diameter size for serpentine penetrations. Core drilling in a rectangular tangential cluster was also used to remove 8 large penetrations, see Figure 3-13. These 8 penetrations were for the in-cell crane and General Mills manipulator penetrations in each of the 4 cells.

Between June 1 and August 7, all core drilling in the front face of the cell was completed, see Figure 3-14. Included were (totals for all 4 cells):

- 1) Two hundred fourteen 5" diameter by 42" long cores,
- 2) Three 5" diameter by 7' long cores,
- 3) One hundred eight 9" diameter by 42" long cores, and
- 4) One hundred forty four 5" diameter by 42" long cores for 8 large blocks for the 4 in cell crane and 4 GM manipulator conduit penetrations.

3.3 Hot Cell Door Removal

There were 5 large (64,000 to 84,000 lb.) shield doors within the hot cell complex; four doors were between the hot cells and decon rooms and the fifth was between Cell 4 and the tool and mockup area, see Figure 3-1. The doors, shown in Figures 3-15, were contaminated and needed to be removed from the cells but they were too big to pass through any existing doorways. Therefore, the decon room door openings were enlarged, see Figure 3-16, by diamond saw cutting, see Figure 3-17 through 3-19. Two 3 1/2 ft by 4 ft. by 2 ft. thick sections were removed from the walls of the decon rooms 1 and 2, see Figure 3-20, and a 5 ft by 10 1/2 ft. x 2 ft. thick section was removed from the decon 3 wall. A portion

of the west services gallery wall was also removed for shield door removal. The doors were then rolled out on dollies bolted to the doors, see Figures 3-15 and 3-21.

The door from cells 1 and 2 (64,000 lbs ea.) and Cell 3 (66,000 lbs ea.) were removed in GFY 92 and transported to the RMDF for decontamination. The two doors for Cell 4 are to be removed in GFY93.

Core Drilling Equipment

Drill Bit

Bracket Studs

Drive Motor

FIGURE 3-9

Bolted Mounting
Bracket

Rockwell International
Rockedyns Division

SC920-23-21
(ETEC 68922-393173)M63

5-In. Core Drilling of Cell No. 1 From Operating Gallery

FIGURE 3-10

Removal of 80-lb Cores From Inside Cell No. 1

FIGURE 3-11

SC920-23-18
(ETEC 68923931E3) M651

Removal of 80-lb Cores From Inside Cell No. 1

FIGURE 3-12

Removal of Thick Sectioned Concrete Blocks by Core Drilling

FIGURE 3-13

Service Gallery Face After Core Drilling of Penetrations Completed

FIGURE 3-14

Cell Door Showing Contaminated Areas (white) After Removal

FIGURE 3-15

Passage for Hot Cell Door Removal

FIGURE 3-16

SC926-23-27/
(ETEC-8/492-339327) M757

Saw Cutting Doorway in Cell Wall

FIGURE 3-17

Final Saw Cut for Block Removal

FIGURE 3-18

Forklift Lowering Concrete Block After Saw Cutting

FIGURE 3-19

Concrete Block Removed by Saw Cutting

FIGURE 3-20

Hot Cell Door Being Removed

SC82C-23-26
(SF31-9/1792-SID-1971757)

FIGURE 3-21

Rockwell International
Rocketdyne Division

3.4 Other Decontamination Activities

In addition to the major decontamination tasks mentioned in the sections above, the following tasks were also performed:

- 1) The penetrations for master slave manipulators and Kollmorgan periscope were removed by using an oxy-acetylene torch to cut the penetration free. It is estimated that cutting these large penetrations out in this way was 4 times faster than the planned core drilling. There were 4 master slave manipulator penetrations and 2 periscope penetrations in each cell for Cells 1 through 3, and 6 master slave and 3 periscope penetrations in Cell 4.
- 2) Removal of paint, using needle scalers and grit blasting, was completed in Cell 4 and the Decon Room 4.
- 3) Removal of paint and decontamination of the operating gallery front face and gallery trenches was completed.
- 4) The facility exhaust system was shutdown 3 times to allow HEPA filter replacement. Following filter replacement the system was reactivated and DOS (Dioclyl Sebacate) tested.
- 5) The furniture and other equipment were removed from the Engineering Trailer and Health Physics Trailer. The trailers were surveyed for radiological contamination and determined to be clean. They were then moved from the RIHL.
- 6) The mockup and shop areas were gridded into one meter squares in preparation for radiation survey which will be performed in GFY1993.
- 7) The Decon Room No. 3 door (20,000 lb) and Decon Room No. 4 door (25,000 lb) were successfully removed and trucked to the RMDF for final decontamination. The doors were then decontaminated at the RMDF.
- 8) Surplus equipment identified for shipment to the University of Missouri was radiation surveyed preparatory to shipment. Shipment will be made in GFY93.

3.5 Radioactive Waste Shipments

The following waste shipments were made from the RIHL to the RMDF:

October 1991: Five B-2 type boxes (134 ft³ ea.) and six B-12 type boxes (45 ft³ ea) of solid radioactive (R/A) waste for disposal.

Nine hundred gallons of R/A water for processing.

November 1991: Nine hundred gallons of R/A water for processing.

December 1991: Decon Room No. 3 door and Decon Room No. 4 door for decontamination, see Section 3.4.

January 1992: Nine hundred gallons of R/A water for processing.

February 1992: Seven hundred gallons of R/A water for processing. Most of this water accumulated in the basement sump and R/A liquid holding facility during storms in February.

April 1992: Five B-12 type boxes of solid R/A waste for disposal.

May 1992: Seven B-12 type boxes of solid R/A waste for disposal.

August 1992: Shield doors from hot cells 1-3 for decontamination, see Section 3.3.

September 1992: Five hundred gallons of R/A water for processing:-

4.0 BUDGET AND SCHEDULE

Entering GFY 1992 the planning budget for RIHL decontamination was to have been \$3,410K but the DOE/SF program manager officially notified Rockwell that the funding would be only \$2,092K. RI initiated task replanning and began negotiations with DOE-SAN Contracts. In December 1991, the DOE-SF program manager notified Rockwell the funding would be increased by \$600K to \$2,692K. In January, concurrent with the decision to remove the cell liner, the effort was replanned to the \$2,692K budget. In addition to the funding and cell liner issues, the replanning included modification M031 to the contract which addressed the OMB review of the ERWM program, the independent Cost Estimate effort, the Tiger Team Assessment, and demolition of the building.

The program ended the fiscal year slightly under budget (39K). This represents < 1.5% of the \$2,692K budget. The schedule, shown in Figure 5-1, is slightly behind (~ 4%) due to the slow cell liner removal discussed in Section 3.1. This effort is, however, nearly complete and steps are being taken to recover any lost schedule. In addition, the 96% completion is nearly equal to the 98.5% expenditure level.

SCHEDULE FOR D&D OF HOT LABORATORY

FIGURE 5-1