

Project Plan

Oak Ridge National Laboratory

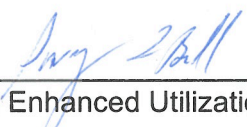
7930 Cell G PaR Remote Handling System Replacement

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10-30-09
Date



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10-30-09
Date

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1.0 BACKGROUND

For over 40 years the US Department of Energy (DOE) and its predecessors have made Californium-252 (^{252}Cf) available for a wide range of industries including medical, nuclear fuels, mining, military and national security. The Radiochemical Engineering Development Center (REDC) located within the Oak Ridge National Laboratory (ORNL) processes irradiated production targets from the High Flux Isotope Reactor (HFIR). Operations in Building 7930, Cell G provide over 70% of the world's demand for ^{252}Cf . Building 7930 was constructed and equipped in the mid-1960s.

Current operations for ^{252}Cf processing in Building 7930, Cell G require use of through-the-wall manipulators and the PaR Remote Handling System. Maintenance and repairs for the manipulators is readily accomplished by removal of the manipulator and relocation to a repair shop where hands-on work can be performed in glove boxes. Contamination inside cell G does not currently allow manned entry and no provisions were created for a maintenance area inside the cell. There has been no maintenance of the PaR system or upgrades, leaving operations vulnerable should the system have a catastrophic failure. The Cell G PaR system is currently being operated in a run to failure mode. As the manipulator is now 40+ years old there is significant risk in this method of operation.

2.0 MISSION NEED

In 2006 an assessment was completed that resulted in recommendations for replacing the manipulator operator control and power centers which are used to control and power the PaR manipulator in Cell G. In mid-2008 the chain for the bridge drive failed and subsequent examinations indicated several damaged links (see Figure 1). To continue operations the PaR manipulator arm is being used to push and pull the bridge as a workaround. A retrieval tool was fabricated, tested and staged inside Cell G that will allow positioning of the bridge and manipulator arm for removal from the cell should the PaR system completely fail. A fully-functioning and reliable PaR manipulator arm is necessary for uninterrupted ^{252}Cf operations; a fully-functioning bridge is needed for the system to function as intended.

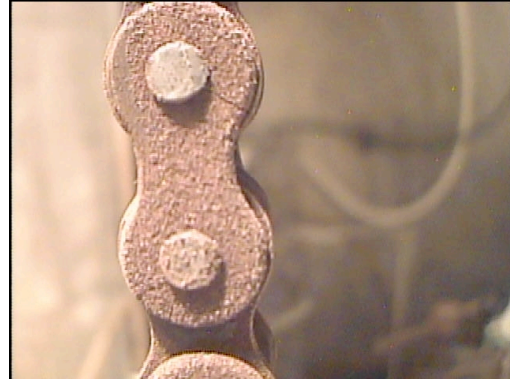


Figure 1. Photographs of damaged bridge drive chain links.

3.0 PAR REMOTE HANDLING SYSTEM REPLACEMENT DESCRIPTION

PaR Systems, in the mid 1960's, designed and built crane and manipulator systems for use in the Building 7930 hot cell complex and for a facility/process mock-up. Cell G was originally designed as a process cell with the radioactive material to be contained within piping and tanks. The mock-up PaR system was installed in Cell G for what was intended as a single production run of short duration; the cell was to be cleared and returned for the original mission that never materialized. A new mission was identified for Cell G and workstations were installed for the californium production.

The Cell G PaR Systems consists of a top-rail running bridge that spans the east-west width of the cell and travels north-south. The telescoping manipulator consists of a PaR Model 3000 telescoping tube hoist with manipulating arm that is mounted on a carriage or trolley that travels east-west on the bridge. This allows nearly full coverage of the cell area by the PaR system. The telescoping arm has a capacity of 150 lbs in any attitude and the shoulder hook of the mast has a net lift capacity of 1000 lbs. The manipulator bridge and trolley freewheel when the power is off or as we learned, when a drive chain is broken. Although operations have continued, the risk to the Cf mission operations has been elevated.

4.0 SCOPE

The scope of this project is limited to replacement of the PaR Remote Handling System in-cell electrical/mechanical hardware, out-of-cell power supply/control equipment, and associated power and control cabling needed to provide, at a minimum, the functionality previously available. Cell de-inventory operations, waste-pull operations, and disposal of waste material will be cost-shared with the Californium Program consistent with previously planned removal/disposal of wastes generated by recent ²⁵²Cf production operations. This project is not expected to accomplish any other upgrades or replacement of other remote hot cell equipment.

5.0 WORK PLAN

5.1 System Design and Procurement

A design-build specification will be prepared for placing a sole-source procurement with PaR Systems, Inc. for the system design, fabrication, and installation guidance.

5.2 Cell Source Material De-inventory and Waste Pull Operations

Cell G source material and waste removal will be necessary prior to removal of the existing PaR assembly. This will be accomplished under separate funding and coordinated with the PaR replacement schedule.

5.3 Removal of the Existing PaR System

The existing PaR system is required to prepare Cell G for the new installation. This preparation includes cable pulls for connecting the new system to new control cabinets and power supplies and repositioning the PaR hardware for removal. The cell roof access plug will be removed, the PaR mast & trolley removed and finally the PaR bridge will be removed from the cell.

5.4 Install New System

Until the final design is approved for fabrication the plans for installation comprise only high level steps at this phase of the project. New cabling and power connections will need to be established using existing cell penetrations to the maximum extent possible. PaR Systems, Inc. technical representatives will provide guidance as ORNL personnel perform the work steps for installation.

5.5 Test and Commission

Approved test plans will be used to test functionality and reliability before the new PaR system is commissioned and the Cell G returned to operations.

5.6 Waste Disposal

Waste disposal will be performed in accordance with ORNL site requirements and state and federal regulations. ORNL Laboratory Waste Services will be engaged in the planning stages for the removal and disposition of the existing PaR assembly and associated project waste materials.

6.0 MILESTONES AND BUDGET

This project is a sub-task of the Nuclear Physics - Enhanced Utilization of Isotope Facilities Recovery Act Project. The Recovery Act budget authority for this project is \$2,000,000.

The Office of Nuclear Physics reportable milestones are summarized in Table 1.

Table 1. Project Milestones

Task No.	ORNL - PaR Remote Handling System Replacement	Date
EUIF.01.03	Issue Project Plan	Nov-09
EUIF.02.03	Complete Procurement Action for Long-Lead Time Equipment	Mar-10
EUIF.02.03	PaR Vendor 100% Design Review Completed and Approved Design Issued	Mar-11
EUIF.02.03	Begin installation of new equipment	Jul-12
EUIF.02.03	Commission New PaR	Sep-12

Intermediate deliverables from the vender to review and develop the working design will be established to assure the design is compatible with access into the contaminated Cell G for installation.

The project performance requirements for the PaR Remote Handling System Replacement project taken from the Guidance Letter/Work Authorization are listed in Table 2.

Table 2. DOE-NP project performance requirements

Due Date	Performance Requirement
1QFY10	Issue Project Plan
2QFY10	Complete procurement action for long-lead time equipment.
2QFY11	PaR Vendor 100% design review completed and Approved Design issued.
4QFY12	Commission new PaR

7.0 ORGANIZATIONAL STRUCTURE

The ORNL Isotope Production Program is responsible for the management of the REDC upgrade investments that include the remote handling system replacement at 7930. This includes maintaining cognizance for developing and maintaining the project plans, executing on time and within budget, and ensuring that the Isotope Program is compliant with the reporting requirements for the ARRA funding.

The Nonreactor Nuclear Facilities Division (NNFD) will take the lead for accomplishing this major upgrade as Facility Landlord for Building 7930 within the REDC. NNFD Lead Engineer Kathy Kinney is responsible for the planning and execution of the project; Scott White is the Operations Supervisor for 7930 and will be the facility contact for the project.

Gary Bell is responsible for the management of the Enhanced Utilization of Isotope Facilities projects. This role includes maintaining cognizance for developing and maintaining the project plans, executing on time and within budget, and ensuring that the projects comply with the reporting requirements for the ARRA funding.

Chip Slate is the Project Controller assigned by the ORNL ARRA Project Controls team. His responsibilities include tracking cost and schedule, working with the Enhanced Utilization of Isotope Facilities project manager to establish and secure approval for a work breakdown structure and account structure meeting ORNL requirements for ARRA funded projects.

Jeff Binder is the ORNL Isotopes Program Manager providing management, budget and technical oversight and serving as the ONRL Point of Contact for all Isotope Program activities.

John Pantaleo is the Federal Program Manager with overall responsibility for successful project execution, oversight, and integration with other program activities.

Contact information for the project team is listed in Table 3.

Table 3. Contact Information

Role	Name	Phone Number	Email Address
NNFD Lead Engineer	Kathy Kinney	865-241-1145	kinneyka@ornl.gov
Operations Supervisor, Bldg. 7930	Scott White	865-574-6925	whitecs@ornl.gov
Enhanced Utilization of Isotope Facilities Manager	Gary Bell	865-241-4400	bellgl@ornl.gov
Project Controller	Chip Slate	865-241-8341	slatear@ornl.gov
ORNL Isotopes Program Manager	Jeff Binder	865-576-3879	binderjl@ornl.gov

Although several divisions within ORNL will participate in accomplishing this task, project implementation will be managed through the NNFD.

8.0 CONDUCT OF OPERATIONS

Laboratory-wide procedures, guidelines, and other documents to be utilized in the execution of this project plan are documented in the Standards-Based Management System (SBMS). The SBMS implements requirements through a series of management systems and subject areas. Key management systems applicable to nuclear activities include Work Planning and Control, Nuclear and Facility Safety, Radiological Protection, Safeguards and Security, Quality, Engineering, Transportation, Acquisition Management, and Worker Safety and Health.

The requirements for Environment, Safety, and Health (ES&H) are contained in the Work Smart Standards (WSS) for Other Industrial, Radiological, and Non-Radiological Hazard Facilities. A National Environment Policy Act action review of the project was conducted to assess whether any additional statutory, regulatory or permit requirements are needed. The review concluded that the project tasks are covered by the Categorical Exclusion (GEN-011), approved by Gary Hartman on 9/18/2009, which covers direct replacement or removal of equipment and/or facility components

The NNFD operates 7930, a Category 2 nonreactor nuclear facility, and maintains procedures for assuring facility safety-basis compliance for all work conducted.

9.0 QUALITY ASSURANCE

The Oak Ridge National Laboratory (ORNL) quality assurance (QA) program is formulated and implemented to address the requirements contained in DOE Order 414.1C (*Quality Assurance*)

and in 10CFR830, Subpart A and is applied on a tailored basis to all work activities at the site. NNFD procedures implement the site QA program and incorporate NQA-1 standard (*Quality Assurance Requirements for Nuclear Facility Applications*) requirements as applicable for this project using a graded approach based on the safety classification for the system. The PaR system is vital to the mission for ^{252}Cf processing but is not classified as safety related or defense-in-depth.