

**INTERNAL READINESS ASSESSMENT
OF THE
RADIOCHEMICAL DEVELOPMENT AND PROCESSING
ACTINIUM-225 GLOVE BOX OPERATIONS**

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EXECUTIVE SUMMARY

An Internal Readiness Assessment of the Radiochemical Development and Processing (RDP) Actinium-225 (^{225}Ac) Glove Box Operations was conducted to determine if RDP and support personnel had achieved an adequate state of readiness to begin operations.

The ^{225}Ac recovery process is a less than Category 3 activity. Currently the activity is performed in modified hoods with glove ports installed. Solutions are hand-carried from the Alpha Cell upstairs to the modified hoods. The new glove boxes, with the sample transfer elevator, will provide increased flexibility in production and better application of Integrated Safety Management (ISM) and “As Low as Reasonably Achievable” (ALARA) principles.

This internal assessment was conducted in accordance with the *Readiness Review* Subject Area from the Standards Based Management System, with the full level of rigor as outlined in DOE Order 425.1B, *Startup and Restart of Nuclear Facilities*. This approach was taken to ensure that the operation was satisfactory and to identify areas in need of added rigor and general improvement.

Overall, preparations for the ^{225}Ac Glove Box Operations were adequate, considering the facility is in the middle of transitioning to the new Non-reactor Nuclear Facilities Division (NNFD) and developing a Safety Analysis Report (SAR)/Technical Safety Requirements (TSR) to replace the current Basis for Interim Operations (BIO)/Operational Safety Requirements (OSR). A particular strength was the knowledge of the operations personnel and the radiological control technicians. Also, noteworthy was the conduct of the pre-job briefings where there was good communications between technicians and the supervisor.

The review team recommends that the Actinium-225 Processing be started in the new glove boxes after the following deficiencies are corrected and verified by the Facility Manager:

- Incomplete administrative and the configuration control requirements for the installation of the glove boxes in Room 212
- Incomplete work control requirements for the HOG/Cell Pressure Instrument Modification.
- Lack of USQ Screen for the HOG/Cell Pressure Instrument Modification.
- Lack or incomplete JHEs for SPD-002 and SPD-010 procedures and incomplete implementation of the controls.
- Operating procedures SPD-002 and SPD-010 incomplete with regards to the hazards and controls identified in the RES package and the discussion comments of OP-01.
- Incomplete documentation of the testing of the sample elevator.

In addition, corrective action plans should be put in place using the Assessment Tracking System (ATS) to address the following deficiencies:

- Operator Aids not labeled or maintained in accordance with the Conduct of Operations Manual.

Assessment Forms (Form 1s)

INTERNAL READINESS ASSESSMENT FORM

Functional Area: Training and Qualification (TQ)	Core Requirement Number: CR- 3	Date: November 1, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

- NSTD Training Manager
- NSTD Training Coordinator

Records and other documents reviewed:

- RSS-978
- SPD-010, Rev. 0, *Room 110-212 Glove Box Subsystem Operation*
- SPD-002, Rev. 4, *Glove Box Operation*
- OJT/JPM on SPD-010 Rev-00
- Qualification Card for RDL Technician
- Qualification Card for RDL Supervisor

Evolutions/operations witnessed:

- Interview/review of training documentation

Discussion:

1. An interview and records review was conducted with the NSTD Training Manager and Training Coordinator to discuss training requirements necessary for conducting Actinium work within 3047.
2. Tasks were identified for competent performance of the process via a job/task analysis.
3. Personnel identified to complete training included the principal investigator, facility technicians, facility supervisor, and radiological controls technicians. This was consistent with the participants list established in the Research Safety Summary (RSS-978).
4. Training associated with the Actinium Separation Process was incorporated into the existing DOE 5480.20A qualification program.
5. Training requirements consisted of required reading of the RSS and On-The-Job (OJT) training on both the SPD-002 and SPD-010 procedures. The OJT required satisfactory completion of Job Performance Measures (JPM). A review of two qualification packages, one technician's and the operations supervisor, revealed adequate documentation of the requirements.
6. RSS-978, SPD-010, and SPD-002 were not included in the NNFD Core Team 1 Facility Manager qualification. Recommend adding to the required reading section of the qualification.

7. Software used to generate the JPM forms limits the ability of the training staff to accommodate changes to the form. The forms generated for the SPD-010 OJT documentation included a signature block for the Assistant Facility Manager. This block was marked "N/A" for the technician qualification package but left blank for the operations supervisor package. The training staff corrected the inconsistency.

Conclusion:

The prerequisites for Core Requirement 3 have been met. The appropriate training and qualifications are in place to perform the ²²⁵Ac Separations work in Building 3047.

Inspected by: Rob F. Peacher	Approved by: MSA Team Manager Date:
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Training and Qualification (TQ)	Core Requirement Number: CR-4	Date: November 1, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

- Training coordinator
- Technician 1
- Technician 2
- Operations Supervisor
- RCT 1
- RCT 2

Records and other documents reviewed:

- OJT records
- JPM records
- TQPP document
- Technician Qual card
- RSS-978
- SPD-010, Rev. 0, *Room 110-212 Glove Box Subsystem Operation*
- SPD-002, Rev. 4, *Glove Box Operation*

Evolutions/operations witnessed:

- Ventilation system alignment
- Transfer using elevator
- Sample port operation
- Glove replacement

Discussion:

1. Training personnel performed a training assessment of the new glovebox operations.
2. The new training requirements were added to all the technicians' Qual cards.
3. Of the evolutions witnessed, the operations personnel and the RCTs demonstrated adequate knowledge of the systems and the procedures used.
4. No abnormal or emergency procedures were developed for this operation. Even though a recovery plan was developed for the elevator failing. This plan was not formally documented and therefore there's no formal training on this event.

Conclusion:

The prerequisites for Core Requirement 4 have been met. The appropriate training and qualifications are in place to perform the ²²⁵Ac Separations work in Building 3047.

<p>Inspected by: Julie G. Ezold</p>	<p>Approved by: MSA Team Manager Date:</p>
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Training and Qualification (TQ)	Core Requirement Number: CR-5	Date: November 4, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

- Training coordinator
- Training Manager
- Operations Manager
- Design Engineer
- Technician 1
- Technician 2
- Operations Supervisor
- RCT 1
- RCT 2

Records and other documents reviewed:

- OJT records
- JPM records
- TQPP document
- Technician Qual card
- RSS-978
- SPD-010, Rev. 0, *Room 110-212 Glove Box Subsystem Operation*
- SPD-002, Rev. 4, *Glove Box Operation*
- RES#3047-01-02, dated 02/08/01, *Alpha Facility Glove Box (4 ea) Installations*

Evolutions/operations witnessed:

N/A

Discussion:

1. All technicians were required to participate with the OJT/JPM for the new glovebox operations.
2. Specific OJT/JPMs were developed to cover the new glovebox operations.
3. The TQPP directed operations personnel to go to Training with the new operations for its assessment.
4. Reviewed Work Package # WP-RDL-134, *Room 212 New Glove Boxes*, to determine the training identified for the installation of the new glove boxes. The process engineer provided detailed input for the procedure in the operation of the glove boxes, transfer of the material and operation of the elevator system. This information was properly implemented into the Glove Box Job Performance Measures (JPMs) and subsequently incorporated into on-the-job training of the glove box procedures.
5. The process engineer also provided information on lesson learned from glove box incidents and instructions on what to do for an upset condition of the elevator. However, the ALARA

Engineer identified a concern that the north and south blowers in Room 212 should be off during all bag-out operations. The Process and ALARA Engineers inputs were not included in the procedures and as a result the operators were not trained to these details.

Conclusion:

The prerequisites for Core Requirement 5 have not been satisfied. Not all of the inputs from the Process Engineer or the ALARA Engineer were incorporated into the procedures and therefore the Operations personnel were not completely trained.

Inspected by: Julie G. Ezold Ken R. Fields	Approved by: MSA Team Manager Date:
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Management (MG)	Core Requirement Number: CR-6	Date: November 4, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

- Operations Manager
- Building Supervisor
- Process Engineer
- Design Engineer

Records and other documents reviewed:

- BIO/3047/F/RT-16/R-1, *Basis for Interim Operation The Radioisotope Development Laboratory Building 3047*
- Safety Evaluation Report for Building 3047 Radioisotope Development Laboratory at ORNL Site
- OSR/3047/RF-16/R-3, *Operational Safety Requirements for the Radioisotope Development Laboratory Building 304*
- SPD-002, Rev. 4, *Glove Box Operation*
- SPD-010, Rev. 0, *Room 110 - 212 Glove Box Subsystem Operation*

Evolutions/operations witnessed:

N/A

Discussion:

1. The OSR identifies the minimum staffing requirements for operations involving greater than category 3 quantities of material as one qualified operator, one supervisor and one radiological technician. Additionally, the OSR identifies the minimum staffing for operations involving quantities of material less than category 3 as one qualified operator or one qualified supervisor. Procedure SPD-002, *Glove Box Operation*, mirrors the requirements specified in the OSR. However, SPD-010, *Room 110 - 212 Glove Box Subsystem Operation*, does not specify the minimum staffing requirement for operations.

Conclusion:

The minimum staffing requirements of this core requirement have been met.

Inspected by: Ken R. Fields	Approved by: MSA Team Manager Date:
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Facility Safety (FS)	Core Requirement Number: CR-7	Date: November 4, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

- Operations Manager
- Building Supervisor
- Process Engineer
- Design Engineer

Records and other documents reviewed:

- ORNL-RP-347, *ORNL RADIOCHEMICAL GLOVEBOX SAFETY*
- ORNL-RP-128, *ORNL RADIOLOGICAL DESIGN REQUIREMENTS FOR NEW FACILITIES AND MODIFICATIONS TO EXISTING FACILITIES*
- SBMS, *RADIOLOGICAL WORK: Preparing for Work*
- Job Hazard Evaluation # 3047-01-02A
- USQDSCREEN/3047/02-003, *Transfer of Ac-225 to the Room 212 Gloved Boxes*
- USQD/3047/01-002, Rev. 0 and Rev. 1, *The Renovation and Upgrade of the Glovebox Complex in Room 212 and Additional Upgrade of the Room 110 Complex*
- USQDSCREEN/3047/01-005, *Problem Safety Summary, Separation of Actinium via Ion Exchange*
- NNFD-002, *Non-Reactor Nuclear Facilities Division Change Control of Safety Structures, Systems, or Components*
- RTS-003, *Engineering Support Work System*
- RTS-011, *Facility Maintenance Work Authorization*
- Work Package # WP-RDL-134, *Room 212 New Gloveboxes*
- Work Package # WP-RDL-180, *HOG/Cell Instrument Modifications*
- RDT-737, Rev. 10, *Building 3047 Check Sheets*
- Vital Safety System Drawing, N3E020399A180, *Hot Off Gas Ventilation Exhaust System Flow Diagram*
- RES#3047-01-02, dated 02/08/01, *Alpha Facility Glove Box (4 ea) Installations*
- Nonconformance #02NSTD008
- SPD-002, Rev. 4, *Glove Box Operation*
- SPD-010, Rev. 0, *Room 110 - 212 Glove Box Subsystem Operation*
- USQDSCREEN/3047/02-004, *Glove Box Nonconformance*
- BIO/3047/F/RT-16/R-1, *Basis for Interim Operation The Radioisotope Development Laboratory Building 3047*
- Safety Evaluation Report for Building 3047 Radioisotope Development Laboratory at ORNL Site
- OSR/3047/RF-16/R-3, *Operational Safety Requirements for the Radioisotope Development Laboratory Building 3047*

Evolutions/operations witnessed:

Facility walk down

Discussion:

1. Building 3047 is currently governed under BIO/3047/F/RT-16/R-1, *Basis for Interim Operation The Radioisotope Development Laboratory Building 3047*, Safety Evaluation Report for Building 3047 Radioisotope Development Laboratory at ORNL Site, and OSR/3047/RF-16/R-3, *Operational Safety Requirements for the Radioisotope Development Laboratory Building 3047*. The facility has submitted a draft SAR/TSR. However, this document has not been approved. The job hazard evaluations (JHE), research safety summary (RSS) and unreviewed safety question screening and determination (USQDs) associated with the installation, modification, maintenance, testing and operation of the Room 212 Glove Boxes were reviewed.
2. The issues associated with USQD Screening/USQDs for installation and modifications are address in core requirement # 9.
3. There are currently no operations personnel qualified to perform USQD/USQD Screening in Building 3047. Operations personnel qualification for performing USQDs expired in October 2002.
4. The RSS ID # 978 *Separation of Actinium via Ion Exchange* provided identification of the potential hazards and controls for this operation. However, all the controls identified in the RSS were not incorporated into the procedures. SPD-002, *Glove Box Operation*, did not reference or provide any controls from the ORNL Chemical Hygiene Plan identified in the RSS. Additionally, SPD-002 did not specify safety glasses with side shields or identify the types of gloves required for handling caustic/corrosive materials. Further, the implied controls of the RSS for explosive hazards of using nitric acid were not in SPD-002. The JHE specifically performed for SPD-002 identified only radiological hazards and the requirements for having a procedure. There was no documented JHE for procedure SPD-010, *Room 110 - 212 Glove Box Subsystem Operation*.
5. The ORNL-RP-347, *ORNL RADIOCHEMICAL GLOVEBOX SAFETY* and ORNL-RP-128, *ORNL RADIOLOGICAL DESIGN REQUIREMENTS FOR NEW FACILITIES*, was reviewed for the modification and installation of the glove boxes. The process engineer did an excellent job of documenting the required reviews and approvals in RES#3047-01-02, dated 02/08/01, *Alpha Facility Glove Box (4 ea) Installations*.

Conclusion:

The prerequisites for Core Requirement 7 were not complete as all the hazard controls identified for SPD-002 have not been incorporated into the procedure and no JHE for SPD-010 has been conducted.

<p>Inspected by: Ken R. Fields</p>	<p>Approved by: MSA Team Manager Date:</p>
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Facility Safety (FS)	Core Requirement Number: CR-8	Date: November 4, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

- Operations Manager
- Process Engineer
- Design Engineer

Records and other documents reviewed:

- RES#3047-01-02, dated 02/08/01, *Alpha Facility Glove Box (4 ea) Installations*

Evolutions/operations witnessed:

N/A

Discussion:

1. The testing, calibrations and documentation of surveillances associated with the glove box installation was reviewed. The process engineer did an excellent job of documenting the required leak testing of the glove box installation. However, the installation testing of the elevator did not document the acceptance criteria to which it was tested.
2. The RDT-737, Rev. 10, *Building 3047 Check Sheets*, documented the daily checks of various differential pressure required to maintain the OSRs. The procedure requires the supervisor to review the checks daily. However, there is no required review signature to document this review. The flow down of the Vital Safety System Drawing Labels has not been incorporated into the check sheets. All the check sheet surveillances were up to date.
3. The calibrations and required preventive maintenance items were reviewed and found to be up to date. However, there is no identified periodic maintenance for the elevator chain tensioner, which has a specific maximum allowable weight adjustment that may require period setting.

Conclusion:

The prerequisites for Core Requirement # 8 have been met.

Inspected by: Ken R. Fields	Approved by: MSA Team Manager Date:
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Facility Safety (FS)	Core Requirement Number: CR-9	Date: November 1, 2002
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Method of Appraisal:

Reviewed documents, conducted interviews and walked down the facility and equipment as indicated below.

Personnel contacted/position:

- \$ Operations Manager
- \$ Building Supervisor
- \$ Process Engineer
- \$ Design Engineer
- \$ Maintenance Coordinator

Records & other documents reviewed:

- \$ ORNL-RP-347, *ORNL RADIOCHEMICAL GLOVEBOX SAFETY*
- \$ ORNL-RP-128, *ORNL RADIOLOGICAL DESIGN REQUIREMENTS FOR NEW FACILITIES AND MODIFICATIONS TO EXISTING FACILITIES*
- \$ SBMS, *RADIOLOGICAL WORK: Preparing for Work*
- \$ Job Hazard Evaluation # 3047-01-02A
- \$ USQDSCREEN/3047/02-003, *Transfer of Ac-225 to the Room 212 Gloved Boxes*
- \$ USQD/3047/01-002, Rev. 0 and Rev. 1, *The Renovation and Upgrade of the Glovebox Complex in Room 212 and Additional Upgrade of the Room 110 Complex*
- \$ USQDSCREEN/3047/01-005, *Problem Safety Summary, Separation of Actinium via Ion Exchange*
- \$ NNFD-002, *Non-Reactor Nuclear Facilities Division Change Control of Safety Structures, Systems, or Components*
- \$ RTS-003, *Engineering Support Work System*
- \$ RTS-011, *Facility Maintenance Work Authorization*
- \$ Work Package # WP-RDL-134, *Room 212 New Gloveboxes*
- \$ Work Package # WP-RDL-180, *HOG/Cell Instrument Modifications*
- \$ RDT-737, Rev. 10, *Building 3047 Check Sheets*
- \$ Vital Safety System Drawing, N3E020399A180, *Hot Off Gas Ventilation Exhaust System Flow Diagram*
- \$ RES#3047-01-02, dated 02/08/01, *Alpha Facility Glove Box (4 ea) Installations*
- \$ Nonconformance #02NSTD008
- \$ SPD-002, Rev. 4, *Glove Box Operation*
- \$ SPD-010, Rev. 0, *Room 110 - 212 Glove Box Operation*
- \$ USQDSCREEN/3047/02-004, *Glove Box Nonconformance*
- \$ BIO/3047/F/RT-16/R-1, *Basis for Interim Operation The Radioisotope Development Laboratory Building 3047*
- \$ Safety Evaluation Report for Building 3047 Radioisotope Development Laboratory at ORNL Site
- \$ OSR/3047/RF-16/R-3, *Operational Safety Requirements for the Radioisotope Development Laboratory Building 3047*

Evolutions/operations witnessed:

- Facility walk down

Discussion:

1. The administrative controls utilized to control the installation and subsequent modification to the Room 212 Glove Boxes were reviewed. The initial installation of the glove boxes was governed by procedures RTS-003, *Engineering Support Work System*, RTS-011, *Facility Maintenance Work Authorization*, which implement the Laboratory level requirements for work control, configuration control, facility and operational safety.
2. Work Package # WP-RDL-134, *Room 212 New Glove Boxes*, was written to install the facility modification. The job hazard evaluations (JHE) conducted per RTS-011 JHE Form and Personal and Environmental JHE Form identified the potential hazards for the work, however, neither the specific controls nor the mitigations for these hazards were included in the work instructions. Although, the required permits for radiological controls, excavation/penetration and welding/burning were included in the work package they were not identified on the Radiological Technology Section Work Authorization Form. Work was authorized by the Facility Manager to start on February 12, 2001.
3. Work Package # WP-RDL-134, *Room 212 New Gloveboxes*, correctly identified the work as a Type C, work for facility modifications. The work package contained no work instructions for the installation of the glove box modification. The initial review of the work by the safety analyst correctly identified the gloves boxes as design features of the Operational Safety Requirements. However, the safety analyst incorrectly concluded that the glove boxes were not subject to configuration control requirements or a formal USQD/USQD Screening. The required configuration control reviews, approvals and requirements of RTS-011 were not maintained during the course of work for the glove box modification and installation.
4. The Request for Engineering Services (RES) Document, RES#3047-01-02, dated 02/08/01, *Alpha Facility Glove Box (4 ea) Installations*, performed in accordance with RTS-003, *Engineering Support Work System*, was a well written and afforded a complete history of installation, testing, recommended training and design documentation of the entire glove box modification. The detail work instructions that were expected to be found in the Work Package # WP-RDL-134 had been captured in this RES Document. However, the controls associated with RTS-011 requiring approval of changes to work instructions, evaluation of new hazards, and configuration controls were not followed.
5. On February 27, 2002, USQD/3047/01-002, Rev. 0 and Rev. 1, *The Renovation and Upgrade of the Glovebox Complex in Room 212 and Additional Upgrade of the Room 110 Complex*, was written to address the impacts of the work on the systems related to safety for Building 3047, specifically, the Hot Off-Gas and Central or Cell Ventilation System. This USQD performed for the installation was revised on September 30, 2002, to include conditions of approval identifying specific radioactive material limits for the operations of the gloves boxes. These conditions of approval were not include in the facilities operation procedures SPD-002, *Glove Box Operation* and SPD-010, *Room 110 - 212 Glove Box Subsystem Operation*.
6. USQD Screen/3047/02-003, *Transfer of Ac-225 to the Room 212 Gloved Boxes*, was written September 9, 2002. This screening was performed to address the operations associated with the glove boxes in Building 3047 Rooms 110 and 212 respectively. The screening used

forms that were over two years old. USQD Screen/3047/02-004, *Non-Conformance - Room 212*, was written in September 13, 2001. This screening was performed to address the problem safety summary for the separation of actinium via ion exchange. The screening forms used did not include the current questions for screening criteria nor did it include a listing of the facilities current authorization documents required by ORNL-FS-PO1, *Unreviewed Safety Questions for Nuclear Facilities*.

7. During the period from October 28 through October 29 of 2002, the facility performed additionally modifications to the glove box system using the new SBMS Work Control procedure. This work was performed under Work Package, WP-RDL-180, *HOG/Cell Pressure Instrument Modifications*. The scope of the work involved piping modifications to allow relocation of HOG pressure gage for the glove boxes. This work also included installation of an additional differential pressure gage in Room 212 to read Alpha Cell differential pressure. Hot Cell Off-Gas is a Vital Safety System (VSS) and is currently governed under Non-Reactor Nuclear Facilities procedure NNFD-002, *Non-Reactor Nuclear Facilities Division Change Control of Safety Structures, Systems, or Components*. The work package was incorrectly identified as a Grade 4, Dispatch Work, rather than a Grade 1, Work affecting operations of a Category 1, 2 or 3 Non-Reactor Nuclear Facility. As a result, the configuration control requirements of NNFD-002 and the USQD requirements of ORNL-FS-PO1 were not followed for the VSS. Additionally, the Operations Manager in lieu of the NNFD Facility Manager authorized work on the system. Further, the configuration item engineer was not involved in the work planning process.

Conclusion:

The prerequisites for Core Requirement #9 have not been met for work control, configuration control and the USQD/USQD Screening process as describe in the text above.

<p>Inspected by: Ken R. Fields</p>	<p>Approved by: MSA Team Manager Date:</p>
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Operations (OP)	Core Requirement Number: CR-10	Date: November 1, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

- Technician 1
- Technician 2
- Principle Investigator
- Operations Supervisor
- Operations Manager
- Design Engineer
- RCT 1

Records and other documents reviewed:

- USQD/3047/01-002 Rev.1, *Additional Upgrade of the Room 110 Complex*
- Separation Process Run Sheets
- SPD-002, Rev. 4, *Glove Box Operations*
- SPD-010, Rev. 0, *Room 110-212 Glove Box Subsystem Operation*
- RSS-978, 5/29/02, *Separation of Actinium via Ion Exchange*
- RTS-026, Rev. 5, *RTS Conduct of Operations*

Evolutions/operations witnessed:

- Ventilation System Alignment
- Transfer of sample via elevator
- Sample Port Operation
- Glove changeout
- Prejob Brief for above operations

Discussion:

1. Conditions of Approval established in the USQD have not been flowed down into the operating procedures.
2. Separation process "Run Sheets" are used to direct personnel throughout the performance of the column processes. The sheets allow for the documentation of start and stop times associated with various steps. Consideration should be given to more of a document control process (e.g., approval signature and revision control).
3. SPD-010 identifies responsibilities of the facility manager (6.2) and facility/operation supervisor (6.3). Although this procedure was established prior to the October 1, 2002 transition to the NNFD model new responsibilities associated with NNFD personnel should be considered and included during the next revision.
4. Two procedures were utilized for the new glove box operations. The SPD-010 procedure was generated for the new glove box operations.

5. Only the JHE for SPD-002, Rev 4 could be verified and it was a generic JHE. Neither procedure had a “Precautions/Limitations” section. There was some safety information contained in the “General Information” section of both procedures.
6. RSS-978 did identify hazards associated with the process and provided hyper-links to applicable SBMS subject areas, Potential Controls, Requirements, and Potential Training.
7. A cover sheet was attached to the procedures which provides the following information: Division, Group, Facility, Procedure Type, Procedure No., Revision, Title, Validation, Concurrence and Approval signatures. The cover sheet also provided the requirements for “Working Copy”, “Controlled Copy” and “Information Only”.
8. During the evolution a potential pinch point was noted by the assessor while performing Step 9.1.1 [B] of procedure SPD-010. Operations personnel may want to investigate if there really is an issue. It was difficult to see how much clearance there was between the handle and the door.
9. Step 9.1.3 of procedure SPD-010 has no criteria as to what is “not excessive” deflection of the glove box containment windows.
10. The technicians performed a maneuver of “parking” the elevator, but there are no steps in the SPD-010 procedure for this operation.
11. The sample port operation of SPD-010 needs to add two RCT steps. First addition after step 9.5.2, Contact RCT. The second addition, after step 9.5.8, Have RCT Personnel smears the area and decontaminate as necessary.
12. There was no mention in the SPD-010 procedure about both technicians releasing the crank handles at the same time when the loading cup was empty. If both technicians release the crank handle, the loading cup will be lifted to Room 212 very rapidly and may damage the unloading station. The technicians were aware of this and took measures to prevent it from happening, but this should be captured in the procedure.

Conclusion:

The prerequisites for Core Requirement 10 have not been met for appropriate flow down of safety requirements.

<p>Inspected by: Julie G. Ezold Rob F. Peacher</p>	<p>Approved by: MSA Team Manager Date:</p>
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Startup Testing (STP)	Core Requirement Number: CR-12	Date: November 1, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

- Operations Manager
- Principle Investigator
- Design Engineer

Records and other documents reviewed:

- SPD-002, Rev. 4, *Glove Box Operations*
- SPD-010, Rev. 0, *Room 110-212 Glove Box Subsystem Operation*
- RSS-978, 5/29/02, *Separation of Actinium via Ion Exchange*
- RTS-026, Rev. 5, *RTS Conduct of Operations*

Evolutions/operations witnessed:

- Ventilation System Alignment
- Transfer of sample via elevator
- Sample Port Operation
- Glove changeout
- Prejob Brief for above operations

Discussion:

1. There was no documented Testing Plan or Start-Up plan to review. There was some testing described in the work package, but not with sufficient detail such as testing criteria, acceptance criteria, or approval signatures.
2. Interviewees indicated there was not a formalized process for system restart following a prolonged standby /shutdown period. It is recommended that some minimal criteria for restart be established which includes management or principal investigator verification of system readiness.

Conclusion:

The prerequisites for Core Requirement 12 have not been met. There is no formally documented Testing Plan for the sample elevator.

Inspected by: Julie G. Ezold Rob F. Peacher	Approved by: MSA Team Manager Date:
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Operations (OP)	Core Requirement Number: CR-13	Date: November 1, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

Facility Engineer
Operations Manager
Principal Investigator
Technician 1
Technician 2
Operations Supervisor
Design Engineer
RCT 1

Records and other documents reviewed:

SPD-002, Rev. 4, *Glove Box Operations*
SPD-010, Rev. 0, *Room 110-212 Glove Box Subsystem Operation*
RSS-978, 5/29/02, *Separation of Actinium via Ion Exchange*
RTS-026, Rev. 5, *RTS Conduct of Operations*

Evolutions/operations witnessed:

Ventilation System Alignment
Transfer of sample via elevator
Sample Port Operation
Glove changeout
Prejob Brief for above operations

Discussion:

1. Prejob brief was conducted for the evolution. All required personnel were present and signed the attendance sheet. The RWP had been revised for the new glove box operations. Good discussions were conducted between the technicians, RCTs, and supervisor.
2. During the Pre-Job Briefing the Operations Supervisor emphasized the importance of applying good ALARA principals throughout the process. He reminded everyone about stepping away from the box when work was not being performed (distance) and staying behind the lead glass when performing the ion exchange work (shielding).
3. The design engineer read the step and then the technician performed. This was just for the evolution. It is the expectation of management that the technicians will be able to perform this work without this rigor.
4. SPD-010 step 9.1 establishes responsibility with the Operations Supervisor to determine if the containment and ventilation system is to be balanced. No criterion for the decision has been established in the procedure. Recommend periodic isolation of the glove boxes in order to verify and/or reestablish proper ventilation balance.

5. A newly installed Magnehelic gauge, located in room 212, was used to observe Alpha Cell differential pressure. All personnel were aware of the gauge but no labeling has been applied and SPD-010 step 9.1.2 does not recognize the availability of the gauge. If the intention was for either Alpha Cell pressure gauge, the one located in room 110 and the new gauge in 212, to be used for monitoring cell differential pressure then it should be included in the procedure.
6. Step 9.1.3 of SPD-010 requires verification of acceptable deflection of the glove box windows. The criteria have not been established in the procedure.
7. During operation of the elevator it was observed that emphasis was placed on a “hands-on” mode of manipulating the crank in order to prevent the elevator from moving under its own momentum. Recommend a note of caution be included in the procedure (SPD-010).
8. Documentation of the criteria used to establish the correct tensioning of the elevator was not readily available. This information may have been available in the work package.
9. Many components in the system were labeled with Sharpie markers. Recommend application of fixed labeling in accordance with System Engineer Subject Area and Conduct of Operations principals.
10. On each of the glove boxes was a plaque with the following information:
 Operation: 0.3 – to – 1.5 w.g.
 This is the allowable operating range for the glove boxes. These plaques meet the definition of an Operator Aid, but are not controlled as such per RTS-026.

Conclusion:

The prerequisites for Core Requirement 13 have not been met with respect to labeling, operator aids, and procedure use.

<p>Inspected by: Julie G. Ezold Rob F. Peacher</p>	<p>Approved by: MSA Team Manager Date:</p>
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INTERNAL READINESS ASSESSMENT FORM

Functional Area: Management (MG)	Core Requirement Number: CR-15	Date: November 1, 2002
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Method of Appraisal (short narrative description):

Reviewed documents, conducted interviews, walked down the facility and equipment, and observed evolutions as indicated below.

Personnel contacted/position:

- Operations Manager
- Principle Investigator

Records and other documents reviewed:

- ATS
- Lessons Learned provided by the Operations Manager

Evolutions/operations witnessed:

NA

Discussion:

1. Operations personnel enter and track issues via the Lab-wide system, ATS. Since the operations team is small, good communications exist at all levels.
2. There were only eight open issues in ATS related to Building 3047 and six of these were related to Fire Protection issues.

Conclusion:

The prerequisites for Core Requirement 15 have been met.

Inspected by: Julie G. Ezold	Approved by: MSA Team Manager Date:
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Deficiency Forms (Form 2s)

INTERNAL READINESS DEFICIENCY FORM

Functional Area: Facility Safety (FS)	Core Requirement Number: CR-9	Date: October 31, 2002 ID #: FS-01
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Requirement:

- Administrative controls are in place to ensure that repairs (or modifications) are adequately analyzed to identify system degradation and to ensure that design changes are documented and approved prior to implementation.
- An adequate process has been implemented to ensure that documentation for systems critical to safety exists and is kept current, as appropriate for their safety functions, and that documentation is available to Actinium Production personnel.
- Drawings and other documentation relied upon for operations and maintenance activities are consistent with the existing equipment configuration.

Reference(s) (specific as to section):

- RTS-003, *Engineering Support Work System*, Sections 6, 7, 8 and 9
- RTS-011, *Facility Maintenance Work Authorization*, Sections 6, 7, 8 and 9
- SBMS, *Work Control*

Finding: X

Observation:

Discussion:

The required administrative work and configuration controls of procedures RTS-003, *Engineering Support Work System*, RTS-011, *Facility Maintenance Work Authorization*, which implement the Laboratory level requirements for work control, configuration control, facility and operational safety were not followed for the installation of Room 212 Glove Boxes.

The requirements of the SBMS, *Work Control*, for work planning and work execution, were not followed for HOG/Cell Pressure Instrument Modifications work. The grading of the work, work authorization and configuration control were not in accordance with the SBMS, *Work Control*, subject area.

Finding Designation: Prestart	Inspector: _____ Ken R. Fields
	Approved by: Date:

INTERNAL READINESS DEFICIENCY FORM

Functional Area: Facility Safety (FS)	Core Requirement Number: CR-7	Date: October 31, 2002 ID#: FS-02
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Requirement:

The USQD for the facility changes and the USQ screening for the Actinium production in the new glove boxes have been approved as appropriate.

Reference(s) (specific as to section):

- ORNL-FS-PO1, Unreviewed Safety Questions for Nuclear Facilities, Section A.1
- SBMS, Work Control, Work Planning Checklist
- ORNL, Research Hazard Analysis and Control System, Define Work Scope Identify/Evaluate

Finding: X

Observation:

Discussion:

All of the USQD Screenings for facility changes associated with the Actinium production in the new glove boxes have not been written or approved. The work associated with the HOG/Cell Pressure instrumentation modification did not perform a USQ Screen on the work conducted on a Vital Safety System.

Finding Designation: Prestart	Inspector: _____ Ken R. Fields
	Approved by: Date:

INTERNAL READINESS DEFICIENCY FORM

Functional Area: Facility Safety (FS)	Core Requirement Number: CR-7	Date: October 31, 2002 ID#: FS-03
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Requirement:

Job Hazard Evaluations (JHEs) and or the Research Safety Summaries (RSS) have been completed for the Actinium Production activities.

Reference(s) (specific as to section):

- SBMS, Work Control, Work Planning Checklist
- ORNL, Research Hazard Analysis and Control System, Define Work Scope Identify/Evaluate Hazards

Finding: X

Observation:

Discussion:

Although, and RSS was performed for the activities associated with the Actinium glove boxes, all of the identified controls were not incorporated into the operation procedures. The JHE performed for SPD-002, *Glove Box Operations* did not identify all the hazards associated with the procedure. There was no JHE performed for SPD-010, *Room 110 - 212 Glove Box Operation*.

Finding Designation: Prestart	Inspector: _____ Ken R. Fields
	Approved by: Date:

INTERNAL READINESS DEFICIENCY FORM

Functional Area: Facility Safety (FS)	Core Requirement Number: CR-8	Date: October 31, 2002 ID #: FS-04
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Requirement:

- Required PM's and calibrations are up to date and in a system that will ensure that they stay up to date.

Reference(s) (specific as to section):

- SBMS, Work Control
- RTS-11, Facility Maintenance Work Authorization, Section 6.5.2

Finding:

Observation: X

Discussion:

There is no preventive maintenance identified for the sample elevator. The elevator chain tensioner, has a specific maximum allowable weight adjustment that may require period setting.

Finding Designation: Poststart:	Inspector: <u>Ken R.Fields</u>
	Approved by: Date:

INTERNAL READINESS DEFICIENCY FORM

Functional Area: Operations (OP)	Core Requirement Number: CR-10	Date: November 5, 2002 ID #: OP-01
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Requirement:

Adequate and correct procedures and safety limits are in place for operating the process systems and utility systems that include revisions for modifications that have been made to the facility.

Reference(s) (specific as to section):

- DOE O 425.1B Section 2.d. (10)

Finding: X

Observation:

Discussion:

The following comments need to be addressed:

1. A potential pinch point during the containment and ventilation system alignment section of procedure SPD-010 was observed.
2. There was no criteria as to what was “excessive” deflection of the glove box containment windows during step 9.1.3 of procedure SPD-010.
3. There were no steps in the SPD-010 procedure regarding “parking” the elevator.
4. There are missing RCT steps during the sample port operation of the SPD-010 procedure.
5. There were no steps in the SPD-010 procedure regarding the danger of both technicians releasing the crank handles with an empty loading station.

Finding Designation: Prestart:	Inspectors: <u>Rob F. Peacher and Julie G. Ezold</u>
	Approved by: Date:

INTRERNAL READINESS DEFICIENCY FORM

Functional Area: Operations (OP)	Core Requirement Number: CR-13	Date: November 6, 2002 ID #: OP-02
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Requirement:

Operator aids are to be documented. They are to be approved by the Assistant Facility Manager (or designee). They are to be maintained in the Facility Operator Aids Log Book.

Reference(s) (specific as to section):

- RTS-026, Rev. 5, *RTS Conduct of Operations*, Section 7.17

Finding: X

Observation:

Discussion:

An operator aid is posted on each of the glove boxes in Room 212. These operator aids are not labeled appropriately or maintained as required by the Con Ops Manual.

Finding Designation:	Inspector: <u> Julie G. Ezold </u>
Poststart:	
	Approved by: Date:

INTERNAL ASSESSMENT DEFICIENCY FORM

Functional Area: Startup and Testing (STP)	Core Requirement Number: CR-12	Date: November 6, 2002 ID #: STP-01
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Requirement:

An adequate startup or restart program has been developed that includes plans for graded operations and testing after startup or resumption to simultaneously confirm operability or equipment, the viability of procedures, and the performance and knowledge of the operators.

Reference(s) (specific as to section):

- DOE O 425.1B Section 2.d. (12)

Finding: X

Observation:

Discussion:

There was not a formally documented testing program. As part of the work package the sample elevator was tested, but there wasn't sufficient detail to assess its operability.

Finding Designation: Prestart:	Inspectors: <u>Julie G. Ezold and Rob Peacher</u>
	Approved by: Date:

INTERNAL READINESS DEFICIENCY FORM

Functional Area: Training and Qualification (TQ)	Core Requirement Number: CR-5	Date: November 5, 2002 ID #: TQ-01
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Requirement:

Workers possess the experience, knowledge, and skills that are necessary for them to perform their work in a safe and effective manner.

Reference(s) (specific as to section):

- SBMS: Management System, *Worker Safety and Health*
- Directive: *Integrated Safety Management System Program Description*, Section 2.2 and 5.3

Finding: X

Observation:

Discussion:

The process engineer identified safety and operational concerns in RES#3047-01-02, but these were not incorporated into the procedures and the operations personnel were trained on the content of the procedures not the RES.

Finding Designation: Prestart:	Inspector: <u>Julie G. Ezold</u>
	Approved by: Date: