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July 21, 2009

Mr. Ted H. Carter

U.S. Nuclear Regulatory Commission

Mail Stop T-8-F-5

Washington, D.C. 20555

Dear Ted,

Enclosed please find combined Quality Procedures and Quality Assurance document in relation to Worcester Polytechnic Institute (WPI) nuclear fuel removal process.

Please review and comment. As you are aware, WPI is working closely with the DOE, the Idaho National Laboratory and NAC to facilitate and schedule a fuel removal as part of WPI's overall decommissioning.

Please feel free to contact Michael Curley, or Dr. David Adams, should you have any questions.

We certify under penalty of perjury that the enclosure is true and correct to the best of our knowledge.

Regards,

Michael J. Curley, Reactor Director/University Compliance and Risk

David S. Adams, Ph.D., Radiation Safety Officer

Reviewed and approved by an officer of WPI, as indicated by the signature below:

Jeffrey S. Solomon, Executive Vice President and CFO

Worcester Polytechnic Institute

Q004  
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<b>Worcester Polytechnic Institute</b>				
<b>Research Reactor</b>				
<b>Quality Procedure</b>				
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## Document Control

### **1 Introduction:**

49 CFR and 10 CFR Part 71 does require that a Licensee preparing a Type B package for shipment of irradiated material maintain sufficient written records and evidence that describe all activities affecting the quality and preparation of that package. The Worcester Polytechnic Institute will utilize controls, actions and processes to generate, maintain and store this Objective Quality Evidence (OQE). All documents issued with respect to the packaging and transport of irradiated material shall have appropriate approvals prior to use. These controls specify the methods that provide reasonable assurance that the requirements of 10 CFR Part 71, Subpart H are adequately satisfied. This Quality Procedure (QP) outlines the methods utilized at Worcester Polytechnic Institute to implement and manage those controls.

### **2 Procedure**

The following guidance is issued to direct and control the generation of Quality Related documents as they pertain to the Worcester Polytechnic Institute, Quality Assurance Program (QAP).

#### ***2.1 Document Review and Approval***

All new procedures issued under the Worcester Polytechnic Institute QAP for packaging and transport of radioactive materials in Type B packages at a minimum shall be approved by the Reactor Director, or the Radiation Safety Officer.

#### ***2.2 Document Change and Authorization***

Existing procedures that are modified or changed following formal issuance under the Worcester Polytechnic Institute QAP at a minimum are to be approved by the original approver, and either the Reactor Director, or the Radiation Safety Officer.

All issued and printed copies of revised procedures will be destroyed or clearly marked as Superseded on the cover page. In addition, any affected issuances of QP-5, Appendix A should be updated and approved to reflect the current revision status.

#### ***2.3 Document Identification and Control***

Each document issued and approved under the Worcester Polytechnic Institute QAP will be uniquely numbered and issued a "Revision Number". Any changes to the document following formal approval will cause a new Revision Number to be issued.

Work relating to the packaging and preparation of Type B packages will be controlled by the issuance of controlled copies of the required procedures. These copies will be clearly marked as

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a single "Controlled" or multiple "Work/Review Copy", and only the "Controlled" copy will be utilized as the master controlling document. The Reactor Director will verify that the "Controlled" copy of the procedure is the most current "approved" revision prior to use, and that any issued QP-5, Appendix "A" is current and approved.

#### **2.4 References:**

- 10 CFR 71.135: Quality Assurance Records
- 10 CFR 71.113: Document Control
  - Worcester Polytechnic Institute Quality Assurance Program

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## Worcester Polytechnic Institute

# QUALITY ASSURANCE PROGRAM

### 1 INTRODUCTION

The Quality Assurance Program submitted here is to assist in the handling of shipments of plate type reactor fuel, and other radioactive material. Specifically the program will cover activities related to the shipping of approved packages containing radioactive material.

The Quality Assurance Program will be the responsibility of Michael Curley (University Compliance Officer, Finance and Operations) and David Messier (Director, Environmental and Occupational Safety) at Worcester Polytechnic Institute. The transport of all radioactive material will be done by a licensed carrier. The shipping container will be Type B containers with an approved Certificate of Compliance (CoC). The containers will be on lease or loan from Nuclear Assurance Corp (NAC) International, a DOE subcontractor.

Worcester Polytechnic Institute does not design, fabricate, assemble, or test containers, and does not intend to procure any container for ownership or lease to others. Worcester Polytechnic Institute does not intend to rework, repair, maintain or modify the container.

The QA Program is submitted pursuant to 10 CFR Part 71.

### 2 ORGANIZATION

Figure 1 shows the organization chart for the operation of the reactor facility. The Quality Assurance Program will be performed within the Operating Organization. The WPI Radiation, Health and Safeguards Committee (RHSC) will review and approve all written procedures. The Reactor Director, Senior Reactor Operator, Radiation Safety Officer, TLG Services technical consultants, and consulting Health Physics personnel will have primary responsibility for monitoring all packaging, shipping and receiving activities.

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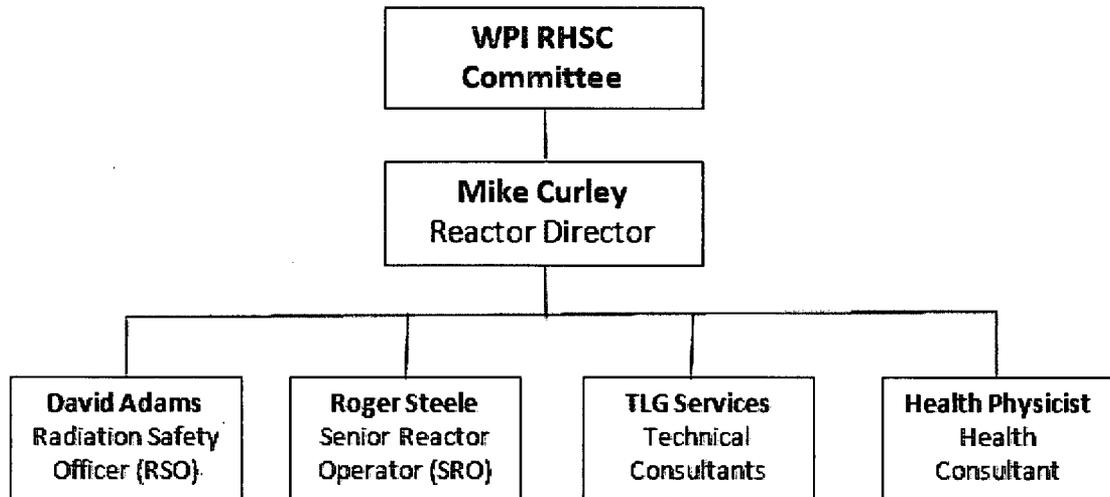


Figure 1. Organization Chart for WPI Reactor Personnel.

### 3 QUALITY ASSURANCE PROGRAM

The scope of the program includes handling, loading, delivering to a carrier for transport an approved package for the transport of plate fuel or other radioactive material. The shipment to remove the fuel in advance of decommissioning will occur once. Quality assurance will be exercised primarily through the use of written procedures constructed from regulatory requirements, applicable portions of the Worcester Polytechnic Institute Radiation Safety Health Physics Procedures, specific procedures developed by the manufacturer of the package, and other procedures or safeguards developed during review of packaging and transportation planning. Quality Assurance will be effected by formatting these procedures as check-lists (or equivalent) to be used by the individuals or their designates who are responsible for quality assurance.

### 4 PACKAGE DESIGN CONTROL

Design activities related to packages will not to be performed by the University.

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## **5 PROCUREMENT DOCUMENT CONTROL**

Procurement activities related to packages will not be performed by Worcester Polytechnic Institute. The proper procurement document control shall be the responsibility of the supplier of the designated package.

## **6 INSTRUCTIONS, PROCEDURES, AND DRAWINGS**

Activities important to safety will be ensured by following all manufacturer's instructions, procedures, and limitations as they relate to the safe use of the packages.

## **7 DOCUMENT CONTROL**

Control shall be exercised over the documents that are used in this shipping activity. The documents include a master document check-list, inspection procedures, loading and unloading procedures, package certification documents, radiation survey records, and shipping papers. All procedures and check-lists and changes will be approved by either the Reactor Director, or the Radiation Safety Officer.

## **8 CONTROL OF PURCHASED MATERIAL, EQUIPMENT, AND SERVICES**

No materials or equipment are to be purchased for this activity. Any required services such as container off-loading and carrier transport will be procured via normal University procedures.

## **9 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS, AND COMPONENTS**

No materials, part or components are to be identified or controlled for this activity. Replacement parts will be obtained from the manufacturer or certificate holder.

## **10 CONTROL OF SPECIAL PROCESSES**

No special processes are to be undertaken for this activity.

## **11 INTERNAL INSPECTION**

The following inspection activities will be implemented for each packaged procured for shipping purposes:

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**11.1 Receiving Inspections**

Inspections will be performed to ensure the integrity of containers that are used for transportation purposes. Visual inspection will include surface conditions, structural integrity, gaskets and flanges, tie-downs, labeling and marking, and other features as specified by the certificate holder.

**11.2 Final Inspections**

Checklists will be established to ensure inspections are performed to verify:

1. Proper package assembly
2. Moderators and neutron absorbers are present (if applicable)
3. Valves are set to specification and to prevent tampering
4. Shipping papers are properly completed
5. Packages are conspicuously and durably marked in compliance with USDOT regulations
6. Measures are established to ensure that appropriate personnel designated by the package user sign shipping tags or indicators prior to the authorization for shipping

**11.3 Maintenance Inspections**

These inspections will not be performed under this activity unless specifically designated by the package standard operating procedures.

**11.4 Inspection Documentation**

Inspection records will be maintained to document performance of inspection activities (period)

**12 TEST CONTROL**

**12.1 Procedures**

Measures will be established to ensure that applicable tests, surveys, or other measurements will be performed according to manufacturer's instructions. Properly calibrated equipment will be used and methods for documenting tests will be established.

**12.2 Acceptance Tests**

Measures will be established to ensure that acceptance tests (as applicable) are performed prior to offering a package for transport. Tests may include structural integrity, leak tightness, component performance, and shielding and thermal integrity.

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### **12.3 Results**

Measures will be established to ensure that test results are documented, evaluated, and maintained as QA records. The Radiation Safety Officer and Health Physics consultant will determine acceptability of the records.

## **13 CONTROL OF MEASURING AND TEST EQUIPMENT**

### **13.1 Calibration Control**

Gauges, reference standards, etc are not expected to be used for this activity. The exception to this is the use of radiation measuring equipment. This equipment will be properly calibrated with traceable standards according to existing standard operating procedures.

### **13.2 Out of Calibration Equipment**

Radiation measuring equipment that is out of calibration will not be used.

## **14 HANDLING, STORAGE, AND SHIPPING CONTROL**

### **14.1 Preservation**

Measures will be established to ensure that cleaning, handling, storage, and shipping are accomplished in accordance with the package design requirements to prevent damage or deterioration by environmental conditions. Provisions for use of special equipment such as cranes or lifting devices will to adequately identify and protect package components. Conditions identified in the CoC will be adhered to when unloading packaging.

### **14.2 Preparation, Release and Delivery to Purchaser**

Measures will be established to ensure that the following requirements are completed prior to shipping:

1. Cavities have been adequately dried
2. All conditions have been completed prior to offering for transport
3. All USNRC and USDOT requirements have been satisfied prior to offering for transport
4. All shipping papers have been completed and reviewed by qualified personnel for accuracy and completeness

## **15 INSPECTION, TEST, AND OPERATING STATUS**

A master check-list will be established to track the status of inspections, test, and operating conditions.

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## **16 NONCONFORMING MATERIALS, PARTS, OR COMPONENTS**

This section does not apply to this activity.

## **17 CORRECTIVE ACTION**

### **17.1 Reporting**

Causes of conditions that are detrimental to quality will be promptly identified and reported to the Radiation Safety Officer. Measures will be established to identify any corrective action from suppliers are obtained and that corrective actions were implemented and effective.

## **18 QUALITY ASSURANCE RECORDS**

### **18.1 General**

QA records will be generated for each activity that is performed during the receipt, unloading, opening and closing, loading, preparation of shipping papers, and adherence to conditions specified by the manufacturer. The records will demonstrate delivery to a carrier and have evidence to show that USNRC and USDOT requirements have been satisfied.

Inspection and test records will identify the test or observation, show that the tests or inspections were complete, record test or survey data, identify any conditions that are non-conforming or are detrimental to quality, names of individuals performing the tests or inspections, and whether the results were acceptable.

### **18.2 Generating Records**

Measures will be established to generate and store records. Paper copies of records generated will be stored in secure files. Additionally documents will be scanned in a pdf format for electronic storage.

### **18.3 Indexing and Classification Records**

Records generated for these activities will be designated as non-permanent and will be retained for a period of at least 3 years.

### **18.4 Receipt, Retrieval, and Disposition of Records**

The records generated by these activities will be stored in fire-proof/explosion-proof filecabinets in the Reactor Facility, and maintained by the Radiation Safety Officer. Procedures are already in place for the storage of records that relate to transportation and health physics activities that relate to the use of licensed material at the University.

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**18.5 Storage, Preservation, and Safekeeping**

Measures will be established to maintain records for the required period. Measures to be established include:

1. Prevention of damage from fire, flood, or other environmental damage
2. Record will be filed in folders in steel storage cabinets
3. Electronic records will be stored on a server which is backed up daily in a remote location
4. Unauthorized personnel will not have access to records
5. Electronic information is accessible to authorized users with password only access
6. Data will be electronically stored as read only pdf files
7. Damaged records will be promptly replaced

**19 AUDITS**

**19.1 Elements of an Audit Program**

This QA plan pertains only to one shipment to remove fuel and one plutonium starter source from the WPI reactor in advance of decommissioning activities. An audit will be conducted after the shipment. An auditor will be appointed by the WPI RHSC. The conditions of Regulatory Guide 7.10 Section 18.1 will be met in establishing an audit program.

**19.2 Scheduling of Audits**

An audit will be performed after the two shipments to ensure that elements of the program are in place and that appropriate documentation was generated and maintained.

**19.3 Team Selection**

Due to the small scope of this activity an independent individual will be chosen that has an understanding of the program and the requirements for compliance.

**19.4 Various Audit Actions**

The auditor will meet prior to the audit to discuss scope and objectives and after the audit to discuss findings, clarify facts, and to ensure all appropriate information has been gathered. A report will be generated to identify deficiencies and a response is required to address deficiencies. The auditor will ensure that a schedule for resolving the items identified is presented and that corrective action is implemented.

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## Instructions, Procedures and Drawings

### **1 Introduction:**

Prior to implementation and use of specific procedures related to the handling, packaging and transport of spent nuclear fuel specific procedures, instructions and drawings are assembled/generated to control the overall process. These controls specify the methods to provide reasonable assurance that the requirements of 10 CFR Part 71, Subpart H are adequately satisfied. This Quality Procedure (QP) outlines the methods the Worcester Polytechnic Institute reactor will utilize to implement and manage those controls.

### **2 Procedure**

The following guidance is issued to direct and control the generation of Quality Related documents as they pertain to the Worcester Polytechnic Institute Quality Assurance Program (QAP).

#### **2.1 Written Procedure Generation**

All procedures developed under the Worcester Polytechnic Institute QAP for packaging and transport of radioactive materials in Type B packages shall at a minimum address the following criteria:

- Approval by the appropriate levels of management as delineated in QP-1
- Compliance with 10 CFR Part 71, Subpart H
- Compliance with applicable sections of 49 CFR
- Work activities coordinated with Worcester Polytechnic Institute QA personnel
- Inclusion of inspection and hold points as necessary to verify that work/preparation and steps have been satisfactorily accomplished
- Objective Quality Evidence (OQE) is demonstrated where specific steps or instructions are generated that are important to safety or the proper assembly of Type B packaging
- Storage and Retention Requirements for all output as generated by the specific procedure

#### **2.2 Existing Procedures and External/Vendor Supplied Procedures**

Current and existing Worcester Polytechnic Institute procedures may be utilized in packaging efforts associated with the preparation of Type B packages for transport. In addition, external or vendor supplied procedures may be implemented for specific operations. This includes existing Safety Analysis Reports, Certificates of Compliance and other cask and equipment operating instructions that are not generated under the control of the Worcester Polytechnic Institute QAP. Prior to use and/or implementation

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for packaging operations, each document will be reviewed and approved for use in accordance with Section 2.3 of this procedure.

### **2.3 Approval and Issuance**

Prior to issuance of any Worcester Polytechnic Institute generated procedure utilized in the preparation and operation of a type B packaging for transport, a formal review and approval shall be issued. This approval shall be in the form of written signature signifying that the document is in compliance with the QAP and meets the requirements for which it was intended.

Existing or External supplied procedures will be reviewed for adequacy and include review and concurrence for use by Worcester Polytechnic Institute QA Personnel. This approval may be listed on Appendix A of this QP.

Appendix A of this QP provides a Job Specific Listing of applicable procedures that are accepted for use in the preparation of Type B packagings at the Worcester Polytechnic Institute facility.

### **2.4 References:**

- 10 CFR 71.111: Instructions, Procedures and Drawings
- Worcester Polytechnic Institute Quality Assurance Program



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**Authorization of Procedure Use:**

The procedures listed above satisfy the applicable requirements of 10 CFR 71 and of the licensee. The procedures meet the requirements of the Worcester Polytechnic Institute Quality Assurance Program and are authorized for use in the packaging and shipment of irradiated material in Type B packaging under the Worcester Polytechnic Institute Quality Assurance Program.

**Approvals:**

 6/22/09

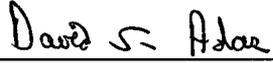
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Michael Carley  
University Compliance Officer  
Reactor Director Date

 6/22/09

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David Messier  
Director Environmental and Occupational Safety  
Quality Assurance Manager Date

 6-22-09

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David Adams  
Radiation Safety Officer Date