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COMPLETE RADIOLOGICAL SERVICES

**United States Nuclear Regulatory Commission**  
475 Allendale Road  
King of Prussia, PA 19406  
**Attention: Ms. Kathleen Modes**

**January 21, 2005**

Re: License No. 37-09135-01

03006198

Dear Ms. Modes,

This correspondence is in response to your January 7, 200<sup>5</sup> request for additional information regarding an amendment request to the Applied Health Physics, Inc. specific license 37-09135-01. Answers can be found in this cover letter or described under a reference to the revised procedure. This submittal (AHP-RSP-1 Revision 1 January 2005) supercedes the previous Non-Routine Maintenance Procedure.

1. Q. Please indicate if the request to perform non-routine maintenance applies to License Items 6.I through 6.R (radionuclides) or provide a list of nuclides with sealed source model numbers and maximum activities.  
  
A. This request applies to isotopes listed in License Items 6.I through 6.R. and please add Po-210 and Cm-244.
2. Q. Please provide how you would like License Item 9 (Authorized Use) to read for non-routine maintenance. Should 9.I through R be modified? If so, how?  
  
A. Please add authorization for sealed source removal, disposal, and installation.
3. Q. From the following list: please identify which maintenance activities you will and which ones you will not perform: Installation, initial radiation surveys, relocation, removal from service, dismantling, alignment, replacement, disposal of the sealed source or source holder and non-routine maintenance or repair of components related to the radiological safety of the gauge  
  
A. AHP requests authorization to conduct the non-routine maintenance activities described above for sealed sources and source holders that have been approved for distribution by the USNRC or an Agreement State.
4. Q. Please provide Messrs. Gerber, Ferrin and Hull's hands-on experience (isotopes handled and maximum activities) to show that they have handled large activity sealed sources before and are capable of performing non-routine maintenance of fixed gauges.

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NMSS/RGNI MATERIALS-002



- A. Messrs. Gerber, Ferrin, Hull and Mobley's hands-on experience includes several years in the handling of devices containing activities ranging from millicurie through multi-curie sources. AHP representatives shall utilize engineering controls and ALARA practices to minimize exposure.
5. Q. Under Prerequisites: please add a statement that reads: source is secured against unauthorized removal or access or under constant surveillance.
- A. A statement was added to the *Prerequisites Section* of the AHP-RSP (Revision 1 January, 2005) Non-Routine Maintenance Procedure stating that licensed material sources and source holders shall be secured from unauthorized removal, access or maintained under direct surveillance.
6. Q. Under Equipment please add: appropriate labels and signs will be used.
- A. A statement was added to the *Equipment Section* of the AHP-RSP (Revision 1 January, 2005) confirming that warning signs and labels will be used as required
7. Q. Under Personnel Monitoring: please delete the phrase: "or based upon expected exposures at the discretion of the RSO or designee." Typically, non-routine maintenance activities require extremity monitoring. You may provide a rationale or justification as to when extremity monitors would not be required, but do not use the phrase at the discretion.
- A. The reference statement "based upon expected exposures at the discretion of the RSO or designee" was deleted from the *Personnel Monitoring Section* of the AHP-RSP (Revision 1 January, 2005)
8. Q. Under Recordkeeping: please add after non-routine maintenance records (e.g. who performed the survey, date of survey, instrument used, measured radiation levels correlated to location of those measurements).
- A. A statement was added to the *Recordkeeping Section* of the AHP-RSP (Revision 1 January, 2005) was revised to confirm that AHP personnel shall retain copies of non-routine maintenance records to include radiation survey date, radiation survey results including measurement locations, instrumentation details, leak tests and a description of services for a minimum of three years.
9. Q. Please provide your emergency procedures for non-routine maintenance. For example, if you are removing the gauge and it drops or falls and the sealed source is exposed or broken.



A. Emergency Procedure is attached.

In addition, AHP requests that Ronald Hand, Jr. be deleted as an Authorized User.

Please call or email any questions.

Best regards,

A handwritten signature in black ink that reads "Todd Mobley". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Todd Mobley  
Applied Health Physics, Inc.  
Radiation Safety Officer



## **NON-ROUTINE MAINTENANCE PROCEDURE INVOLVING NUCLEAR GAUGING DEVICES**

**AHP Procedure RSP-1 (Revision 1 January, 2005)**

### **Purpose**

This procedure provides instruction for the removal from service, repair of gauging device shutter controls, removal/ replacement of sealed source, reinstallation of device/source holders and initial survey.

### **Scope**

This procedure is applicable for the removal of nuclear gauging devices/source holders from service for the following reasons:

- Placement of device(s) in storage
- Shipment of device(s) for disposal, transfer and/or return to manufacturer
- Replacement or repair of shutter control components
- Removal/replacement of sealed sources

### **Limitations**

Only devices and sources registered with the USNRC, Agreement States or cognizant jurisdiction are authorized for removal, replacement, repair or installation under this procedure.

### **Prerequisites**

1. All Applied Health Physics, Inc. representatives involved in the removal, shutter repair and installation of nuclear gauging devices and removal and replacement of sealed sources must possess the following training qualifications and demonstrate proficiency in the assigned tasks:
  - Successful completion of the Applied Health Physics, Inc. 24-hour Radiation Safety Officer Training course, or equivalent training commensurate with NUREG 1556, Volume 18 Guidance for applicable non-routine maintenance and NUREG 1556, Volume 4 Appendix N guidance
  - Received instruction on the proper methods of conducting shutter repair, sealed source removal and replacement
  - Full understanding of specific license conditions and restrictions

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- Minimum of two years of experience conducting radiation safety monitoring and surveillance and radioactive materials handling duties
  - Sources and source holders containing licensed material shall be secured from theft and unauthorized use or under constant surveillance
2. Prior to removal of a nuclear gauging device, a specified location must be identified to securely store or stage the device prior to transfer. In the event that the device is to be stored, a chosen storage location will meet the following requirements:
- The storage room will be located in an area of the facility with low traffic patterns
  - Access will be restricted to unauthorized personnel through the use of locked doors. Only the Radiation Safety Officer or responsible individual will maintain the key(s)
  - Storage area doors or cabinets will be labeled with a “Caution, Radioactive Materials” sign with contact phone numbers for the Radiation Safety Officer or responsible individual

#### **Precautions and Limitations**

All work will be conducted by or under the supervision of a qualified technician. Applied Health Physics, Inc. will not conduct non-routine maintenance other than device/source holder or sealed source removal and installation, alignment, relocation, shutter repair or component replacement, operational tests, leak tests and initial radiation surveys.

Nuclear gauging devices will be removed from service under the following conditions:

- Devices with an operable shutter secured in closed position
- Devices with inoperable shutter shall be shielded or ensure beam is focused away from personnel
- Devices have a valid leak test performed prior to removal

Nuclear gauging devices will be removed from storage and reinstalled under the following conditions:

- Devices are operational and possess a acceptable leak test
- Devices that have an operable shutter whereby the shutter mechanism is secured in a closed position

**The following services shall not be completed:**

- Opening of the source capsule



- Changes to components or device configuration that would compromise the engineering safety controls, as described in the Sealed Source and Device Registration

### **Equipment**

The following equipment should be utilized to ensure worker safety and ALARA considerations.

- Calibrated survey instrumentation capable of measuring the type and strength of radiation emitted
- Remote handling tools
- Temporary shielding
- Proper lifting equipment
- Appropriate warning signs and labels shall be used as required
- Replacement parts supplied or recommended by the Original Equipment Manufacturer (OEM) or equivalent, so as not to compromise the safety of the device
- Whole body and extremity monitoring devices
- Transport container

### **ALARA**

During all phases of non-routine maintenance, the individuals shall ensure that radiation exposure to Authorized Users is maintained As Low As Reasonably Achievable (ALARA). Methods of exposure reduction will include but not be limited to:

- Avoiding the unshielded beam
- Remote handling tools
- Temporary shielding
- Closed shutter when possible
- Determining ALARA Zones in work area

In addition, exposures to individuals not associated with non-routine maintenance activities shall be minimized by the following methods:

- Restricting access to the work area
- Notifying facility supervisors of activity and location
- Discussions with workers
- Monitoring the radiation levels at the Restricted Area boundary (<2 mR/hour)



### **Device/ Source Holder Removal Instructions**

1. Perform radiological monitoring and inspection of device, including valid leak test. Document results.
2. Verify proper placement of personal monitoring devices.
3. Verification that the shutter mechanism is closed if operational.
4. Utilize temporary shielding if radiation levels exceed 100 mR/hour at 30 cm.
5. Utilize lifting hoist for devices over 100 pounds (Safety: two person carry above 50 lbs.)
6. Stage shield container or temporary shields
7. Focus beam away from personnel
8. Remove nuclear gauge or source holder and transfer gauge or source holder to specified storage or repair location.
9. Perform radiological monitoring, posting and inspection of storage area.
10. Ensure device is secured from theft or unauthorized access.

### **Sealed Source Removal**

1. Sealed source removal shall be conducted only by qualified individuals.
2. Current leak test will be verified or completed.
3. Personal monitoring equipment shall include whole body and extremity monitoring.
4. Radiation survey meters shall be in place and operable.
5. Shielding container and/or material shall be properly staged.
6. Sealed source shall be removed as per manufacturer instructions (as available), including remote handling tools where applicable.
7. ALARA practices shall be strictly enforced.
8. Sealed source shall be properly shielded, labeled and stored prior to transfer.
9. Transfer and or disposal of licensed material shall be conducted per applicable regulatory requirements.

### **Sealed Source Replacement**

1. Replacement sealed source manufacturer, model, isotope and activity shall be authorized by Sealed Source and Device Registration.
2. Receipt of sealed source shall be authorized under specific license conditions or general license instructions.
3. Replacement sealed source shall have a current leak test.
4. Sealed source installation shall be conducted only by qualified individuals.
5. Personal monitoring equipment shall include whole body and extremity monitoring.
6. Radiation survey meters shall be in place and operable.

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7. Shielding container and/or material shall be properly staged.
8. Sealed source shall be installed as per manufacturer instructions (as available) including remote handling tools where applicable.
9. ALARA practices shall be strictly enforced.
10. Following sealed source/source holder installation, the Applied Health Physics Authorized User shall verify proper operation of shutter mechanism if applicable. Inoperable shutters shall be repaired or replaced, as per AHP procedure.
11. Initial radiation survey shall be completed with shutter open and results documented.

### **Shutter Component Repair or Replacement**

1. AHP representatives shall replace shutter components with equipment supplied by the Original Equipment Manufacturer (OEM) or equivalent. All replacement parts will meet or exceed the specifications recommended by the manufacturer or as described in the device registration.
2. Remote handling equipment and temporary shielding shall be used as necessary to maintain personnel exposures ALARA.
3. Unauthorized personnel shall be removed from the Restricted Area.
4. Safety components shall be tested and verified as operational prior to returning to routine use.

### **Device/Source Holder Installation Instructions**

1. Device/source holder installation shall be conducted only by qualified individuals.
2. Personal monitoring equipment shall include whole body monitoring.
3. Radiation survey meters shall be in place and operable.
4. Shielding container and/or material shall be properly staged.
5. Device/source holder shall be installed as per manufacturer instructions (as available), including remote handling tools where applicable.
6. ALARA practices shall be strictly enforced.
7. Perform radiological monitoring and inspection of device.
8. Verify Lock-out/Tag-out of shutter mechanism and valid leak test results.
9. Transfer nuclear gauge to specified location and install.
10. Perform and document radiological monitoring, including survey results in all accessible areas with shutter in the open position. Verify proper operation of shutter mechanism. Document results.



### **Personal Monitoring**

AHP would provide monitoring to individuals working directly on devices or that could receive in excess of 10% of the annual limits. As a minimum, each individual would be provided whole body monitoring. Extremity monitoring shall be provided during shutter repair and source removal/replacement. Monitoring devices shall be provided by a NVLAP approved vendor and exchanged at least quarterly. Records of individual exposures shall be reviewed and maintained as required.

### **Recordkeeping**

AHP personnel shall retain copies of non-routine maintenance records to include radiation survey date, radiation survey results including measurement locations, instrumentation details, leak tests and a description of services for a minimum of three years. Exposure records shall be retained until authorized for disposal by the USNRC.



## EMERGENCY RESPONSE PROCEDURE

### AHP Procedure RSP-2 (Revision 1 January, 2005)

#### Description

This procedure describes the proper response in the event of a radiological emergency or incident involving sealed source, gauging devices. AHP personnel involved in the response to radiological emergencies shall have been authorized for non-routine maintenance activities and wear appropriate exposure monitoring equipment. This document is provided as a supplement to the AHP Non-routine Maintenance Procedure. Authorized Users shall utilize the contents of both procedures during response and recovery projects. Examples of radiological emergencies could include but are not limited to:

- Damage to the housing/shield of a device
- Damage to the shutter mechanism
- Mishandling of a sealed source capsule
- Damage to sealed source

**Notification to the appropriate regulatory agency shall be made as required by the AHP Radiation Safety Officer or designee. The licensee as required shall retain documented records of all events related to the emergency response.**

#### Damage to the housing/shield of a device

In the event of physical damage to the housing/shield of a device containing a radioactive sealed source AHP personnel shall ensure the following:

1. Isolate the affected area to a minimum of a 10' radius, as conditions permit.
2. Restrict access of unauthorized personnel via caution signs/barrier tape.
3. Conduct and document a radiation survey and leak test.
4. Unbolt/package the device based upon results of radiation survey/leak test.
5. Transfer for repair or disposal/recycling.

#### Damage to the shutter mechanism

In the event of shutter mechanism failure on a device containing a radioactive sealed source AHP personnel shall ensure the following:



1. Isolate the affected area to a minimum of a 10' radius, as conditions permit.
2. Restrict access of unauthorized personnel via caution signs/barrier tape.
3. Conduct and document a radiation survey and leak test if not current.
4. Unbolt/package the device based upon results of radiation survey/leak test to include temporary shielding as necessary.
5. Repair shutter as per manufacturer's guidance or transfer for repair, disposal or recycling.

#### **Mishandling of a sealed source capsule**

In the event of the mishandling of a radioactive sealed source authorized AHP personnel shall ensure the following:

1. Isolate the affected area to a minimum of a 25' security radius, as conditions permit.
2. Restrict access of unauthorized personnel via caution signs/barrier tape.
3. Conduct and document radiation/contamination surveys of the secure perimeter and areas in close proximity to the source.
4. Adjust the "Restricted Area" boundary, and implement any required postings commensurate with measured levels of radiation/contamination.
5. Stage shield container, long-handled retrieval tools, decontamination supplies and survey instruments.
6. Authorized AHP personnel shall retrieve the source using appropriate protective clothing, engineering controls and ALARA principles.
7. The source should be inspected for damage prior to installation or removal using remote visual monitoring equipment and leak tested. Sources showing visible damage or failing the leak test should be packaged for storage prior to encapsulation/disposal. Decontamination of areas or equipment shall be completed as per the pertinent regulatory guidance.
8. Sources verified as undamaged should be installed as per manufacturer's procedure or packaged for storage prior to transfer for disposal/recycling.

#### **Damage to sealed source**

In the event of the mishandling of a radioactive sealed source authorized AHP personnel shall ensure the following:

1. Isolate the affected area to a minimum of a 25' security radius, as conditions permit.
2. Restrict access of unauthorized personnel via caution signs/barrier tape.



3. Conduct and document radiation/contamination surveys of the secure perimeter and areas in close proximity to the source.
4. Adjust the "*Restricted Area*" boundary, and implement any required postings commensurate with measured levels of radiation/contamination.
5. Stage shield container, long-handled retrieval tools, decontamination supplies and survey instruments.
6. Authorized AHP personnel shall retrieve the source using appropriate protective clothing, engineering controls and ALARA principles.
7. The damaged source shall be packaged for safe storage in a shielded container prior to final packaging/encapsulation.
8. Decontamination of areas or equipment shall be completed as per the pertinent regulatory guidance.