Rachel Browder

From: Goodstein, Penny H [penny.goodstein@bp.com]
Sent: Tuesday, October 28, 2008 5:52 PM
To: Rachel Browder
Cc: Luhrs, James G Jr. (AES); Baisdon, James (AES); Young, Michael 'Zip' (AES)
Subject: RE: LETTER asking for amendment to NRC specific license 50-27789-01, BPXA
Attachments: 2008 Aug.G&I non-routine training Certificates .ppt; Non Routine Maintenance description Berthold 8.08.doc; UPS-US-AK-ALL-ALL-HSE-DOC-00525-2 Sealed source procedure.doc

Here is the response to your comments below. They are in green below the comment/question.
Please contact me at the number below, or at this e-mail address, for clarification or more information.

Penny Goodstein
senior industrial hygienist
RSO
BPXA
1-907-564-5069

From: Rachel Browder [mailto:Rachel.Browder@nrc.gov]
Sent: Thursday, October 09, 2008 12:21 PM
To: Goodstein, Penny H
Subject: RE: LETTER asking for amendment to NRC specific license 50-27789-01, BPXA

Penny,
I have reviewed the information that was submitted for BP performing non-routine maintenance at the Alaska licensed facilities. In order to complete the review, I will need some additional information. The following requested information is based on NUREG-1556, Volume 4, Appendix N guidance, if you would like to review that information as part of your response. I've attached a .pdf of Volume 4.

1. Please provide a copy of the certifications for each of the individual's listed, so that I can verify that they attended "Non-Routine" Maintenance Training.
Attached."2008 Aug. G&I non-routine maintenance training Certificates.ppt"

2. It appears that the .pdf for the Berthold non-routine maintenance is not formatted correctly because there are double pages and the page numbering jumps between pages, for example, page 24 to page 2 to page 22, etc. I have attached a .pdf from our website at: http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0133/r2/br0133r2.pdf of the Brochure. In addition, this brochure is generic information on portable and fixed gauges and does not appear to provide sufficient information for individuals to perform non-routine maintenance of fixed gauges. Berthold should have provided specific information for performing non-routine maintenance for their devices.

The instructor sent a copy of the specific information provided during the training. I am not sure why I didn't have this in the beginning, but it also attached above.

3. Please specifically state each of the "non-routine" maintenance items that you want the staff to perform. Such as, installation, relocation, alignment, radiation surveys, etc. This will then be clearly stated in your license.

the personnel will be able to perform:

- **Leak test, including the direct reading survey and the wipe test**
- **Shutter test**
- **Temporarily remove source from pipe**
- **Reinstall source to pipe**

4. Please provide BP in-house procedures for the non-routine operations. This could be based on the manufacturer's procedures. The procedures should include the elements specified in Appendix N. This includes, but is not limited to: dosimeter requirements, survey instrument that will be used and commitment to perform surveys as specified, commitment to follow manufacturer/distributor instructions, verification that the source is secured during performance of non-routine maintenance, and before returning the gauge to routine use that the gauge is tested to verify that it functions as designed and source integrity was not compromised.

I have attached the BP Sealed Source procedure. We seldom perform non-routine operations. We normally only perform shutter and leak (wipe) tests, and the accompanying radiation survey with a direct reading meter. This is one of the few cases where a sealed source must be periodically moved and we need our personnel, instead of the manufacturer's, to perform the work.

If there are any questions, please do not hesitate to contact me. I'll review your response as quickly as possible in order to continue to process your request. I'll be out of the office the week of October 20 for an inspection; otherwise, I should be in the office.
Sincerely,
Rachel

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From: Goodstein, Penny H [mailto:penny.goodstein@bp.com]
Sent: Thursday, September 25, 2008 8:13 PM
To: Rachel Browder
Subject: LETTER asking for amendment to NRC specific license 50-27789-01, BPXA

As we discussed several weeks ago, I have enclosed a letter requesting an amendment to specific license #50-27789-01, BPXA in Alaska requesting that specific people be listed on the license as able to move Berthold sealed sources.

Guide for Mounting and Un Mounting of Devices

In general, always observe the following:

a) Keep the time of hand-contact (body contact) with the device as short as possible. This can be achieved by planning the mounting process and having all necessary parts and tools before starting to mount the device.

b) Maximize the distance between you and the device at all times.

1. You must perform a visual inspection for damage and ensure that the device is in the closed locked position. If damage is evident or suspected, prevent access to the vicinity of the device and contact Berthold Technologies immediately at 1-865-483-1488 and ask for instructions.

2. If the device is undamaged, you may proceed to mount or un mount the device to the process locations. The device may only be mounted in a location compatible with the "Conditions of Normal Use" on the registration certificate and as described in the Operator's Manual. Berthold Technologies will have sanctioned the mounting location prior to shipment of the device to your location. The device must remain in the sealed and locked closed condition at all times during the mounting process and may ONLY be unlocked (prior to commissioning) in the presence of a person specifically licensed by the NRC or an Agreement State.

3. Normal and general safety precautions must be used when mounting the device, consistent with the size, shape and weight of the device and the process location.

4. The device may not be modified in any way or at any time.

5. You are to ensure that all labels and instructions affixed to the device are not removed and that the labels are maintained in legible condition.

6. You are to ensure that leak tests and shutter tests indicated on the labels are performed at appropriate intervals and you are to maintain records of all tests and service of the device. You are also required to maintain records of receipt and copies of Source certificate, radiation surveys upon installation and serial numbers of the source and shielding.

7. Never abandon the device. It contains radioactive material.

Non Routine Maintenance

Perform Leak Test

1.0 Preamble

Radiation safety demands periodic testing of sealed radioactive sources and the shielding containers. This must be done as frequently as dictated by the applicable device registration granted by the Licensing State and the US Nuclear Regulatory Commission. Sealed sources must be leak tested at intervals of not more than 6 months prior to installation in their working shields. The device Registration defines the frequency of leak testing of an installed working shield. Any leakage and/or removable contamination level in excess of 0.005 micro curies must be reported to the distribution Licensing Authority and the appropriate specified actions must be taken.

2.0 Scope

Leak Testing of sealed sources and shielding containers shall be performed according to this procedure. Only persons designated by the RSO as having been trained to perform these tests are allowed do so. The tests shall be performed using an approved kit and the instructions contained therein.

This procedure is based on the use of an external contractor to supply each leak test kit and to provide the analysis of the leak test sample. The U.S. Nuclear Regulatory Commission must license such a contractor.

2.1 Location of Testing and Precautions

2.1.1 Sealed Sources

The leak testing of sealed sources may only be performed in a suitably shielded area or at sufficient distance so that the dose rate to the general public at no time exceeds 0.002 rem/hr. The leak testing of sealed sources shall be under the direct control of the RSO. The precautions to be followed by the person performing the test are:

a) The work shall be planned to minimize the exposure time of the person performing the test.
b) Surgical gloves shall be worn; direct contact with the source should be avoided.
c) Any items such as gloves, tools or tweezers in direct contact with the source during testing shall be stored in a container under the care of the RSO until the results of the tests are known.

2.1.2 Shielding Containers with Sealed Sources

Normal safety precautions are required when leak-testing a shielding container.

3.0 Leak Testing

3.1 Read and follow the Leak Testing Instructions provided with the leak-testing kit. Avoid touching the swab before inserting it into its tube and sealing it. Complete the information on the ID sticker and attach to the tube containing the swab. Complete the certificate.
Make a copy of the certificate for the RSO.

Pack the tube in the shipping box and **Survey** the outside of the box using a survey meter capable of detecting 0.5 mrem/hr prior to shipping. If less than 0.5 mrem/hr, ship.

If the dose rate exceeds 0.5 mrem/hr **DO NOT SHIP**. Contact the RSO for further instructions.

Survey and Shutter Test

1.0 Preamble

Considerations of radiation safety require that devices containing radioactive sources are surveyed periodically and that records are maintained which show the results of such surveys. The level and frequency of such surveys are dictated by the Radioactive Material Device License granted by the US Nuclear Regulatory Commission or an Agreement State.

2.0 Permissible Levels

Each type of shielding has a specified radiation level when loaded with the highest activity of source allowable by the device registration. This is stated as a dose rate at 12 inches (30cm) from the surface of the source. Under no circumstances may the dose rate exceed this number. Frequently, shielding contain sources with activities under the maximum permissible levels. The device is surveyed prior to shipment and at installation. The records of the surveys are maintained at Berthold Technologies USA and at the user site.

3.0 Survey Equipment

The surveys shall be conducted using instruments capable of detecting a dose rate of better than 0.01 mrem/hr of gamma radiation. The equipment shall be periodically calibrated under the QA procedures of Berthold Technologies USA. Calibration records shall be maintained according to the requirements of ISO 9000.

4.0 Documentation

The device to be surveyed shall be identified by Model, Serial Number, Isotope, Activity, and Source Serial Number. If in service, the previous survey records shall be reviewed and the previous date noted on the new survey record. The new date and survey results will be noted and compared to the previous results.

5.0 Survey

The shutter operation shall be tested for ease of operation at least 5 times and placed in the closed position. The device shall be surveyed at the same distance from the surface as previous surveys but at no further than 12 inches from the surface, with the shutter closed.

6.0 Action

Any survey which indicates that the dose rate specified for the device is being exceeded, must immediately be reported to the Radiation Safety Officer and only persons licensed by the US Nuclear Regulatory Commission or an Agreement State may approach or deal with the device until the problem is resolved.

Sealed Source Radioactive Devices

Authority:	BPX(A) HSE Operations Manager	**Custodian:**	Radiation Safety Technical Authority
Scope:	BPX(A)	**Document Administrator:**	HSE Web Specialist
Issue Date:	January 1, 2007	**Issuing Dept:**	HSE
Revision Date:	Initial	**Control Tier:**	2
Next Review Date:	January 1, 2010		

Revision Log

Revision Date	Authority	Custodian	Revision Details
January 1, 2007	Len Seymour	Penny Goodstein	Initial version

1.0 Purpose/Scope

Devices with radioactive sealed sources in BPX(A) operations r measure fluid and other material levels in pipes and tanks. These procedures follow Nuclear Regulatory Commission (NRC) requirements and best practices from NRC and sealed source manufacturers.

These procedures apply to all sealed sources, whether under specific or general licenses. Specific and general licenses require some of the same activities. Follow NRC device labels, license requirements, NRC registries of sealed sources and devices, and manufacturer's directions for performing these activities.

Except for paragraph 5.14, the scope of this procedure applies solely to sources permanently installed in BP-operated facilities and licensed to BP. Only paragraph 5.14 applies to sources that NRC licensed contractors performing work for BP own and use.

When purchasing new radiation sources, contact the radiation safety officer (RS0) (senior industrial hygienist) 907-564-5069, (penny.goodstein@bp.com). Also contact the BPX(A) safety advisor for the area involved.

2.0 Definitions

For definitions see **Attachment 1**.

For a general description of sealed sources see **Attachment 2**.

3.0 General Requirements

Most sealed sources are under license from NRC or a participating state. Each of the licensed devices has a "Sealed Source and Device Registration Certificate" (SSD) that explains the device and requirements associated with the device. Each device has a label on the device that also provides important information concerning the device.

Follow all NRC requirements, and all manufacturer requirements including device label instructions.

Retract and lock out all sealed sources during vessel entry or prior to source removal.

4.0 Key Responsibilities

4.1 Radiation Safety Officer (RSO)

The RSO is an individual responsible for having knowledge of the appropriate regulations and requirements and the authority for taking required actions to comply with appropriate regulations and requirements. The licensee, [BPX(A))] through the RSO, ensures compliance with appropriate regulations and requirements. For BPX(A) the RSO is the senior industrial hygienist.

4.1.a. Training

RSOs shall receive appropriate training at an approved course prior to appointment. The training must meet NRC requirements..

4.1.b. Responsibilities

The RSO advises potential purchasers/users of the radioactive devices on regulations and other health and safety matters in connection with ionizing radiation. The RSO's name is on the sealed source NRC specific licenses. The responsibilities are listed on the specific NRC license. The RSO is also responsible for ensuring appropriate activities occur for sealed sources under general licenses.

4.1.c. delegations of duties

RSOs may delegate duties such as leak testing and inspection to personnel who have received training in these duties. This training may consist of training by:

- The RSO
- Sealed source manufacturer or
- Training company contracted for the purpose of providing training

4.2. Safety Advisors/N Slope IH (RSO delegates)

4.2.a. Training

Many Safety Advisors and N Slope IHs will have training to perform

- leak tests
- on/off shutter tests
- inventories
- locking out sealed sources before vessel entry

In accordance with NRC requirements for generally and specifically licensed devices.

4.2.b Activities

N. Slope Advisors and IHs can perform:

- Leak tests
- on/off shutter tests
- inventories
- locking out sealed sources before vessel entry

as required for each device.

They will document these activities and keep for 3 years beyond the date of the test/inventory. They will provide copies to the RSO.

4.3 Operations/maintenance staff ordering/using sealed sources

Operations and/or maintenance staff ordering/using sealed sources (new users) must notify the BPX(A) RSO (senior industrial hygienist) of all planned purchases of devices and equipment containing radiation that fall under the General or Special license provisions of the NRC regulations. They must fill out Attachment 10, Required Information for Radioactive sources.

New users must notify the Safety Advisor associated with their operation of all planned purchases of devices and equipment containing radiation that fall under the General or Special license provisions of the NRC regulations.

Users of the equipment are responsible for all licensing fees.

Anyone suspecting problems with a sealed source either during or after installation must contact the RSO or delegate and/or manufacturer for help.

Personnel with specific training may perform some or all of the duties of the Safety Advisors and Industrial Hygienists listed in section 4.2. Some of these job titles include facility maintenance technicians and A/E/I technicians

4.4 Purchasing (ASCII)

ASCII personnel must notify the BPX(A) RSO (senior industrial hygienist) of all new purchases of devices and equipment containing radiation that fall under the General or Special license provisions of the NRC regulations.

Purchasing personnel do NOT have to notify for purchase of exit signs, smoke alarms and other items containing tritium or not more than 100 microcuries of other beta and/or gamma emitting material.

5.0 Procedure

5.1 Description of Sealed Sources

Refer to **Attachment 2** for a general description of sealed source devices.

5.2 Licensing and Registration

The NRC requires that anyone wishing to keep or use radioactive materials above a specific activity must be registered / licensed to do so.

BPX(A) personnel may purchase radioactive devices such as sealed sources either under the BPX(A) specific license, or under the general license if NRC has authorized the manufacturer to sell using the general license.

The manufacturer will transfer the general license for sources purchased under general licenses.

Sources may be purchased under BP's specific license #50-27789-01.

Information on license requirements is located on website www.nrc.gov

Whether purchasing under the manufacturer's license, as a general license, or under the BPX(A) specific license, the new users in BPX(A) must notify the RSO of the new source. In the case of general licenses, the user must ensure that the contractor/manufacturer has obtained the relevant documents prior to installation.

If any radioactive source is no longer required, contact the RSO for potential disposal routes.

A source must not be used on premises/sites other than that to which the registration / license relates.

Strictly follow all conditions included in the license and SSD Registration Certificate. Although some radioactive sources are covered by general licenses, they still have requirements concerning periodic inventories and testing.

The State of Alaska requires registration with the Radiological Health Program for all radioactive sources. This registration is in addition to registration with the NRC. The new user will complete the form and send to the RSO. The form is available on the website http://www.radhealth.com/. It is also attached as **Attachment 3.** One form is required for each source. The RSO will send in the form by fax to the Radiological Health office, where it receives a registration number and is returned. The RSO will provide a copy to each new user.

The registration is valid for two year. The user must either submit a registration form every two years, or notify the RSO to do this.

5.3 Labels and signs

5.3a Labels

All labels affixed to the device at the time of receipt bear a statement that removal of the label is prohibited

The labels must remain on the device, and users must comply with all instructions and precautions provided by this label.

If labels become unreadable contact the manufacturer for a new label.

5.3b Signs

Areas with radioactive devices must have a sign indicating the location of the device. This will provide information to workers unfamiliar with the area, and to emergency responders.

Manways that allow entry into pipes and vessels must have warning signs on the manhole indicating the presence of a radioactive device inside.

Place NRC Form 3 in a sufficient number of places to permit individuals to observe it on the way to or from any particular licensed activity location to which the document applies. Break rooms will meet requirements for placing the form. It shall be conspicuous, and shall be replaced if defaced or altered. NRC Form 3 is **attachment 4**.

5.4 Storage of Radioactive Materials

Users may not hold devices that are not in use for longer than 2 years.

If devices with shutters are not being used, the shutter must be locked in the closed position.

The required testing need not be performed during the period of storage only.

When devices are put back into service or transferred to another person, and have not been tested within the required test interval, they must be tested for leakage before use or transfer and the shutter tested before use.

Devices kept in standby for future use are excluded from the two-year time limit if the general licensee performs quarterly physical inventories of these devices while they are in standby.

5.5. Physical Inventory and Shutter Test

The RSO or delegate must conduct a physical inventory as required on the Materials License/SSD registration certificate/device label every 6 months. This inventory must account for all sealed sources and/or devices received and possessed under the license. The person performing the inventory must assure that the device is in place and document that it is on the form in **Attachment 5** Nuclear Gauge Inspection, Shutter and Leak Test Report.

Devices with shutters require a test to ensure the shutter will go to the "off" position every 6 months. Close the shutter momentarily to test it. Use a radiation meter to ensure that the radiation level decreases when the shutter is closed. During normal operations this should also create a change in the screen in the facility control room.

If performing a shutter and/or leak test, the tests verify the presence of the device. If a shutter and/or leak test are not required during the sixth month period, then the only documentation required is the presence

of the device. Even when shutter and leak tests are not required every 6 months an inventory of the device is required every 6 months.

5.6 Relocating devices

BPX(A) personnel or contractors must not relocate a sealed source unless they have received training appropriate for this work and the license allows such activity. If BPX(A) personnel or contractors do not have such training then manufacturer's personnel must move sources, as described in the Materials License and/or SSD registration certificate.

The RSO or delegate must amend the source registration card (**Attachment 6**) with the new location of the source. When re-installing the device, update the source registration card.

Keep source movement records at the site to which they relate for a minimum period of 3 years unless otherwise described by the license and/or certificate of registration.

If it is suspected that a radioactive source, however small, is lost, the Area Manager must be informed. Contact the RSO as soon as possible.

Immediately inform the NRC if it is suspected that any person could be exposed to a significant radiation dose. Contact the RSO for help if it is possible that this occurred.

In the case of contractor/manufacturer's sources used at a BPXA site, contractor/manufacturer holds all responsibilities for sources left at the site, e.g. radiography sources, and must complete the source location checks and complete their own daily record card accordingly.

5.7. Periodic Inspections and Testing

5.7. a. Routine Physical Inspection

The RSO, or delegate, must perform regular checks every six months or as specified on the license/ certificate of registration/device label l to account for all sealed sources and devices received and possessed, that the device is in working order and all requirements, such as legible labels, are met.

Document the results of the inventory/inspection on the Nuclear Gauge Inspection, Shutter and Leak Test Report form (**Attachment 5**)

5.7. b. Direct Reading Radiation Monitoring

As part of the periodic inspections the RSO or delegate should monitor dose rates around installations, which incorporate a radioactive source, by using a survey meter.

This is a highly recommended practice as it provides information on leakage before the person performing the test actually touches the area around the gauge.

The meters must meet the following requirements (from NRC NUREG 1556, Volume 4):

- Measures at least 0.3 through 1 through 200 mR per hour (50 microcoulombs per kilogram). Meters that measure lower amounts are acceptable.
- Is capable of measuring the radiation being emitted from the gauge's sealed source
- Is checked for functionality with a source of radiation at the beginning of each day of use (e.g., with the gauge or a check source)
- Is sent to a qualified equipment laboratory and calibrated
  - At intervals not to exceed 12 months
  - Using a source of radiation similar to those found in the gauges
  - To ensure that exposure rates indicated by the meter do not vary from the actual exposure rates by more than ± 20% on each scale
  - After any servicing or repair (other than a simple battery exchange)

Document the results of area monitoring on **Attachment 5** Nuclear Gauge Inspection, Shutter and Leak Test Report.

5.7.c Shutter tests

The RSO or delegate must test each gauge for the proper operation of the on-off mechanism (shutter) and indicator, if any, at intervals not to exceed 6 months or as specified in the SSD certificate

The test includes using a radiation meter to determine radiation readings with the shutter open, and with it closed. The radiation dose rate in the radiation beam of the device at 45 cm (18 inches) from the radiation source with the device shutters, if any, in the open position must not exceed 1 mSv/hour (0.1 rem/hour. After closing the shutter the radiation should be appreciably less, or preferably zero.

Document the results of the shutter test on the Nuclear Gauge Inspection, Shutter and Leak Test Report form (**Attachment 5**). Use same form for the routine physical inspection.

5.7.d. Wipe Testing for Leakage

All sealed sources require testing for leakage at intervals required by the NRC Material License and/or certificate of registration.

Testing must consist of a wipe tests sent to a laboratory for analysis.

Wipe testing methods vary with manufacturer and laboratory. Refer to the manufacturer's information or laboratory instructions for leak testing instructions. Refer to **Attachment 7** for a generic procedure for leak testing.

Document the results on the Nuclear Gauge Inspection, Shutter and Leak Test Report form (**Attachment 5**). Keep the results for 3 years after the leak test. Send a copy of the completed Nuclear Gauge Inspection, Shutter and Leak test to the RSO.

The laboratory analyzing the wipe tests must meet requirements in the NRC regulations.

5.8 Documentation

There must be documentation of all inventories, leak tests and evaluation of on/off mechanisms.

The records must show the results of tests.

The records also must show the dates of performance of, and the names of persons performing, testing, installing, servicing, and removing from the installation radioactive material and its shielding or containment.

Retain each record of a test for leakage for three years after the next required leak test is performed or until the sealed source is transferred or disposed of.

Each record of a test of the on-off mechanism and indicator required must be retained for three years after the next required test of the on-off mechanism and indicator is performed or until the sealed source is transferred or disposed of.

In order to keep a central location for information copies of the results must be supplied to the RSO in Anchorage. Copies need to also be located at the Slope locations for NRC audit purposes.

5.9 Controlled Radiation Areas

A Safe Work Permit for any vessel with a radiation device mounted on it must include the lockout of all radiation devices.

5.9.1 Lockout situations

Typical lock-out procedures include locking the shutter into the "off" position and tagging the shutter control mechanism to indicate the gauge is locked-out. The procedures are required during maintenance, repairs, or work in, on, or around the process line (e.g., bin, tank, hopper, pipe, or conveyor belt) where the device is mounted.

When the distance or air gap between the source and detector permits entry of all or a portion of a person's body into the primary radiation beam, there must be lock out procedures developed before the job begins.

The lock-out procedures must encompass

- locking the on-off or shutter mechanism into the off position or otherwise controlling the radiation beam or
- Using any other means of preventing an individual or a portion of an individual's body from entering the radiation beam.

There must be signage to indicate the locked out state of the devices.

- Tag the on-off or shutter control mechanism to indicate that the gauge is locked out.
- Post a warning sign at each entryway to an area where it is possible to be exposed to the primary beam. In addition to providing a warning, the sign should give safety instructions, e.g., "contact the RSO before entering this vessel." Lock-out procedures should specify who is responsible for performing them.

Only personnel with training, as described in section 4.2, may lock out and tag sealed sources.

The RSO or delegate will use a survey meter to check for radiation levels before granting an entry permit. Take readings from a location that will provide necessary information for entry.

All vessels containing, or having associated with them, a radioactive source, must have a warning notice as illustrated in **Attachment 9** on each personnel entry point.

Withdraw all sources into their housing and/or shutters locked in the closed position before opening the first man way.

The RSO or trained delegate is responsible for ensuring that this has been done and for signing or delegating the "work permit" and/or the isolation control certificate as appropriate.

5.9.2 Normal operations

We do not expect, under normal operating conditions, to meet the requirements necessary for controlling areas.

For normal operation, an area must be designated a controlled area only if doses of ionizing radiation are likely to lead to an exposed person exceeding 10% of the annual dose to a worker.

5.10 Exposure limits for Ionizing Radiation

We do not expect that BPX(A) exposure levels will exceed, or even reach these levels from the sealed sources.

5.11 Non-routine Activities

Anyone performing non-routine activities on a source, such as moving it from one location to another, must have received training from the manufacturer or equivalent training.

5.12 Source Retraction

As appropriate, retract sources into the source housing. This must occur in instances of vessel entry as well as possibly at other times.

In all cases lock the shutter in the closed position before removing the source holder or performing any work that the dose rates around the vessel concerned could affect.

If removing a source holder, confirm by monitoring that the shutter is closed. Use a radiation meter meeting requirements in

Do not remove the padlocked covers from the source housing. Only personnel with training to perform non-routine tasks may remove sources from their housing. If a source cannot be withdrawn into its

housing or a shutter cannot be closed contact the RSO or delegate immediately. The RSO or delegate must contact the manufacturer.

5. 13 Contingency Plan

5.13.1 Emergencies

Report to the RSO or delegate immediately any damage to the source container which could affect either its operation or the integrity of the shielding.

The RSO or delegate must inform the Site Manager and assess the condition of the source container by monitoring the dose rates around the container. If necessary, erect barriers at the 2mR/hr dose rate contour and display warning notices at the barrier. All personnel must remain outside the controlled area. The RSO or delegate will decide what further actions are necessary.

In the case of fire, do not attempt to withdraw sources into their housings or to close shutters if this involves personnel entering hazardous areas. After such an emergency, the RSO or delegate will advise on suitable methods for recovering the sources or returning them to their holders.

In case of emergency

- Stop use of the gauge.
- Restrict access to the area.
- Contact responsible individuals.
- Call Emergency response 911
- Call the RSO (senior industrial hygienist 907-564-5069)

In an emergency situation, consideration of the following points can substantially reduce the overall dose received during the recovery period.

- The use of available shielding, preferably high atomic number material, e.g. lead, steel.
- The radiation dose from point sources (the type used in gauges) reduces on an inverse square law basis, i.e. doubling the distance to the source reduces the dose rate by a factor of four.
- The dose received is directly proportional to the time spent in the area.

An emergency situation is likely to be an unfamiliar situation. Therefore, if remedial work is likely to involve source manipulation, practice the work using non-radioactive equipment.

If a significant emergency occurs that immediately threatens the lives of personnel or the integrity of the installation, the presence of radioactive sources should not prevent entry by emergency personnel combating the crisis or aiding those in danger.

5.13.2 Loss of a Source

In the event that a sealed source is lost, or otherwise unaccounted for, the installation RSO or delegate must immediately notify the Site Manager. The RSO or delegate will initiate a search of all likely areas using available radiation meters. When the source is found the RSO or delegate shall implement a retrieval plan keeping in mind dose limitation and, if necessary, temporary source storage.

If the source cannot be readily found, the RSO or delegate will prepare a detailed report of the incident and through the site manager notify the appropriate authorities prior to considering what further action to take.

5.14 Contractor Using Radioactive Materials on BPXA Premises

All contractors using sealed radioactive sources on BPXA premises are directly responsible to the NRC and State of Alaska for meeting all regulatory requirements for use of the devices.

All contractors using sealed radioactive sources on BPXA premises must have the following before commencing work:

- A current license for the source(s) being used
- Suitable radiation monitor(s) appropriate to the radiation(s) being used with current calibration certificate(s)
- Barriers, warning notices, etc. to demarcate any designated controlled areas
- An "Authorized Person" or "RSO" on site to receive the source, unless previously agreed otherwise with the Site Manager/ BPXA RSO.

New contractors must also supply a copy of their local rules which relate to the work they are performing to the RSO for comment before receiving a contract. Where existing contractors have revised their local rules, they must supply a copy to the RSO for review.

Contractors must supply details relating to the source(s) to the RSO and the sponsoring department representative, prior to despatch to the site. These shall include:

- Isotope name
- Source strength at a particular date
- Source identification number
- Container number
- Transport index
- Transport category
- Name of RSO
- Appropriate transport details, e.g. date, ETD, ETA and contractor shall be included.

Sources must not be left on BPXA premises unless prior agreement has been reached with the Site Manager/RSO.

The BPX(A) RSO or delegate may perform confirmatory dose rate monitoring outside any contractor designated controlled area if deemed appropriate. Monitoring of received sources in the absence of contractor's personnel may also be necessary to confirm the suitability of storage arrangements.

5.15 Transport of Sealed Sources

The transportation of radioactive materials must follow requirements in 49 CFR 173 Subpart I, Shippers – General Requirements for Shipments and Packaging, Class 7 (Radioactive) Materials

5.16 Transferring sources

already licensed

If transferring a source, including returning it to the original manufacturer, notify the Nuclear Regulatory Commission of the transfer.

Director of Nuclear Material Safety and Safeguards,

ATTN: Document Control Desk/ GLTS

The report must contain:

- The identification of the device by manufacturer's (or initial transferor's) name, model number, and serial number;
- The name, address, and license number of the person receiving the device (license number not applicable if exported)
- The date of the transfer.

5.17 License fees

The appropriate fee must accompany each application for which a NRC requires a fee, including applications for new licenses and license amendments.

Most NRC licensees are also subject to annual fees.

The users are responsible for all licensing fees, including for application and annual fees.

5.18 Audits

The RSO will perform and audit annually. The audit checklist is provided as **Attachment 11**.

6.0 Key Documents/Tools/References

References

10 CFR 19	Notices, Instructions and Reports to Workers: Inspection and Investigations
10 CFR 20.	Standards of Protection Against Radiation
10 CRF 32	Specific Domestic Licenses To Manufacture Or Transfer Certain Items Containing Byproduct Material
10 CFR 31.5	Certain detecting, measuring, gauging, or controlling devices and certain devices for producing light or an ionized atmosphere.
NUREG 1556 Volume4	Program Specific Guidance About Fixed Gauge Licenses

Attachments

Attachment 1 Definitions

Attachment 2 Description of sealed sources

Attachment 3 Alaska State Registration For

Attachment 4 NRC Form 3, Notice to Employees

Attachment 5 Nuclear Gauge Inspection, Shutter and Leak Test Report

Attachment 6 Source Registration Card

Attachment 7 Procedure for leak testing

Attachment 8 Exposure limits for radiation

Attachment 9 Vessel Entry signs

Attachment 10 Required information for new radioactive devices

Attachment 11 Fixed Gauge Audit Checklist

Attachment 1

Definitions

Absorbed Dose Quantity of energy imparted by Ionizing Radiations to unit mass of matter such as tissue.

Atom Smallest particle of matter which can enter into chemical combinations. In basic terms, consists of a nucleus formed from positively charged protons and neutral neutrons, which is surrounded by circulating negatively charged electrons. The atom is electronically neutral.

Becquerel SI unit of radioactivity. Defined as the occurrence of one atomic disintegration per second within the isotope (Bq)

Curie The original unit of radioactivity defined as the quantity of any radioactive isotope in which the number of disintegrations per second is 3.7 x E10. One curie (Ci) is equivalent to 3.7 x E10 Becquerels.

Dose Rate A measure of the presence of Ionizing Radiations and indicating the rate at which energy is being deposited in an absorbing medium, e.g. milliGray per hour ($mGyh^{-1}$), microGray per hour (μGyh^{-1}).

Equivalent Dose The radiation dose obtained by multiplying the absorbed dose by a radiation weighting factor to account for varying effects of different Ionizing Radiations when causing damage to tissue.

The Sievert (Sv) is the unit of equivalent dose. The radiation weighting factor for gamma rays and beta particles is 1, hence the absorbed dose in Grays is numerically equal to the equivalent dose in Sieverts for gamma and beta radiation.

Gray The Gray (Gy) is the SI unit of absorbed dose and is a measure of the amount of radiation energy deposited in any medium. The Gray is equivalent to one joule per kilogram (1 JKg-1).

Ionizing radiation a type of particle radiation in which an individual particle carries enough energy to completely remove an electron from its orbit. Ionizing radiation may also consist of fast-moving particles such as electrons or small atomic nuclei.

mCi MilliCurie =1 1/1000 of a Curie

MBq 1000 Bequerels

Nuclear Regulatory Commission (NRC) - is an independent agency established by the Energy Reorganization Act of 1974 to regulate civilian use of nuclear materials. a five-member Commission heads the NRC.

mR/hr milliRoentgen per hour

Radioactivity The process of radioactive decay in which unstable atoms of an element undergo spontaneous transformation into more stable product atoms by emitting charged particles and/or electromagnetic radiations. The product atoms may or may not be radioactive. If radioactive, decay continues until achieving a non-radioactive isotope.

Radionuclide A shortened form of "radioactive nuclide," practically synonymous with "radioisotope" or "radioactive isotope."

rad (Roentgen Absorbed Dose) Unit of absorbed dose. The mean energy per unit of mass imparted by ionizing radiation in a mass. One rad is 100 ergs absorbed per gram. 1 rad = 0.01 Gray. The Rad is often superseded by the Gray.

rem (Roentgen Equivalent Man) Unit of absorbed dose, in rad, multiplied by a quality factor used to express the relative biological effects of the particular radiation as compared to gamma radiation. Personnel exposure limits are often expressed in rem. Although often superseded by the **Sievert** the **Nuclear Regulatory Commission (NRC)** still uses this unit.

Roentgen (R) The amount of x- or gamma radiation that produces ionization resulting in one electrostatic unit of charge in one cubic centimeter of dry air at standard conditions.

Attachment 1

Definitions

Sievert The Sievert (Sv) is the SI unit of equivalent dose and is the product of absorbed dose and the appropriate radiation weighting factor. The factor for gamma rays, and beta particles is 1 and for alpha particles 20. The absorbed dose in Grays therefore is numerically equal to the equivalent dose in Sieverts for beta and gamma radiation (see Equivalent Dose).

International System of Units

The International System (SI) units are a consistent set of units for use in all branches of science. The General Conference on Weights and Measures acting on the recommendation of the International Commission on Radiation Units and Measurements (ICRU) has adopted special unit names for SI units used in connection with radioactivity.

The SI unit of activity is the Becquerel (symbol Bq) equal to one nuclear transformation per second.

3.7×10^{10} Becquerels equal 1 Curie (Ci) exactly.

1 Gray equals 100 rads exactly.

The SI unit of equivalent dose is the joule/kilogram (J/kg). International Commission on Radiological Protection (ICRP) proposes that this unit be named the Sievert (symbol Sv). 1 Sievert equals 100 rems exactly.

Attachment 2

DESCRIPTION OF SEALED SOURCES

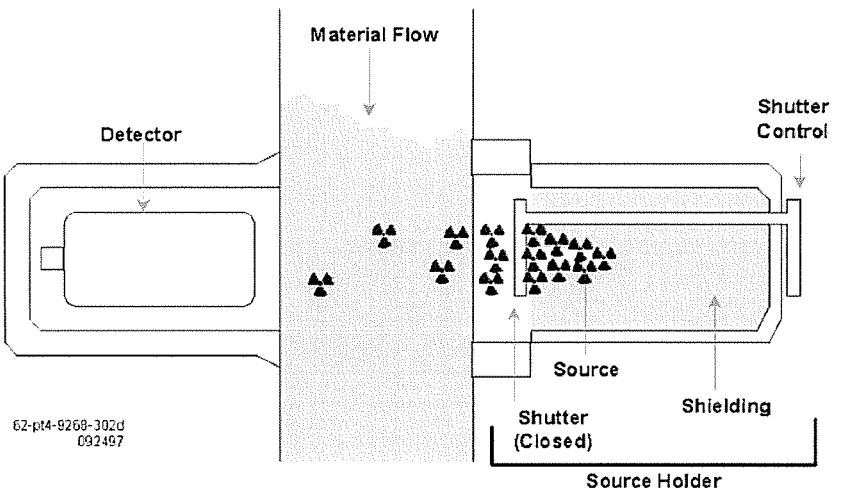
Typically gauges help with process control including the level of material in vessels and tanks, and volumetric flow rate. Because of differences in design, manufacturers provide appropriate instructions and recommendations for proper operation and maintenance. In addition, with gauges of varying designs, the sealed sources may be oriented in different locations within the devices, resulting in different radiation safety problems.

The radioactive material used in this type of source is contained in a stainless steel capsule (approximately 1 cm3) and shielded by a lead or steel housing. Sealed sources may be permanently installed units for smoke detection, density, level, and interface measurement, or mobile units including radiography sources or portable level gauges. Regardless of device type, the source's energy is transmitted through the measured medium to a detector. As the medium's level or density varies, the detector receives a relative change in radiation that is converted to a real world measurement.

Within nucleonic instrumentation, the type and size (activity) of the source is determined by several process parameters. The goal is to minimise the amount of emitted radiation to that necessary for the detection system's successful operation.

The gauges typically have on/off mechanisms to ensure that the radiation can be shielded during vessel entry.

Although designs vary, the gauges typically have these basic components:



Attachment 3

STATE OF ALASKA
DEPARTMENT OF HEALTH & SOCIAL SERVICES
DIVISION OF PUBLIC HEALTH
SECTION OF STATE LABORATORIES
RADIOLOGICAL HEALTH PROGRAM
4500 BONIFACE PARKWAY
ANCHORAGE, ALASKA 99507-1270

REGISTRATION FORM – RADIOACTIVE MATERIAL

Note: ***Use ONE form for each source*** **Please print or type information**

Owner:

BP Exploration (Alaska)

Address:

P.O. Box 199612
Anchorage, AK 99519

Telephone: **907-564-5069**
Fax: **907-564-5020**

Person in Charge of Radiation Safety
Name:
Penny Goodstein
Address:
BPX(A)
900 East Benson Boulevard
Anchorage, AK 99508
Telephone: 907-564-5069

Source Material:

Activity (Ci or MBq):

Physical Form (underline or circle: (solid, liquid, gas):

If Part of Equipment:
Manufacturer:
Model Name:
Serial Number:
Location (If different from owner- actual location of device :):

(Circle all that apply)
Type: **a.** Sealed
Unsealed
b. Stationary
Mobile/portable
c. Other _____

Please provide a brief description of source (Include whether it is for medical, industrial, research, etc. uses)

Note: This registration is valid for two years, and will expire: [ ]

Individual completing Registration Form:

Name: Title:

Signature: _____ Date:

This form may be reproduced as needed.

Send completed form to address above

After review a number is assigned and a copy of this form will be returned to the Registrant as proof of registration.

(907) 334-2107 FAX: (907) 334-2163

FOR DEPARTMENTAL USE ONLY

Reviewed by: _____

Registration Number: _____

Attachment 4

NRC FORM 3
(5-2005)
Part 1

UNITED STATES NUCLEAR REGULATORY COMMISSION
Washington, DC 20555-0001

NOTICE TO EMPLOYEES

STANDARDS FOR PROTECTION AGAINST RADIATION (PART 20); NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS; INSPECTIONS (PART 19); EMPLOYEE PROTECTION

WHAT IS THE NUCLEAR REGULATORY COMMISSION?

The Nuclear Regulatory Commission is an independent Federal regulatory agency responsible for licensing and inspecting nuclear power plants and other commercial uses of radioactive materials.

WHAT DOES THE NRC DO?

The NRC's primary responsibility is to ensure that workers and the public are protected from unnecessary or excessive exposure to radiation and that nuclear facilities, including power plants, are constructed to high quality standards and operated in a safe and secure manner. The NRC does this by establishing requirements in Title 10 of the Code of Federal Regulations (10 CFR) and in licenses issued to nuclear users.

WHAT RESPONSIBILITY DOES MY EMPLOYER HAVE?

Any company that conducts activities licensed by the NRC must comply with the NRC's requirements. If a company violates NRC requirements, it can be fined or have its license modified, suspended or revoked.

Your employer must tell you which NRC radiation requirements apply to your work and must post NRC Notices of Violation involving radiological working conditions.

WHAT IS MY RESPONSIBILITY?

For your own protection and the protection of your co-workers, you should know how NRC requirements relate to your work and should obey them. If you observe violations of the requirements or have a safety concern, you should report them.

WHAT IF I CAUSE A VIOLATION?

If you engaged in deliberate misconduct that may cause a violation of the NRC requirements, or would have caused a violation if it had not been detected, or deliberately provided inaccurate or incomplete information to either the NRC or to your employer, you may be subject to enforcement action. If you report such a violation, the NRC will consider the circumstances surrounding your reporting in determining the appropriate enforcement action, if any.

HOW DO I REPORT VIOLATIONS AND SAFETY CONCERNS?

If you believe that violations of NRC rules or the terms of the license have occurred, or if you have a safety concern, you should report them immediately to your supervisor. You may report violations or safety concerns directly to the NRC. However, the NRC encourages you to raise your concerns with the licensee since it is the licensee who has the primary responsibility for, and is most able to ensure, safe operation of nuclear facilities. If you choose to report your concern directly to the NRC, you may report this to an NRC inspector or call or write to the NRC Regional Office serving your area. If you send your concern in writing, it will assist the NRC in protecting your identity if you clearly state in the beginning of your letter that you have a safety concern or that you are submitting an allegation. The NRC's toll-free SAFETY HOTLINE for reporting safety concerns is listed below. The addresses for the NRC Regional Offices and the toll-free telephone numbers are also listed below. You can also e-mail safety concerns to allegation@nrc.gov.

WHAT IF I WORK WITH RADIOACTIVE MATERIAL OR IN THE VICINITY OF A RADIOACTIVE SOURCE?

If you work with radioactive materials or near a radiation source, the amount of radiation exposure that you are permitted to receive may be limited by NRC regulations. The limits on exposure for workers at NRC licensed facilities whose duties involve exposure to radiation are contained in sections 20.1201, 20.1207, and 20.1208 of Title 10 of the Code of Federal Regulations (10 CFR 20) depending on the part of the regulations to which your employer is subject. While these are the maximum allowable limits, your employer should also keep your radiation exposure as far below those limits as is "reasonably achievable."

MAY I GET A RECORD OF MY RADIATION EXPOSURE?

Yes. Your employer is required to advise you of your dose annually if you are exposed to radiation for which monitoring was required by NRC. In addition, you may request a written report of your exposure when you leave your job.

HOW ARE VIOLATIONS OF NRC REQUIREMENTS IDENTIFIED?

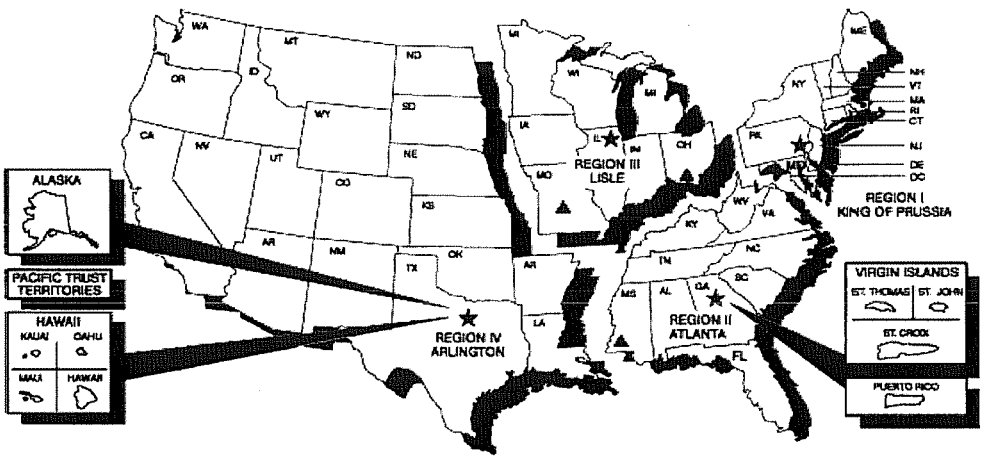
NRC conducts regular inspections at licensed facilities to assure compliance with NRC requirements. In addition, your employer and site contractors may conduct their own inspections to assure compliance. All inspectors are protected by Federal law. Interference with them may result in criminal prosecution for a Federal offense.

MAY I TALK WITH AN NRC INSPECTOR?

Yes. NRC inspectors want to talk to you if you are worried about radiation safety or have other safety concerns about licensed activities, such as the quality of construction or operations at your facility. Your employer may not prevent you from talking with an inspector. The NRC will make all reasonable efforts to protect your identity where appropriate and possible.

MAY I REQUEST AN INSPECTION?

Yes. If you believe that your employer has not corrected violations involving radiological working conditions, you may request an inspection. Your request should be addressed to the nearest NRC Regional Office and must describe the alleged violation in detail. It must be signed by you or your representative.



▲ - Callaway Plant Site in Missouri and Grand Gulf Plant Site in Mississippi are under the purview of Region IV. The Portsmouth Gaseous Diffusion Plant in Ohio is under the purview of Region II.

Attachment 5

Nuclear Gauge Inspection, Shutter and Leak Test Report

Use this form, or manufacturer equivalent

General Information:

Facility: _____ Location: _____

Device manufacturer: _____ Device model number: _____

Device serial number: Device Isotope and activity level: _____

Performed by:

Name: _____ Company: _____ Date: _____

signature: _____

Laboratory performing wipe samples: _____

Direct reading meter

Manufacturer: _____ Serial Number: _____

Calibration date: _____

Location of tests and results:

_____

Leak (Wipe) Test performed yes no

Location of wipe sample(s): _____

Laboratory analyzing samples: _____

Shutter Test performed yes no

Shutter OK Not OK

If not OK, necessary actions: _____

Shutter verified by: visual inspection actually turning off and on

Verify shutter **NOT** locked into "on" position with padlock or other locking device

Device Label

Readable Needs cleaning Needs replacement

Comments:

_____

_____

_____

Attachment 6

RADIOACTIVE Source Registration Card

Source Identification Number		Source Activity		Reference Date		Nuclide		Date of Receipt		Normal Location		Purpose	
Date of Last Leakage Test		Date Next Leakage Test Due											

Source Movement Record

Installed in Normal Location		Removed from Normal Location		
Date and Time	Checked by	Date and	Removed	New Location

Initials of Person Carrying Out Source Installation Checks

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2												
3												
4												
5												
6												
7												
8												
9												
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Attachment 7

Procedure For Leak testing of Sealed Sources

Use instructions from device manufacturer or analyzing laboratory if available

Introduction

Under US requirements, sealed sources with 100 mCi or greater must be tested for leakage of radioactive material between 6 and 36 months, depending upon the label, registration and/or license that the Nuclear Regulatory Commission issues or manufacturer requires.

Retain the results on file for a minimum of three years from the date of test.

Do not expose the source for the test.

Equipment required:

The equipment is available as a kit from the laboratory that will be performing the analysis.

One radiation contamination meter, electronically calibrated within the past 12 months.

Cotton swab

Tweezers

Detergent supplied in kit, or methanol/distilled water

2 Plastic bags

Labels

Method

Test any area that has an opening where radiation may leak out.

For nucleonic gauges this will generally be the area around the shutter mechanism (open / closed handle).

If the sources are in dip pipes inside the vessels, pull the sources into the housing and the close shutter. Wipe the source rod. For other sources a wipe around the source housing / container.

Using the dose rate meter ensures that the source is not exposed and the radiation dose rate to the operator is less than 500 μR/hour (0.5 mR, which is also 5 μSv / h).

Take the samples for laboratory analysis, following laboratory or device manufacturer's directions.

1. Wipe the first cotton swab around the identified area.
2. Place in plastic bag, marked with source details, source type, serial number, activity, location, and the fact that the swab is dry.
3. If laboratory indicates a second, wet sample, dip the second cotton swab in the detergent or methanol/distilled water.
4. Squeeze off the excess detergent or methanol/distilled water.
5. Using the cotton wool wipe around the identified area.
6. Place the swab into a plastic bag.
7. Note the source details, source type, serial number, activity, and location and that this swab is wet.
8. Place the information along with the enclosed wipe into another plastic bag. This will prevent the ink coming into contact with the detergent on the wipe and smudging the source information.
9. Send the wipes to the appropriate laboratory for analysis.

Leak Test Results

The RSO for the sealed source needs to receive copies of leak tests.

Attachment 8

Regulatory Exposure Limits for Radiation

OSHA

The US Occupational Safety and Health Administration (OSHA) has set limits for worker exposure to ionizing radiation. These limits are contained in the following table and are expressed in Rems.

	Rems per calendar quarter	equivalent for year
Whole body: Head and trunk; active blood-forming organs; lens of eyes; or gonads	1 1/4	5
Hands and forearms; feet and ankles	18 3/4	75
Skin of whole body	7 1/2	30

Exposure to ionizing radiation to the whole body is not to exceed 3 Rems per calendar quarter. The dose to the whole body is not to exceed 5 (N – 18) Rems, where N is the workers age in years. Exposure recorded must show that additional doses of radiation do not exceed the amounts in the formula.

NRC

An annual limit, which is the more limiting of

The total effective dose equivalent being equal to 5 rems (0.05 Sv); **or**

The sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (0.5 Sv).

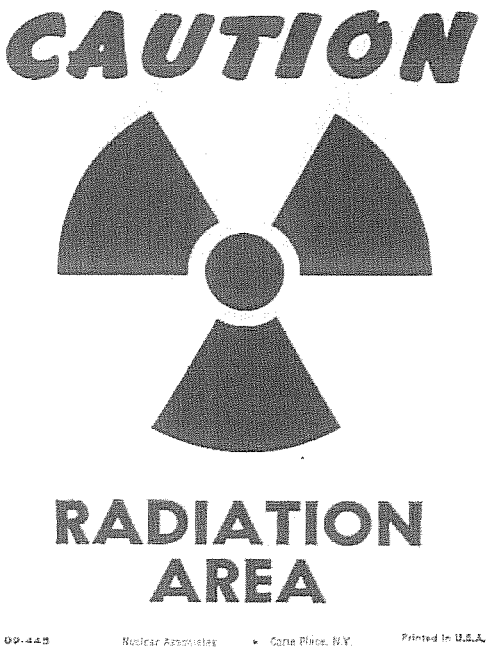
The annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities, which are

A lens dose equivalent of 15 rems (0.15 Sv), and

A shallow-dose equivalent of 50 rem (0.5 Sv) to the skin of the whole body or to the skin of any extremity

Attachment 9

Vessel Entry Signs



CAUTION

RADIATION AREA

1. **No entry to this vessel without clearance from the Radiation Safety Officer (RSO)**
2. **Contact the Radiation Safety Officer (RSO) via the Control Room**
3. **In the event of any unusual occurrence involving the source of radiation, contact:**

..... (RSO)

Attachment 10

Required Information for Radioactive Devices

Manufacturer Name	Device Model	Serial Number	Source type	Source activity	Facility	Skid / Module	Type of Device	Use	Person responsible for device	Comments

Attachment 11

Fixed Gauge Audit Checklist

(From NUREG 1556, Volume 4, Appendix H)

Note: All areas indicated in audit notes may not be applicable to every license and may not need to be addressed during each audit. For example, licensees do not need to address areas which do not apply to their activities and activities which have not occurred since the last audit need not be reviewed at the next audit. Licensee's name License No.

Date of This Audit Date of Last Audit Date

(Auditor Signature) Date

(Management Signature) Date

Audit History

A. Last audit of this location conducted on (date)

B. Were previous audits conducted at intervals not to exceed 12 months? [10 CFR 20.1101]

C. Were records of previous audits maintained? [10 CFR 20.2102]

D. Were any deficiencies identified during last two audits or two years, whichever is longer?

E. Were corrective actions taken? (Look for repeated deficiencies).

Organization and Scope of Program

A. If the mailing address or places of use changed, was the license amended?

B. If ownership changed or bankruptcy filed, was NRC prior consent obtained or was NRC notified?

C. Radiation Safety Officer

1. If the RSO was changed, was license amended?
2. Does new RSO meet NRC training requirements?
3. Is RSO fulfilling his/her duties?
4. To whom does RSO report?

D. If the designated contact person for NRC changed, was NRC notified?

E. Sealed Sources and Devices

1. Does the license authorize all of the NRC regulated radionuclides contained in gauges?
2. Are the gauges as described in the Sealed Source and Device (SSD) RegistrationCertificate?
3. Have copies of (or access to) SSD Certificates?
4. Have manufacturers' or distributor*s manuals for operation and maintenance? [10 CFR 32.210]
5. Are the actual uses of gauges consistent with the authorized uses listed on the license?
6. Are the location of the gauges compatible with the "Conditions of Normal Use" and "Limitations and/or Other Considerations of Use" on the SSD Registration Certificates?

Training and Instructions to Workers

A. Were all workers who are likely to exceed 1 mSv (100 mrem) in a year instructed per [10 CFR 19.12]? Refresher training provided, as needed [10 CFR 19.12]? Records

maintained?

B. Did each AU receive training and instruction given at the time of gauge installation or equivalent training and instruction before using gauges?

C. Are training records maintained for each AU?

D. Did individuals who perform non-routine operations receive training before performing these operations?

E. Did interviews with AUs reveal that they know the emergency procedures?

F. Did this audit include observations of AUs using the gauge?

G. Did this audit include observations of workers performing routine cleaning and lubrication on the gauge?

H. HAZMAT training provided, if required? [49 CFR 172.700, 172.701, 172.702, 172.703, 172.704]

Radiation Survey Instruments

A. If the licensee is required to possess a survey meter, does it meet the NRC's criteria? [10 CFR 20.1501]

B. Are calibration records maintained [10 CFR 20.2103(a)]?

Gauge Inventory

A. Is a record kept showing the receipt of each gauge? [10 CFR 30.51(a)(1)]

B. Are all gauges physically inventoried every six months?

C. Are records of inventory results with appropriate information maintained?

Personnel Radiation Protection

A. Are ALARA considerations incorporated into the radiation protection program? [10 CFR 20.1101(b)]

B. Were prospective evaluations performed showing that unmonitored individuals receive #10% of limit? [10 CFR 20.1502(a)]

C. Did unmonitored individuals' activities change during the year which could put them over 10% of limit?

D. If yes to C. above, was a new evaluation performed?

E. Is external dosimetry required (individuals likely to receive >10% of limit,)? And is dosimetry provided to these individuals?

Is the dosimetry supplier NVLAP approved? [10 CFR 20.1501(c)]
Are the dosimeters exchanged monthly for film badges and quarterly for TLD's?
Are dosimetry reports reviewed by the RSO when they are received?
Are the records NRC Forms or equivalent? [10 CFR 20.2104(d), 20.2106(c)]

a. NRC-Form 4 "Cumulative Occupational Exposure History" completed?
b. NRC-Form 5 "Occupational Exposure Record for a Monitoring Period" completed?

2. Declared pregnant worker/embryo/fetus

a. If a worker declared her pregnancy, did licensee comply with [10 CFR 20.1208]?
b. Were records kept of embryo/fetus dose per [10 CFR 20.2106(e)]?

F. Are records of exposures, surveys, monitoring, and evaluations maintained [10 CFR 20.2102,

20.2103, 20.2106]

APPENDIX H

NUREG - 1556, Vol. 4 H-4

Public Dose

A. Is public access to gauges controlled in a manner to keep doses below 1 mSv (100 mrem) in a year? 10 CFR 20.1301(a)(1)]

B. Has a survey or evaluation been performed per 10 CFR 20.1501(a)? Have there been any additions or changes to the storage, security, or use of surrounding areas that would necessitate a new survey or evaluation?

C. Do unrestricted area radiation levels exceed 0.02 mSv (2 mrem) in any one hour? [10 CFR 20.1301(a)(2)]

D. Is gauge access controlled in a manner that would prevent unauthorized use or removal? [10 CFR 20.1801]

E. Records maintained? [10 CFR 20.2103, 20.2107]

Operating and Emergency Procedures

A. Have operating and emergency procedures been developed?

B. Do they contain the required elements?

C. Does each individual working with the gauges have a current copy of the operating and emergency procedures (including lock-out procedures and emergency telephone numbers)?

D. Is a lock-out warning sign posted at each entryway to an area where it is possible to be exposed to the beam?

E. Did any emergencies occur?

1. If so, were they handled properly?

2. Were appropriate corrective actions taken?

3. Was NRC notification or reporting required? [10 CFR 20.2201, 20.2202, 20.2203]

Leak Tests

A. Was each sealed source leak tested every 6 months or at other prescribed intervals?

B. Was the leak test performed according to the license?

C. Are records of results retained with the appropriate information included?

D. Were any sources found leaking and if yes, was NRC notified?

APPENDIX H

H-5 NUREG - 1556, Vol. 4

Maintenance of Gauges

A. Are manufacturer's or distributor*s procedures followed for routine cleaning and lubrication of gauge?

B. Was each on-off mechanism tested for proper operation every 6 months or at other prescribed intervals?

C. Are repair and maintenance of components related to the radiological safety of the gauge performed by the manufacturer, distributor or person specifically authorized by the NRC or an Agreement State and according to license requirements (e.g., extent of work, procedures, dosimetry, survey instrument, compliance with 10 CFR 20.1301 limits)?

D. Are labels, signs, and postings identifying gauges containing radioactive material, radiation areas, and lock-out procedures/warnings clean and legible?

Transportation

(*Note:* This section will not apply if you have not transported gauges during the period covered by this audit.)

A. DOT-7A or other authorized packages used? [49 CFR 173.415, 173.416(b)]

B. Package performance test records on file?

C. Special form sources documentation? [49 CFR 173.476(a)]

D. Package has two labels (ex. Yellow-II) with TI, Nuclide, Activity, and Hazard Class? [49 CFR 172.403, 173.441]

E. Package properly marked? [49 CFR 172.301, 172.304, 172.310, 172.324]

F. Package closed and sealed during transport? [49 CFR 173.475(f)]

G. Shipping papers prepared and used? [49 CFR 172.200(a)]

H. Shipping papers contain proper entries? {Shipping name, Hazard Class, Identification Number (UN Number), Total Quantity, Package Type, Nuclide, RQ, Radioactive Material, Physical and Chemical Form, Activity (SI units required), category of label, TI, Shipper's Name, Certification and Signature, Emergency Response Phone Number, Cargo Aircraft Only (if applicable)} [49 CFR 172.200, 172.201, 172.202, 172.203, 172.204, 172.604]

I. Shipping papers within drivers reach and readily accessible during transport? [49 CFR 177.817(e)].

J. Package secured against movement? [49 CFR 177.834]

K. Placards on vehicle, if needed? [49 CFR 172.504]

L. Proper overpacks, if used? [49 CFR 173.25]

M. Any incidents reported to DOT? [49 CFR 171.15, 171.16]

Auditor's Independent Survey Measurements (If Made)

A. Describe the type, location, and results of measurements. Does any radiation level exceed regulatory limits? [10 CFR 20.1501(a) & 20.1502(a)]

Notification and Reports

A. Was any radioactive material lost or stolen? Were reports made? [10 CFR 20.2201, 30.50]

B. Did any reportable incidents occur? Were reports made? [10 CFR 20.2202, 21.21, 30.34, 30.36, 30.50]

C. Did any overexposures and high radiation levels occur? Reported? [10 CFR 20.2203, 30.50]

D. If any events (as described in items a through c above) did occur, what was root cause? Were corrective actions appropriate?

E. Is the management/RSO/shift foreman licensee aware of telephone number for NRC Emergency Operations Center? [(301) 816-5100]

Posting and Labeling

A. NRC-Form 3 "Notice to Workers" posted? [10 CFR 19.11]

B. NRC regulations, license documents posted or a notice posted? [10 CFR 19.11, 21.6]

C. Other posting and labeling? [10 CFR 20.1902, 20.1904]

Record Keeping for Decommissioning

A. Records kept of information important to decommissioning? [10 CFR 30.35(g)]

B. Records include all information outlined in [10 CFR 30.35(g)]?

Bulletins and Information Notices

A. NRC Bulletins, NRC Information Notices, NMSS Newsletters, received?

B. Appropriate training and action taken in response?

APPENDIX H

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Special License Conditions or Issues

A. Did auditor review special license conditions or other issues (e.g., non-routine operations)?

Deficiencies Identified in Audit; Corrective Actions

A. Summarize problems/deficiencies identified during audit.

B. If problems/deficiencies identified in this audit, describe corrective actions planned or taken. Are corrective actions planned or taken at ALL licensed locations (not just location audited)? Include date(s) when corrective actions are implemented.

C. Provide any other recommendations for improvement.

Evaluation of Other Factors

A. Senior licensee management is appropriately involved with the radiation protection program and/or RSO oversight?

B. RSO has sufficient time to perform his/her radiation safety duties?

C. Licensee has sufficient staff to support the radiation protection program?