

Industrial Radiography
Inspection Checklist

Attachment 2.6-1 Vermont Department of Health Radioactive Materials Program Inspection Checklist		
Industrial Radiography		
Licensee:		License No.:
Licensee Contact:		
Telephone Number:		
Email Address:		
Last Inspection Date:		
Priority:		
Location (Authorized Site):		Inspection Date:
Inspector:		
Inspection Procedure(s) used: 87121, 87137, 86730, 86740, 83822		
<u>Inspection Objectives:</u>		
<ul style="list-style-type: none"> • To determine if licensed activities are being conducted in a manner that will protect the health and safety of workers and the general public. • To determine if licensed activities are being conducted in accordance with Vermont Department of Health regulations. 		
<u>Focus Elements:</u>		
<ol style="list-style-type: none"> 1. Security and Control of Licensed Materials 2. Shielding of Licensed Materials 3. Comprehensive Safety Measures 4. Radiation Dosimetry Programs 5. Radiation Instrumentation and Surveys 6. Radiation Safety Training and Practices 7. Management Oversight and Program Scope 8. Licensed Activities Performed by Contracted Personnel 		
Type of Inspection:		Date of Last Inspection:
<input type="checkbox"/> Announced <input type="checkbox"/> Unannounced <input type="checkbox"/> Initial <input type="checkbox"/> Routine <input type="checkbox"/> Other:		
Amendments and Significant Program Changes (Review from last license renewal)		
Amendment #:	Date:	Amendment Item(s):
Note:		

Industrial Radiography
Inspection Checklist

Program Inspection History	
<p>Is this an initial inspection?</p> <p>List previous open items of violations:</p> <p>Have previous violation(s) been properly corrected? If no, list those items not corrected with an explanation.</p> <p>List previous items of recommendations:</p> <p>Did licensee address previous recommendation(s)? If no, explain.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p>
Organization [Note: Request organization chart]	
<p>Briefly describe licensee organizational structure as it pertains to licensed activities. [L/C]</p>	
<p>Organizational structure meets requirements as identified on license.</p> <p>Radiation Safety Officer (RSO) identified on license. [L/C, 10 CFR 34.13]</p> <p>RSO fulfills his/her duties as required. [L/C, 10 CFR 34.42]</p> <p>To whom in the organization does the RSO report? _____</p> <p>The RSO has sufficient access to licensee's senior management?</p> <p>Has there been a change in RSO? If yes, was the license amended?</p> <p>Does the new RSO meet the Department's training requirements?</p> <p>Has there been a change in the licensee contact person for the Department?</p> <p>Note: Confirm through discussions with management and licensee personnel whether changes have occurred in the licensee ownership, or in the RSO's authority or duties, that may impact the RSO's ability to safely conduct the licensee's radiation protection program.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>

Industrial Radiography
Inspection Checklist

<p>Audit records were reviewed by Department inspector.</p> <p>Performance Evaluation Factors (PEF)</p> <p>Note: PEF evaluations are best accomplished by interviewing management, RSO, ANPs, AUs, and other licensee personnel.</p> <p>Senior management is involved with radiation safety program and RSO oversight.</p> <p>The RSO has sufficient time to perform his/her radiation safety duties.</p> <p>The licensee has sufficient staffing to support its activities and radiation protection programs.</p> <p>Adequate audits are being implemented.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
Personnel Observations	
<p>List individuals interviewed at temporary jobsites during the inspection.</p> <p style="margin-left: 40px;">Individual 1: Individual 2: Individual 3: Individual 4:</p> <p>Radiographer is accompanied by an additional radiographer or radiographer's assistant per 10 CFR 34.41(a) & NUREG-1556 Volume 2, Section 8.10.9.3. [Note: Two-man rule]</p> <p>The additional person is available to give immediate assistance.</p> <p>The additional person directly observes radiographic operations.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
Personnel Monitoring	
<p>The licensee may not permit any individual to act as a radiographer or radiographer's assistant unless, at all times during radiographic operations, each individual wears on the trunk of the body, a direct reading dosimeter, an operating alarm ratemeter, and a personnel dosimeter that is processed and evaluated by an accredited National Voluntary Laboratory Accreditation Program (NVLAP) processor. At permanent radiography installations where other appropriate alarming or warning devices are in routine use, the wearing of an alarming ratemeter is not required. [10 CFR 34.47]</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>Pocket dosimeters must have a range from zero to 2 mSv (200 mR) and must be recharged at the start of each shift. Electronic personnel dosimeters may only be used in place of ion-chamber pocket dosimeters. Each personnel dosimeter must be assigned to and worn only by one individual. [10 CFR 34.47]</p> <p>Film badges must be replaced at periods not to exceed one month and other personnel dosimeters processed and evaluated by an accredited NVLAP processor must be replaced at periods not to exceed three months. After replacement, each personnel dosimeter must be processed as soon as possible. [10 CFR 34.47]</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>

Industrial Radiography
Inspection Checklist

<p>Direct reading dosimeters such as pocket dosimeters or electronic personnel dosimeters, must be read and the exposures recorded at the beginning and end of each shift, and records must be maintained in accordance with 10 CFR 34.83.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Pocket dosimeters, or electronic personnel dosimeters, must be checked at periods not to exceed 12 months for correct response to radiation and records must be maintained in accordance with 10 CFR 34.83. Acceptable dosimeters must read within plus or minus 20 percent of the true radiation exposure.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>If an individual's pocket chamber is found to be off-scale, or if his or her electronic personnel dosimeter reads greater than 2 mSv (200 mR), and the possibility of radiation exposure cannot be ruled out as the cause, the individual's personnel dosimeter must be sent for processing within 24 hours. In addition, the individual may not resume work associated with licensed material use until a determination of the individual's radiation exposure has been made. This determination must be made by the RSO or the RSO's designee. The results of this determination must be included in the records maintained in accordance with 10 CFR 34.83.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>If the personnel dosimeter is lost or damaged, the worker shall cease work immediately until a replacement personnel dosimeter meeting the requirements in paragraph (a) is provided and the exposure is calculated for the time period from issuance to loss or damage of the personnel dosimeter. The results of the calculated exposure and the time period for which the personnel dosimeter was lost or damaged must be included in the records maintained in accordance with 10 CFR 34.83.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Dosimetry reports received from the accredited NVLAP personnel dosimeter processor must be retained until the Vermont Department of Health terminates the license.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Each alarm ratemeter must:</p>	
<p style="padding-left: 40px;">Be checked to ensure that the alarm functions properly (sounds) before using at the start of each shift;</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p style="padding-left: 40px;">Be set to give an alarm signal at a preset dose rate of 5 mSv/hr (500 mrem/hr), with an accuracy of plus or minus 20 percent of the true radiation dose rate;</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p style="padding-left: 40px;">Require special means to change the preset alarm function; and</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Be calibrated at periods not to exceed 12 months for correct response to radiation. The licensee shall maintain records of alarm ratemeter calibrations in accordance with 10 CFR 34.83.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Monitoring reports reviewed by licensee [L/C]:</p> <p style="padding-left: 40px;"> <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/> Annually </p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Licensee provides all workers a written report of their annual radiation exposure per 10 CFR 19.13 & 10 CFR 20.2106.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No

Industrial Radiography Inspection Checklist

Are these records maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Upon request of employee after termination of employment, worker's exposure records are provided within 30 days per 10 CFR 19.13 .	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bioassays performed as required by the license. [L/C]	<input type="checkbox"/> Yes <input type="checkbox"/> No
The specific information used to calculate the internal radiation exposure under 10 CFR 20.1204 is maintained for the duration of the license. [10 CFR 20.2106]	<input type="checkbox"/> Yes <input type="checkbox"/> No
Dose evaluations or surveys of unrestricted areas are performed and documented to ensure public dose does not exceed 2 mrem in any one hour or 100 mrem in one year.	<input type="checkbox"/> Yes <input type="checkbox"/> No
The specific information used to assess the dose to individual members of the public is maintained for the duration of the license. [10 CFR 20.1301 Subpart D]	<input type="checkbox"/> Yes <input type="checkbox"/> No

Materials and Equipment

List the sources:

No	Rec Date	MFR	Isotope	Model #	S/N	Activity (Ci)	Activity Date	Disp/Transfer Date
1								
2								
3								
4								

Note: Use additional supplementary inventory sheet if needed.

Request a copy of the most recent inventory from licensee.

Match the source number(s) with the camera number(s) below.

List the cameras/source changers:

No	MFR	Model #	S/N	Notes
1				
2				
3				
4				

Radiographic Equipment Performance Requirements

Each device has a visible label attached containing the following information per **10 CFR 34.20 Subpart C § (b)(1)(i-v)**:

Chemical symbol and mass number of radionuclides in the device.

Yes No

Activity and date for last measurement of source activity.

Yes No

Model or product code and serial number of the sealed source.

Yes No

Industrial Radiography
Inspection Checklist

Name of the sealed source manufacturer.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Licensee's name, addresses, and telephone number.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Radiation symbol and the words "Caution, Radioactive Material." [10 CFR 20.1904(a)]	<input type="checkbox"/> Yes <input type="checkbox"/> No
The radiographic exposure devices, source assemblies, and associated equipment that allow the source to be moved out of the device meets the following requirements of 10 CFR 34.20 Subpart C § (c)(1-3) :	
The device must automatically secure the source assembly when it is cranked back into the fully shielded position within the device.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Guide tubes are used when moving the source out of the device.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Collimators are used in all portable radiographic operations per 10 CFR 34.20 . [Note: except when physically impossible.]	<input type="checkbox"/> Yes <input type="checkbox"/> No
Any equipment problems identified by the licensee per 10 CFR 34.31 ?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, has equipment been removed from service until repaired?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Storage Container Safety Requirements	
The exposure device has a lock or container has a lock per 10 CFR 34.23 .	<input type="checkbox"/> Yes <input type="checkbox"/> No
The storage container is locked except when in direct visual surveillance of radiographer or radiographer's assistant per 10 CFR 34.23 .	<input type="checkbox"/> Yes <input type="checkbox"/> No
Radiation Surveys	
Conduct surveys with a calibrated and operable radiation survey instrument that meets the requirements of 10 CFR 34.25 .	<input type="checkbox"/> Yes <input type="checkbox"/> No
Surveys are conducted on device and guide tube after each exposure when approaching the device to ensure the source has returned to its shielded position per 10 CFR 34.49 .	<input type="checkbox"/> Yes <input type="checkbox"/> No
Surveys are conducted on device(s) prior to placing the device in storage, or when the source is exchanged, to ensure the source is in the shielded position per 10 CFR 34.49(c) .	<input type="checkbox"/> Yes <input type="checkbox"/> No
Independent Survey Measurements by the Department Inspector	
Independent confirmatory surveys performed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Inspector survey instrument used: Mfg./Make: Model #: Serial #: Last calibration date:	
Licensee survey instrument(s): Mfg./Make: Model #: Serial #:	

Industrial Radiography
Inspection Checklist

Last calibration date:	
<p>Describe inspector instrument readings as compared to licensee instrument readings.</p> <p>Highest radiation levels for following areas: Unrestricted area when exposed: _____ mR/hr Note: Include floor/ceiling if applicable. External surface of device when shielded: _____ mR/hr 1 meter from device when shielded: _____ mR/hr Other locations surveyed:</p> <p>Radiation levels in all unrestricted areas less than 2 mR in any one hour and resulting non-occupational personnel exposure less than 100 mR/year, per 10 CFR 20.1301(a)(2).</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
Posting	
<p>Posting required per 10 CFR 20.1902 in each applicable area:</p> <p>“Caution, Radioactive Material” signs posted per 10 CFR 20.1902.</p> <p>“Caution, Radiation Area” (5 mrem in 1 hour @ 30 cm) per 10 CFR 20.1003. Note: Can be posted at the restricted area line (2 mrem/hr).</p> <p>“Caution/Danger, High Radiation Area” (100 mrem in 1 hour @ 30 cm) per 10 CFR 20.1003.</p> <p>“Very High Radiation Area” (500 rem in 1 hour @ 1 meter) per 10 CFR 20.1602.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
Documents and Records	
<p>The following is available at the jobsite per 10 CFR 34 Subparts D & E:</p> <p>License.</p> <p>Copy of 10 CFR 34, Part 20 and Department Form 3.</p> <p>Utilization log.</p> <p>Daily equipment check log.</p> <p>Dosimeter reading log.</p> <p>Operating and emergency procedures.</p> <p>Latest survey instrument calibration record.</p> <p>Alarming ratemeter calibration.</p> <p>Shipping paperwork, which includes:</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Material description: Description entered first or in a separate color.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No

Industrial Radiography
Inspection Checklist

The words "Radioactive Material."	<input type="checkbox"/> Yes <input type="checkbox"/> No
Name of radionuclide.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Description of physical form.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Activity of radionuclide.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Category of label applied to package.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Transport index assigned to package.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Name of shipper.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Emergency response telephone number.	<input type="checkbox"/> Yes <input type="checkbox"/> No
A copy of applicable state or NRC license when operating under reciprocity.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Transportation of Radioactive Materials

Package/container is blocked and braced during transfer per 49 CFR 177.842 .	<input type="checkbox"/> Yes <input type="checkbox"/> No
Vehicle is prominently labeled on both sides with licensee's name and city/town of main business office per 10 CFR 71.5 & NUREG-1556 Volume 2 § 8.10.9.6 .	<input type="checkbox"/> Yes <input type="checkbox"/> No
Proper shipping name and identification number is marked on package per 49 CFR 172.301(a) .	<input type="checkbox"/> Yes <input type="checkbox"/> No
Package is labeled properly per 49 CFR 172.403 .	<input type="checkbox"/> Yes <input type="checkbox"/> No
Package is marked properly per 49 CFR 172.310(b) with shipping name, identification number, and "Type B."	<input type="checkbox"/> Yes <input type="checkbox"/> No
For packages greater than 110 pounds the gross weight is marked on outside of package per 10 CFR 172.310(a) .	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
For shipments utilizing overpacks, the overpack is marked with the following per 49 CFR 173.25 :	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
(1) Proper shipping name and identification number.	<input type="checkbox"/> Yes <input type="checkbox"/> No
(2) A statement indicating that the inside (inner) package complies with specification markings (i.e. shipping name and number, "Type B," and gross weight as necessary.)	<input type="checkbox"/> Yes <input type="checkbox"/> No
For shipments utilizing overpacks, the overpack must bear the applicable label per 49 CFR 173.448 .	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
For packages shipped Yellow-III, the vehicle is placarded per 49 CFR 172.500 .	<input type="checkbox"/> Yes <input type="checkbox"/> No
The shipping paperwork is readily accessible during transportation. [49 CFR 177.81(e)]	<input type="checkbox"/> Yes <input type="checkbox"/> No

Industrial Radiography
Inspection Checklist

Equipment and Instrumentation
Criteria: Licensee possesses and uses appropriate, operable, and calibrated equipment and follows procedures. Observations and Findings:
Surveys and Contamination Control
Criteria: Licensee performs appropriate surveys, air monitoring, wipes, and leak tests, and results are available for review. Licensee uses proper protective attire. Conduct interviews or observations to ensure compatibility and perform independent measurements to confirm. Observations and Findings:
Training and Instruction to Workers
Criteria: Training and retraining requirements and documentation; interviews and observations of routine work; staff knowledge of all routine activities; 10 CFR 19.12 and 10 CFR Part 20 requirements; emergency situations; and supervision by authorized users. Observations and Findings:
Waste Management
Criteria: Disposal of material is per license and records are available for review. Disposal; effluent pathways and control; storage areas; transfer; packaging, control, and tracking procedures; equipment; incinerators; hoods, vents, and compactors; license conditions for special disposal method. Observations and Findings:
Decommissioning
Criteria: Records are available. Observations and Findings:

Industrial Radiography
Inspection Checklist

Notifications and Reports	
<p>Criteria: Have any thefts, losses, incidents, or overexposures occurred and have they been reported to the Department?</p> <p>Observations and Findings:</p>	
License Conditions/Tie-downs	
License conditions reviewed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Licensee activities conducted in accordance with license conditions/tie-downs.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Information Notices	
Licensee is receiving information notices. [Note: Inspector will provide copies if the licensee has not received them.]	<input type="checkbox"/> Yes <input type="checkbox"/> No
Licensee has taken appropriate action in response to the notices.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Security Inspection	
<p>On-site Security Review: If this licensee is authorized for possession of material equal to or exceeding the Category 2 threshold, complete an on-site security review per 10 CFR 37.43.</p> <p>If yes,</p> <p>Licensee Contact Name:</p> <p>Contact Telephone Number:</p> <p>Contact Email Address:</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Summary of Observations, Findings, and Conclusions	
<p>Business Operations:</p> <p>Facility – Visit all storage and use locations identified on the application.</p> <p>Radiation Safety Operations.</p> <p>Personnel.</p> <p>Overall Assessment</p> <p>Note: If there is not sufficient information to conclude that licensed material will be used as specified on the license, immediately notify Department supervision.</p>	

Industrial Radiography
Inspection Checklist

Exit Meeting at Conclusion of Inspection
Identify and list the individuals in attendance.
Date Meeting Conducted:
List those issues discussed at the exit meeting.
Summary of Violations and Recommendations