Canadian Radiography Industry Performance - A Regulatory Perspective

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Directorate of Nuclear Substance Regulation
The Canadian Nuclear Safety Commission (CNSC):

“protects the health, safety and security of persons and the environment, and implements Canada's international commitments on the peaceful use of nuclear energy”
Licensees responsible for: the protection of health, safety, security, and the environment, and respecting Canada’s international commitments.

Exposure Device Operators: work safely and meet regulatory expectations.

CNSC responsible for: regulating licensees, assessing whether licensees are compliant with the NSCA, regulations, and international obligations.
Nuclear Regulations

1. General Nuclear Safety & Control (GN)
2. Nuclear Substances & Radiation Devices (NSRD)
3. Radiation Protection (RP)
4. Packaging & Transport of Nuclear Substances (PTNS)
5. Nuclear Security Regulation (NSR)
CNSC Compliance Program

Promotion
encourages voluntary compliance with regulatory requirements

Verification
assess actual level of compliance:
Annual Compliance Report
Type I & Type II inspections

Enforcement
graduated approach
Verification: Inspections

Type II Inspections - Snapshot of Compliance at the location

Type I Inspections
Onsite audit of licensee’s programs, processes and practices

Planned vs Unannounced

Performance versus Records

Use Worksheet Approach
Verification: Type II Inspections

Based on safety and control area (SCA):

- Radiation protection
- Training and qualification
- Operational procedures
- Packaging and transport
- Security
DNSR Regional Offices
OID Inspectors 2013 - 14
Inspection Worksheets Are Risk-Based

Each regulatory requirement is ranked by the impact of its non-compliance.

- **High Risk**  Immediate health, safety, or security issue
- **Medium Risk**  Potential health, safety or security issue
- **Low Risk**  No health, safety or security issues  
  (generally administrative issues)
## Risk Ranking Use Types

<table>
<thead>
<tr>
<th>High Risk</th>
<th>Medium Risk</th>
<th>Low Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Industrial Radiography</td>
<td>• Portable gauges</td>
<td>• XRF Analyzers</td>
</tr>
<tr>
<td>• Logging</td>
<td>• Consolidated</td>
<td>• Electron capture detectors</td>
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<tr>
<td>• Subsurface zone (frac tracer)</td>
<td>• Laboratory studies</td>
<td>• Static Eliminators</td>
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<tr>
<td></td>
<td>• Fixed gauges (<em>increased inspection frequency</em>)</td>
<td>• Low risk sealed sources</td>
</tr>
<tr>
<td></td>
<td>• Distribution</td>
<td></td>
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<tr>
<td></td>
<td>• Self Shielded irradiators (<em>security</em>)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Diagnostic/ therapeutic nuclear medicine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Veterinary nuclear medicine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Servicing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Processing</td>
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Grading System

Purpose of grading:

- To communicate performance in a consistent transparent manner
- To allow trend analysis of individual licence performance
- To monitor performance of
  - Licence use-types
  - CNSC’s regulatory program
Grading System - Example only

A- Licensee **exceeds** compliance requirements = Fully Satisfactory
   Ex: Regulations require one functional survey meter; licensee has a functional meter in each lab.

B- Licensee **meets** compliance requirements = Satisfactory
   Ex: Regulations require one functional survey meter; licensee has one functional survey meter.

C- Licensee **below** compliance requirements = Below Expectations
   Ex: Regulations require one functional survey meter; licensee has one un-calibrated survey meter.

D- Licensee **significantly below** compliance requirements = Unacceptable
   Ex: Regulations require one functional survey meter; licensee does not have a survey meter.

E- Breakdown or loss of control = Unacceptable
   Ex: Breakdown of RP program and Immediate risk to health & safety
Operator Obligations

- Use a radiation survey meter while performing radiography
- Wear a dosimeter and record dose received
- Have required equipment on hand so as to operate an exposure device safely
Operator Obligations

• Take necessary steps to transfer and store an exposure device safely
• Follow operational procedures that insure the safe operation of an exposure device
Compliance Inspections Performed 2008-2013
## Compliance Performance 2013

<table>
<thead>
<tr>
<th>Usetypes</th>
<th>Radiation Protection</th>
<th>Emergencies / Unplanned Events</th>
<th>Training</th>
<th>Operational Procedures</th>
<th>Organization and Management</th>
<th>Security</th>
<th>Packaging and Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>811</strong> Portable Gauges</td>
<td>89 ↔ 90</td>
<td>82 ↔ 83</td>
<td>95 ↔ 96</td>
<td>90 ↔ 87</td>
<td>97 ↔ 96</td>
<td>97 ↔ 97</td>
<td>60 → 60</td>
</tr>
<tr>
<td><strong>812</strong> Industrial Radiography</td>
<td>83 ↑ 89</td>
<td>92 ↔ 93</td>
<td>93 ↔ 96</td>
<td>89 ↔ 91</td>
<td>95 ↔ 94</td>
<td>84 ↔ 83</td>
<td>82 → 84</td>
</tr>
<tr>
<td><strong>814</strong> Fixed Gauges</td>
<td>83 ↓ 76</td>
<td>87 ↓ 80</td>
<td>94 ↓ 87</td>
<td>85 ↔ 81</td>
<td>86 ↔ 88</td>
<td>96 ↔ 99</td>
<td>88 ↓ 75</td>
</tr>
<tr>
<td><strong>816</strong> Sealed Source Logging</td>
<td>83 ↑ 96</td>
<td>97 ↔ 96</td>
<td>97 ↔ 98</td>
<td>83 ↑ 91</td>
<td>97 ↔ 100</td>
<td>78 ↑ 89</td>
<td>69 ↑ 76</td>
</tr>
<tr>
<td><strong>822</strong> Basic Servicing</td>
<td>88 ↑ 93</td>
<td>91 ↑ 100</td>
<td>98 ↑ 98</td>
<td>71 ↑ 93</td>
<td>90 ↑ 96</td>
<td>95 ↑ 100</td>
<td>91 → 89</td>
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Industrial Radiography Non-Compliances

- **Radiation Protection**
  - Obligations of CEDOs are not complied with (ex. - Posting of signs/barriers, functioning emergency equipment, doses limited to non-NEWs)
  - Inadequate RP program/management oversight

- **Packaging and Transport**
  - Transport document contains incorrect information, or not signed/dated for each date of transport
  - Four Class 7 placards not displayed on vehicle

- **Security**
  - Security Plans not up-to-date or followed
  - Non-functional darkroom truck alarm
Enforcement Actions Taken

- Inspector Orders issued to Companies (Five in 2013)
- Decertification of Operator (Two in 2013)
- Administrative Monetary Penalties Issued (Companies Two) (One to a CEDO)
Decertification

• Seven recommendations for decertification were presented for consideration. Serious violations such as: *failure* to use a survey meter, *failure* to supervise a trainee, post signs/barriers, wear dosimetry or *overexposure* to a member of the public.

• In two cases the radiographers were *decertified*. In the other cases alternate action by the licensee and the radiographer was accepted.
Industrial Radiography - 37 Events in 2013

- Barrier breach that was near miss with low dose 14
- Source retrieval    7
- Barrier breach with significant dose to public 1
- Improper device operation due to dirt/ice 4
- Dropped device 3
- Dropped dosimeter badge 3
- Improper procedure 1
- Lost device 1
- Transport (MVA) 3
Industrial Radiography - Events

Source Retrievals

- Didn’t fully retract source 1
- Improper connection of guide tube 2
- Tripod/stand fell on guide tube 2
- Failure to connect source assembly 1
- Possible mechanical failure 1
Moving Forward

- CNSC/Industry Working Group
  - open communication
- annual meetings with industry
- promote safety culture
- update certification requirements
- focused regulatory oversight
The CNSC Will Not Compromise Safety!

Visit our Web site www.nuclearsafety.gc.ca