Irradiator Technology (H-315)

Course Schedule & Content

DAY 1

Session 1  Introduction

9:00 - 10:15  . Welcome
              . Preliminary tour of IR-147

10:15 - 10:30  COFFEE BREAK

Session 2  Industrial Irradiators

10:30 – 11:30  . Types
               . Components
               . Design principles
               . Touchtime
               . PLC

Session 3  Research Irradiators

11:30 - 12:00  . Types
                . Design

12:00-13:00  LUNCH

Session 3  Research Irradiators (continued)

13:00 – 13:30  . Use
                . Inspections (hands-on)

Session 4  Cobalt-60

13:30 - 14:30  . Cobalt-59
                . Production of Co-60
                . Transportation of Co-60
                . Handling of Co-60
**DAY 1 (continued)**

Session 5  Source Loading

14:30 - 15:15  
. What every operator should know
. Handling tools
. Typical loading
. Source loading procedure

15:15 - 15:30  **COFFEE BREAK**

Session 6  Safety Systems & Features

15:30 - 17:00  
Personnel protection
Equipment protection
Product protection
### DAY 2

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<thead>
<tr>
<th>Session 6</th>
<th>Safety Systems &amp; Features</th>
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<tr>
<td>9:00 - 9:30</td>
<td>Less important faults &amp; cautions</td>
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<tr>
<th>Session 7</th>
<th>Operation of Industrial Irradiators</th>
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| 9:30 -10:00 | Start-up procedure, Warning signs  
Operating modes, PLC |

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<th>10:00 - 10:30</th>
<th>COFFEE BREAK</th>
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<th>Session 8</th>
<th>Walk-through Inspection (hands-on)</th>
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<td>11:00- 12:00</td>
<td>A complete safety inspection is performed</td>
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<tr>
<th>Session 9</th>
<th>Irradiator Maintenance</th>
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| 14:00 - 15:15 | . Control room organization  
. Equipment maintenance  
. Electrical/ Mechanical  
. Safety checks |

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<th>15:15 - 15:30</th>
<th>COFFEE BREAK</th>
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<tr>
<th>Session 10</th>
<th>Process control &amp; Validation</th>
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| 15:30 - 17:00 | . Standard Operating Procedures  
. Following product from receiving to shipping |
DAY 3

08:00  Leave Laval for Kanata

**Session 11**  **Tour of a cobalt-60 production facility**

All day  . Storage pool
. Hot cells
. Encapsulation
. Leak testing
. F-168 container
. Transportation

12:00 - 13:30  **LUNCH**

**Session 12**  **Tour of a Molybdenum 90 Production Facility**

13:30 – 15:00  . Guided tour of the MDS Nordion Molybdenum 90 production facility

15:00 – 18:00  . Return to Laval
**DAY 4**

**Session 13**  
Dosimetry (hands-on)

9:00 - 10:00  
- Types of dosimeters  
- Characteristics  
- Reading equipment

10:00 - 10:15  
COFFEE BREAK

**Session 14**  
Emergency Procedures

10:15 – 11:15  
- Procedures as required by 10CFR36

**Session 15**  
Wipe test (video)

11:15 – 11:30  
- How a source rack wipe test is performed

**Session 16**  
Radiation Safety Officer and Operator responsibilities

11:30 – 12:00  
- Maintenance records  
- Irradiation log book  
- Visitor records

12:00 - 13:15  
LUNCH

**Session 17**  
Radiation Survey (hands-on)

13:15 - 13:45  
- A radiation survey of biological shield is performed

**Session 18**  
Incidents

13:45 - 14:30  
- Incidents at irradiation facilities

14:30 - 15:00  
COFFEE BREAK
**DAY 4 (continued)**

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<tr>
<th>Session 19</th>
<th>Introduction Regulatory Licensing &amp; Inspections (NRC instructor)</th>
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<tr>
<td>15:00 – 17:00</td>
<td>. Introduction</td>
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<td>. Inspection Checklists</td>
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<td>. Self-shielded irradiator safety</td>
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<td>. Increased controls inspections</td>
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<td>. Panoramic irradiator safety</td>
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**DAY 5**

**Session 22**  
Review  
9:00 – 10:00  
Questions & Discussion

**Session 23**  
Examination  
10:30 - 12:15  
Written test

**References:**  
Inspection Checklists for:  
NSTS  
Panoramic Irradiator  
Self-Shielded Irradiator  
IC

**Instructors Cv's**

**Note:**  
All hands-on exercises are carried out using a full scale commercial irradiator and two research irradiators.