Changes to Regulatory Requirements for Low Level Radioactive Waste Incineration at Fuel Facilities in Canada

Workshop on Fuel Cycle Safety
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OUTLINE

• CNSC’s background, history, mandate and structure

• Incinerator regulation in Canada

• Compliance program

• Conclusions
THE CNSC’s MANDATE

“To regulate the development, production and use of nuclear energy, nuclear substances, prescribed equipment, and prescribed information in order to:

• Prevent unreasonable risk to the environment and to the health and safety of persons;
• Prevent unreasonable risk to national security; and
• Achieve conformity with measures of control and international obligations to which Canada has agreed.”
REGULATORY BODIES

Federal Authorities:
- Environment Canada
- Human Resources and Social Development Canada (HRSDC)

Provincial Authorities:
- Ministry of Environment, Ontario

Canadian ‘Acts of Parliament’ required to provide a means for the legal structure to be initiated and enforced.
INCINERATION

Incineration:
Decomposition via thermal oxidation at high temperature to destroy organic waste.

May produce residuals in the ash or emit trace amounts of unburned hazardous waste, incomplete by-products, metals and particulates.
CNSC CHANGE PROCESS

- Pre-consultation with licensees and public
- Policy decision
- Promotion workshops
- Validation of licensee understanding at site
- Compliance inspections
- Verification / enforcement as needed
REGULATORY CHANGE PROCESS

• 2002, 2003 tighter environmental limits targeted by Environment Canada

• Ontario’s Ministry of Environment elected to set provincial limits more stringent to be consistent (Guidelines A-7 and A-8 introduced in 2004)

• Objective: transparent regulatory regime avoiding duplication
REGULATORY CHANGE PROCESS (cont’d)

• Timeframe:
  • 2002 / 2003 regulatory decision to change incinerator emission limit
  • 2004 Guidelines issued with effective date
  • 2005 / 2006 / 2007 site licences amended
    • Environmental assessment, approval of site changes
  • January 1, 2007: regulatory enforcement date
REGULATORY CHANGE PROCESS (cont’d)

• Two facilities licensed by Processing and Research Facilities Division of CNSC for low level waste incineration prior to 2007.

• One incinerator shutdown, the second modernized.

• New Canada-wide Regulations now in effect.
### EFFECTIVE INCINERATOR LIMITS
**JANUARY 01, 2007**

- **Table 1: List of Contaminants and Emission Limits by the January 2007**

- **Contaminant New Emission Limit**

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>New Emission Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate Matter</td>
<td>17 mg/Rm³</td>
</tr>
<tr>
<td>Cadmium</td>
<td>14 ug/Rm³</td>
</tr>
<tr>
<td>Lead</td>
<td>142 ug/Rm³</td>
</tr>
<tr>
<td>Mercury</td>
<td>20 ug/Rm³</td>
</tr>
<tr>
<td>Dioxins and Furans</td>
<td>80 pg/Rm³ as ITEQ</td>
</tr>
<tr>
<td>Hydrochloric Acid</td>
<td>18 ppmv (27 mg/Rm³)</td>
</tr>
<tr>
<td>Sulphur Dioxide</td>
<td>21 ppmv (56 mg/Rm³)</td>
</tr>
<tr>
<td>Nitrogen Oxides</td>
<td>110 ppmv</td>
</tr>
<tr>
<td>Organic Matter</td>
<td>100 ppmv undiluted (expressed as equivalent methane)</td>
</tr>
</tbody>
</table>
REGULATORY CHANGE PROCESS

• Plan is to re-start the uranium refining facility incinerator in October – November 2007.

• Validation testing to follow start up and commissioning.
INCINERATOR MODERNIZATION

• Re-engineered fuel firing system
• Temperature reduction system for safe handling of hot fuel gases
• Flue gas scrubbing system for gaseous pollutants
• Flue gas filtering system for particulate matter
• Volatile organic compounds emissions scrubbing
• Dust collection system for fly ash emission
• Continuous stack emission monitoring
INCINERATOR MODERNIZATION

• Final Verification

• Single source testing by independent, qualified testing organization.
• Ministry of Environment, Ontario – to observe
• CNSC – to observe and / or review results.

• Final authorization granted on satisfactory compliance of commissioning test.
Questions?

www.nuclearsafety.gc.ca