Issues Resolution
Roadmap for Metals and Controls Corporation

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To the Advisory Board on Radiation and Worker Health’s Work Group on Metals and Controls Corporation

April 13, 2020
Goals of Roadmap

- Summarize main exposure pathways
- Attempt to group findings, observations, concerns, and issues into exposure scenarios
- Summarize status of all findings, observations, concerns, and issues
- Make recommendations on paths forward
Exposures Scenarios

Building 10 Exposures
- Subsurface and Pipes
- HVAC Maintenance
- Roof and Overhead
- Welding

Non-Building 10 Exposure Scenarios
- Below Ground Outdoor
- Above Ground Outdoor
- Waste Water

Overarching Issues
- External
- Substitute Data
- Thorium
Building 10 subsurface and pipes

Comparison of Building 10 subsurface and pipes model parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SC&amp;A</th>
<th>NIOSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contamination level</td>
<td>95th percentile (ordered data calculated 5,878.1 pCi/g)</td>
<td>95th percentile (lognormal calculated 6,887.84 pCi/g)</td>
</tr>
<tr>
<td>Dust loading</td>
<td>200 μg/m³</td>
<td>220 μg/m³</td>
</tr>
<tr>
<td>Breathing rate</td>
<td>2.5 m³/hr</td>
<td>1.2 m³/hr</td>
</tr>
<tr>
<td>Exposure duration</td>
<td>2 months</td>
<td>2 months</td>
</tr>
<tr>
<td>U inhalation rate</td>
<td>40 Bq/yr</td>
<td>Not provided</td>
</tr>
</tbody>
</table>

- Although there are differences in assumptions, SC&A believes that both sets of assumptions are scientifically sound and claimant favorable
- SC&A recommendation: Close
Building 10 HVAC maintenance

Comparison of Building 10 HVAC maintenance model parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SC&amp;A</th>
<th>NIOSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific activity (gross alpha)</td>
<td>1.23E-4 dpm/µg</td>
<td>1.23E-4 dpm/µg</td>
</tr>
<tr>
<td>Dust loading</td>
<td>100 mg/m³</td>
<td>100 mg/m³</td>
</tr>
<tr>
<td>Breathing rate</td>
<td>1.2 m³/m³</td>
<td>1.2 m³/m³</td>
</tr>
<tr>
<td>Dose rate</td>
<td>1.77 mrem/hr</td>
<td>1.7 mrem/hr</td>
</tr>
</tbody>
</table>

▶ In the NIOSH white paper dated October 24, 2018, NIOSH fully accepted SC&A’s assessment and conclusions regarding the internal exposures HVAC exposure scenario

▶ SC&A recommendation: Close
Building 10 roof and overhead

Comparison of Building 10 roof and overhead model parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SC&amp;A</th>
<th>NIOSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removable surface contamination (gross alpha)</td>
<td>11.7 dpm/100 cm²</td>
<td>8.99 dpm/100 cm²</td>
</tr>
<tr>
<td>Resuspension factor</td>
<td>100 1E-4/m</td>
<td>100 1E-4/m</td>
</tr>
</tbody>
</table>

- Differences in how zeros are treated account for the majority of the difference in tabulated values
- SC&A found that the NIOSH approach was scientifically sound and claimant favorable
- SC&A recommendation: Close
Building 10 welding work

- SC&A is currently drafting a response regarding thorium and welding
- SC&A recommendation: Remain In Progress
Outdoor above ground external exposures

- SC&A calculated annual effective dose of 5.32 mrem
- Lower than monthly dose derived by NIOSH via dosimetry
- SC&A recommendation: Close
Outdoor below ground external exposures

- SC&A calculated an annual effective dose of 2.08 mrem (assuming 200 hr/yr occupancy)
- Lower than monthly dose derived by NIOSH via dosimetry
- SC&A recommendation: Close
Waste water treatment exposures

- SC&A evaluated scenario raised by worker interview
- Doses were found to be negligible
- SC&A recommendation: Close
External exposures

- NIOSH retooled their approach in the September 12, 2018, M&C SEC issues matrix
  - beta skin dose of 12 mrem/month
  - penetrating dose of 4 mrem/month

- SC&A calculates:

<table>
<thead>
<tr>
<th>Column</th>
<th>Standing on contaminated slab</th>
<th>Subsurface environment in Building 10</th>
<th>HVAC maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta skin dose</td>
<td>&lt;1 mrem/month</td>
<td>32.5 mrem/month</td>
<td>&lt;1 mrem/month</td>
</tr>
<tr>
<td>Penetrating dose</td>
<td>&lt;1 mrem/month</td>
<td>12.75 mrem/month</td>
<td>&lt;1 mrem/month</td>
</tr>
</tbody>
</table>

- SC&A has remaining concerns about the applicability of the 1967 data to the residual period; however, SC&A finds the NIOSH calculation to be bounding
Many concerns have been raised regarding the applicability of survey data from the 1980s and 1990s to represent earlier parts of the residual period.

The NRC concluded no significant differences were observed between the data collected at the termination of AWE operations and the data collected in the NRC 1983 surveys.

The NRC made a similar statement that the 1983 data compare well with the data collected in the 1990s.
Thorium exposures

- SC&A is currently drafting a response regarding thorium and welding
- SC&A recommendation: Remain In Progress
Questions?