GENERAL ICE FORMATION REMOVAL

Date Developed: January 29, 2009    Revision Date: April 21, 2011
Last Reviewed on: April 21, 2009

Document Owner: Director, Environment, Health & Safety
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Scope
This procedure provides instruction for removal of ‘simple’ and ‘complex’ ice formations.

Precautions
The table below lists common potential job hazards and the precautions that should be taken for reasons of safety, the environment, quality, ergonomics and best management practices, before beginning the ice removal process.

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Precaution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falling ice contacting either the person executing the removal of icicles or people who may be in the vicinity of the ice removal operation</td>
<td>Do not position yourself in the line of fire. Falling ice can splinter and fly in many directions. Ensure adequate eye protection such as a face shield is worn. Before executing any ice removal ensure that any potential property / equipment damage that may occur from the icicle removal (falling ice) is identified and steps are taken to protect against property damage.</td>
</tr>
<tr>
<td>Loose ice “riding” the extension pole and contacting the person removing the icicles.</td>
<td>There is an inherent hazard of using poles to remove icicles from below as the icicle can break free, fall onto the pole and slide down the pole toward the user. Identification and mitigation of this hazard needs to be included in the pre-job planning.</td>
</tr>
</tbody>
</table>

Tools and Equipment

<table>
<thead>
<tr>
<th>Tools and/or Equipment</th>
<th>Use (if explanation is needed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension pole (Preferably telescopic and non-conductive)</td>
<td>Used to knock ‘simple’ ice formations free.</td>
</tr>
<tr>
<td>Aerial Lift</td>
<td>Used to position personnel closer to the ice formation and outside the line of fire</td>
</tr>
<tr>
<td>Face shield</td>
<td>Used to protect from potential debris</td>
</tr>
</tbody>
</table>
Steam Lance & Associated PPE such as Insulated Gloves and Protective Outerwear | Used to melt ice formations in a safe and controlled manner

**Ice removal procedure**

1. Prior to removing any icicles please ensure that workers use the checklist provided in Appendix I: Overhead Ice & Snow Removal Checklist to assist with job set-up & execution. Ensure all flagging of work areas is done in accordance with the related standard - LMS0019A-Erection, Identification and Removal of Flagging.

2. Remove ‘simple’ ice formations as follows:

<table>
<thead>
<tr>
<th>IF ...</th>
<th>THEN ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice formations are of ‘manageable’ size and do not create a hazard to either the personnel removing them or the equipment they are attached to or the equipment below and can be removed from ground level or a fixed platform</td>
<td>Remove the ice using an extension pole to knock it down – allowing adequate clearance from the anticipated paths of the falling ice.</td>
</tr>
<tr>
<td>Ice formations are of ‘manageable’ size and do not create a hazard to the personnel removing them and are at an elevation where they cannot be removed safely from ground level or a fixed platform.</td>
<td>Use an aerial lift to position personnel at an appropriate elevation outside of the line of fire and knock the ice with an extension pole.</td>
</tr>
<tr>
<td>Ice formations are of ‘manageable’ size and do create a hazard to the equipment they’re attached to or equipment below and are at an elevation where they cannot be removed safely from ground level or a fixed platform.</td>
<td>Use an aerial lift to position personnel at an appropriate elevation outside of the line of fire and remove the icicle with an extension pole AND implement a controlled drop where the icicle is removed and contained. If this is not practical make arrangements to have the equipment appropriately shielded to protect it from the falling ice.</td>
</tr>
<tr>
<td>Ice formations are of ‘manageable’ size and do create a hazard to either the personnel removing them or the equipment they are attached to or the equipment below but can be removed at ground level or a fixed platform.</td>
<td>Remove the ice using a steam lance. Begin working at the tip of the ice formation and progress to the point where it is attached to the structure. Allow adequate clearance from the anticipated paths of the falling ice if the ice breaks unexpectedly. When ever possible, implement a controlled drop where the ice is removed and contained. If this is not practical make arrangements to have the equipment appropriately shielded to protect it from the falling ice.</td>
</tr>
</tbody>
</table>
Ice formations are of ‘manageable’ size and do create a hazard to the personnel removing them and are at an elevation were they cannot be removed safely from ground level or a fixed platform.

| Use an aerial lift to position personnel outside of the line of fire and remove the icicles using a steam lance starting at the tip of the ice formation and progress to the point where it is attached to the structure and allow adequate clearance from the anticipated paths of the falling ice if the icicle breaks unexpectedly. When ever possible, implement a controlled drop where the icicle is removed into a containment sack. If this is not practical make arrangements to have the equipment shielded to protect it from the falling ice. |

3. If icicles are deemed ‘complex’ due to size, weight and location the maintenance manager for the area in question is accountable to develop a customized and detailed procedure that prescribes the lowest risk method for removal of the icicles in consultation with operations, engineering and the business area safety specialist.

**Responsibilities**

Business area maintenance managers are responsible for the implementation of this standard. Let’s list the positions for all of the parties involved / mentioned in this procedure so folks are clear on accountabilities.

**Reference to Related Documents**

LMS0019A-Erection, Identification and Removal of Flagging

**Reference to Lessons Learned**

Ice Knocked Down and Struck an Occupied Trailer
APPENDIX I

Overhead Ice and Snow Removal Checklist

☐ Yes  ☐ No  Is there a specific permit in place? Permit # ______________________

☐ Yes  ☐ No  Has the Ice Removal Procedure been reviewed & FLRA been completed and reviewed by entire crew & signed off by the foreman?

☐ Yes  ☐ No  Has the area that will be flagged off during the ice removal been thoroughly inspected to ensure that all personnel are out of the area (including any occupied trailers, hoardings, etc) and equipment is protected during ice removal activities?

☐ Yes  ☐ No  Is the restricted area large enough to contain ice that may fall further and farther than intended?

☐ Yes  ☐ No  If the area has high pedestrian or vehicle traffic, have adequate measures been taken to prevent inadvertent access to the work area (may need to consider hard barricades).

☐ Yes  ☐ No  Red flagging installed with an adequate number of tags?

☐ Yes  ☐ No  Inspect area where ice is to be removed, ensure no additional ice overhead.

☐ Yes  ☐ No  If using an extension pole, ensure that any wiring that could be contacted with the extension pole or falling ice is protected or de-energized if required.

☐ Yes  ☐ No  When removing icicles from a large area on a vertical structure, begin the work at the top of the structure and work down.

☐ Yes  ☐ No  Before descending a level ensure no ice is trapped in pipe racks.

☐ Yes  ☐ No  When task is completed clean up work area and remove flagging.

☐ Yes  ☐ No  Sign off permits and turn area back over to operations.

If any ice hazards cannot be removed due to size or location, report findings to foreman and supervisor.

Supervisor:_________________________________ Date:_______________________
Checklist Completed by:________________________ Date:________________________
The following individuals have approved and signed this document.

UserName: Kevin Gertken (kgertken)
Title:
Date: Wednesday, 22 April 2009, 08:21 AM  Mountain Standard Time
Meaning: Approver 1 Signed
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