Proposed Mark-Up

5-1.2.2 Initial Load Test of Lifting Devices Used for Critical Lifts

(a) Load testing of lifting devices used for critical lifts shall be conducted prior to initial use and prior to use following repairs or alterations on load-bearing components. The test shall be conducted in accordance with one of the following:

(1) Prior to its initial use, a Design Category C lifting device shall be subjected to a test load equal to 150% of the maximum service load. After the device sustains the test load for a period of not less than 10 min, critical areas, including major load-bearing welds, shall be visually inspected for defects and all components inspected for permanent deformation. Nondestructive examination (NDE) of the major load-bearing welds shall be performed in accordance with AWS D14.1/D14.1M, Section 10.8.

(2) A redundant lifting device shall be load tested in accordance with (1) except that each path in the redundant device shall be subjected separately to a test load equal to 125% of the maximum service load.

(b) When the test is performed with a crane, care shall be taken to ensure crane operations remain within allowed tolerances as described in the applicable ASME standard.

(c) When acoustic emissions testing (AET) will be used for continuing compliance of the lifting device, a baseline AET shall be taken at a load test as described in (a)(1) or (a)(2). The AET shall be performed in accordance with ASTM E569/E569M.

5-1.2.3 Continuing Compliance for Lifting Devices Used for Critical Lifts

(a) A lifting device used for critical lifts shall undergo inspection as described in (1) or testing shall be tested as described in (2) each time it completes the maximum number of lifting evolutions listed in Table 5-1.2.3-1. Any flaw discovered shall be evaluated and dispositioned by a Qualified Person. Required repairs should be in accordance with the manufacturer's original design specifications.

(1) Dimensional inspection, visual inspection, and visual NDE of major load-carrying welds and critical areas, as determined by a qualified person, for cracks shall be performed in accordance with AWS D14.1/D14.1M, Section 10.

(2) Acoustic emissions testing (AET) shall be performed in accordance with ASTM E569/E569M.

(-a) A baseline acoustic reading shall be taken during either the initial load testing or subsequent load testing.

(-b) If the AET of the lifting device does not match the baseline AET, testing as described in para. 5-1.2.2(a)(1) or para. 5-1.2.2(a)(2) shall be performed.

(b) Initial load testing prescribed in para. 5-1.2.2(a)(1) or para. 5-1.2.2(a)(2) shall be performed following an incident in which repairs or alterations were required on load-bearing components.

(c) Any Design Category C lift devices stored outdoors shall meet the requirements of 5-1.2.3(a) prior to every use.

(Ballot continues on next page)
Proposed Final Text

5-1.2.2 Load Test of Lifting Devices Used for Critical Lifts

(a) Load testing of lifting devices used for critical lifts shall be conducted prior to initial use and prior to use following repairs or alterations on load-bearing components. The test shall be conducted in accordance with one of the following:

(1) An ASME BTH-1, Design Category C lifting device shall be subjected to a test load equal to 150% of the maximum service load. After the device sustains the test load for a period of not less than 10 min, critical areas, including major load-bearing welds, shall be visually inspected for defects and all components inspected for permanent deformation. Nondestructive examination (NDE) of the major load-bearing welds shall be performed in accordance with AWS D14.1/D14.1M, Section 10.8.

(2) A redundant lifting device shall be load tested in accordance with (1) except that each path in the redundant device shall be subjected separately to a test load equal to 125% of the maximum service load.

(b) When the test is performed with a crane, care shall be taken to ensure crane operations remain within allowed tolerances as described in the applicable ASME standard.

(c) When acoustic emissions testing (AET) will be used for continuing compliance of the lifting device, a baseline AET shall be taken at a load test as described in (a)(1) or (a)(2). The AET shall be performed in accordance with ASTM E569/E569M.

5-1.2.3 Continuing Compliance for Lifting Devices Used for Critical Lifts

(a) A lifting device used for critical lifts shall be inspected as described in (1) or shall be tested as described in (2) each time it completes the maximum number of lifting evolutions listed in Table 5-1.2.3-1. Any flaw discovered shall be evaluated and dispositioned by a Qualified Person. Required repairs should be in accordance with the manufacturer’s original design specifications.

(1) Visual examination of major load-carrying welds and critical areas, as determined by a qualified person, for cracks performed in accordance with AWS D14.1/D14.1M, Section 10.

(2) Acoustic emissions testing (AET) performed in accordance with ASTM E569/E569M.

(b) Load testing prescribed in para. 5-1.2.2(a)(1) or para. 5-1.2.2(a)(2) shall be performed following repairs or alterations to load-bearing components.

(c) Any Design Category C lift devices stored outdoors shall meet the requirements of 5-1.2.3(a) prior to every use.
5-2 OTHER RIGGING EQUIPMENT

Off-the-shelf rigging hardware shall meet the requirements of ASME B30.9 and ASME B30.26. (a) For standard lifts, special lifts, and lifts made with redundant load path below-the-hook lifting devices, off-the-shelf rigging hardware shall meet the requirements of ASME B30.9 and ASME B30.26. (b) For critical lifts, off-the-shelf rigging hardware shall meet the requirements of ASME B30.9 and ASME B30.26 with all safe working loads reduced by 50%.

Justification: For Critical Lifts, off-the-shelf hardware must be rated for twice the design load for provide a higher design margin. As originally written, the standard allows OTS hardware to be used in a critical lift using the catalog safe working loads. This was not the intent.
ASME NML-1 Load Block Proposed Revisions

1-5 DEFINITIONS

load block: the assembly of hook or shackle, swivel, bearing, sheaves, pins, and frames suspended by the hoisting rope; this shall include any items reeved in the hoisting ropes.

Justification: There is no existing definition for load block in NML-1. Copied the definition from NOG-1 for consistency.

2-5.3 Other Considerations for Critical Lifts

(a) The running rope and lower load block of an overhead crane are considered part of the overhead crane. Thus, the movement of an empty load block is not considered a critical lift.

(b) Movement safety envelopes shall be established for overhead cranes used for critical lifts. These envelopes shall include minimum lift heights to ensure that emergency braking systems engage and stop load movement.

Justification: “Load Block” and “Lower Block” are used interchangeably in ASME NML-1. “Load Block” is used primarily in NOG-1 and NUM-1. B30.2 only uses “Load Block.” “Lower Block” will be changed to “Load Block” for consistency in the volume.
5-1.2.2 Initial Load Test of Lifting Devices Used for Critical Lifts

(a) Load testing of lifting devices used for critical lifts shall be conducted in accordance with one of the following:

(1) Prior to its initial use, an ASME BTH-1, Design Category C lifting device shall be subjected to a test load equal to 150\%(+5\%/-0\%) of the maximum service load. After the device sustains the test load for a period of not less than 10 min, critical areas, including major load-bearing welds, shall be visually inspected for defects and all components inspected for permanent deformation. Nondestructive examination (NDE) of the major load-bearing welds shall be performed in accordance with AWS D14.1/D14.1M, Section 10.8.

(2) A redundant lifting device shall be load tested in accordance with (1) except that each path in the redundant device shall be subjected separately to a test load equal to 125\%(+5\%/-0\%) of the maximum service load.

Justification: Tolerances added to align with B30.20.
Record 20-2380 Submitted for Second Reconsideration

Proposed Mark-Up

NOTE:

Initial changes are in red strikeout and blue underline.
First Reconsideration changes are in blue strikeout and green underline.
Second Reconsideration changes are in green strikeout and tan underline.

4-1 CRANE DESIGN

4-1.1 Overhead Crane

The minimum crane designs for the lift categories are provided in (a) through (cd). Table 4-1-1 provides examples of where enhanced safety crane designs are used in various nuclear power plant applications.

(a) For Nuclear Safety Critical Lifts. Overhead cranes used for nuclear safety critical lifts shall be designed to meet the requirements of ASME NOG-1 Type I, ASME NUM-1 Type I, or other enhanced safety single-failure-proof crane designs with single-failure-proof features previously accepted by the applicable regulatory agency.

(b) For Critical Lifts. Where an enhanced safety handling system is credited to mitigate potential consequences of load handling events during critical lifts, overhead cranes used for critical lifts should be designed to meet the requirements of ASME NOG-1 Type I, ASME NUM-1 Type I, or other enhanced safety designs, single-failure-proof designs previously accepted by the applicable regulatory agency. If the crane itself is located over an SSSC, then the crane shall be designed to meet the requirements of ASME NOG-1 Type II or ASME NUM-1 Type II. As a minimum, overhead cranes used for critical lifts shall meet the requirements of ASME NOG-1 Type III or ASME NUM-1 Type III as applicable. At a minimum, overhead cranes used for critical lifts shall meet the requirements of 4.1.1(c).

(bc) For Special Lifts. Overhead cranes used for special lifts shall be designed to meet, as a minimum, the requirements of ASME NOG-1 Type III or ASME NUM-1 Type III. If the crane itself is located over an SSSC, then the crane shall meet the design requirements of ASME NOG-1 Type II or ASME NUM-1 Type II.

(cd) For Standard Lifts. Overhead cranes used for standard lifts shall be designed to meet, as a minimum, the requirements of CMAA 70 or CMAA 74.

As applicable, the criteria stated in (a) through (cd) shall also apply to jib cranes and monorail cranes.

Proposed Final Text

4-1 CRANE DESIGN

4-1.1 Overhead Crane

The minimum crane designs for the lift categories are provided in (a) through (d). Table 4-1-1 provides examples of where enhanced safety crane designs are used in various nuclear power plant applications.
(a) For Nuclear Safety Critical Lifts. Overhead cranes used for nuclear safety critical lifts shall be designed to meet the requirements of ASME NOG-1 Type I, ASME NUM-1 Type I, or other crane designs with single-failure-proof features previously accepted by the applicable regulatory agency.

(b) For Critical Lifts. Overhead cranes used for critical lifts should be designed to meet the requirements of ASME NOG-1 Type I, ASME NUM-1 Type I, or other crane designs with single-failure-proof features previously accepted by the applicable regulatory agency. At a minimum, overhead cranes used for critical lifts shall meet the requirements of 4.1.1(c).

(c) For Special Lifts. Overhead cranes used for special lifts shall be designed to meet, as a minimum, the requirements of ASME NOG-1 Type III or ASME NUM-1 Type III. If the crane itself is located over an SSSC, then the crane shall meet the design requirements of ASME NOG-1 Type II or ASME NUM-1 Type II.

(d) For Standard Lifts. Overhead cranes used for standard lifts shall be designed to meet, as a minimum, the requirements of CMAA 70 or CMAA 74.

As applicable, the criteria stated in (a) through (d) shall also apply to jib cranes and monorail cranes.
Record 21-2162 NML-1, Single-Failure-Proof Revision

Proposal

Non-Mandatory Appendix A, Table A-1-1.

<table>
<thead>
<tr>
<th>Section (Paragraph)</th>
<th>Summary of Guidance</th>
<th>ASME NML-1 Requirement or Recommendation</th>
<th>Conforms to NUREG-0612 (Yes/No)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1.2 (7)</td>
<td>The crane should be designed to meet the applicable criteria and guidelines of Chapter 2-4 of ANSI B30.2-1974, &quot;Overhead and Gantry Cranes&quot; and CHAA-95, &quot;Specifications for Electric Overhead Travelling Cranes.&quot; An alternative to a specification in ANSI B30.2 or CHAA-70 may be accepted in lieu of specific compliance if the intent of the specification is satisfied.</td>
<td>4-1.1(a) Where an enhanced safety handling system is credited to mitigate potential consequences of load-handling events during critical lifts, overhead cranes used for critical lifts shall be designed to meet the requirements of ASME NOG-1 Type I, ASME NUM-1 Type I or other single-failure-proof designs previously accepted by the applicable regulatory agency.</td>
<td>Yes</td>
<td>ASME NML-1 requirements are more restrictive than those of ASME B30.2 or CHAA-70.</td>
</tr>
<tr>
<td>5.1.6</td>
<td>In other plant areas, loads may be handled which, if dropped in a certain location, may damage safe shutdown equipment.</td>
<td>2-2 Under ASME NML-1, the consequences of such an event are high, which will drive this lift into either the special or critical classification. Each of these lifts demand greater rigor in the planning, execution, and oversight of the lift.</td>
<td>Yes</td>
<td>..</td>
</tr>
<tr>
<td>5.1.7</td>
<td>Lifting devices for associated lifts shall meet the design fabrication, inspection and testing guidance in ASME B30.10-1 (as described in Table 5-1-1) and ASME B30.20.</td>
<td>2.5.1.1(11) Enhanced safety handling systems shall be designed to have an extremely low likelihood of system failure through use of design incorporating single-failure-proof features and or significantly increased margins of safety.</td>
<td>Yes</td>
<td>..</td>
</tr>
</tbody>
</table>

Paragraph 1

Overhead cranes used for nuclear safety critical lifts shall be designed to meet the requirements of ASME NOG-1 Type I, ASME NUM-1 Type I, or other crane designs with single-failure-proof features previously accepted by the applicable regulatory agency.

Rationale

This change is needed for two purposes:

1. Replace the phrase “single-failure-proof” with “single-failure-proof features.” This is the last usage of the phrase “single-failure-proof” in the document.
2. Align this text with the text approved by Ballot 21-2119 RC101.
Record 21-2163

Background:

During the balloting of Record 20-2380, this comment was submitted:

“(2) I have also voted negative since I believe the last sentence requiring a minimum design as a NOG or NUM Type III crane, should be deleted in its entirety. The NOG Type III criteria does not line up with the general industry standard (CMAA 70), and the new proposed NUM-1 standard will state that NUM does not address the criteria for Type III equipment, with such equipment being per industry standards. (Recommend deleting the last sentence as shown below.)

RECOMMENDED REVISIONS:
(b) For Critical Lifts. Where an enhanced safety handling system is credited to mitigate potential consequences of load handling events during critical lifts, overhead cranes used for such lifts should be designed to meet the requirements of ASME NOG-1 Type I, ASME NUM-1 Type I, or be designed with other enhanced safety features and designs. If the crane itself is located over an SSSC, then the crane shall be designed to meet the requirements of ASME NOG-1 Type II or ASME NUM-1 Type II.”

The final language approved for this ballot did eliminate the reference to NUM-1 Type III cranes as noted by the comment. However, there was one additional paragraph that also referenced NUM-1 Type III cranes. This paragraph was not in the scope of this ballot and record. Therefore, Record 21-2163 was created to address this paragraph of the standard.

Current Language (from the Approved 20-2380 Record)

(c) For Special Lifts. Overhead cranes used for special lifts shall be designed to meet, as a minimum, the requirements of ASME NOG-1, Type III, or ASME NUM-1, Type III. If the crane itself is located over an SSSC, then the crane shall meet the design requirements of ASME NOG-1, Type II, or ASME NUM-1, Type II.

Proposed Ballot

Deletions shown in Red Strikethrough, additions shown in Bold Blue.

(c) For Special Lifts. Overhead cranes used for special lifts shall be designed to meet, as a minimum, the requirements of ASME NOG-1, Type III, or ASME NUM-1, Type III CMAA 74. If the crane itself is located over an SSSC, then the crane shall meet the design requirements of ASME NOG-1, Type II, or ASME NUM-1, Type II.