

Regulatory Guide 1.244

Control of Heavy Loads at Nuclear Facilities

Presentation to EPRI Hoisting, Rigging and Crane Users Group

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Agenda

1. Introduction
2. Continuing Guidance
3. New Guidance
4. Safety Significance
5. Public Comments
6. Conclusion

Introduction

- Purpose of RG 1.244:
 - Endorse appropriate consensus standards
 - Update guidance contained in current technical reports
 - Expand applicability to include major component replacement and spent fuel storage
- These consensus standards provide updated guidance:
 - methods to assure safety functions are accomplished
 - standards for design, fabrication, operation, maintenance, and testing, especially for enhanced safety systems

Continuing NRC Guidance

- NUREG-0612, “Control of Heavy Loads at Nuclear Power Plants”
 - Provides criteria for protection of safety functions
 - Specifies good practices for the handling of heavy loads
- NUREG-0554, “Single Failure-Proof Cranes for Nuclear Power Plants”
 - Provides criteria for crane design, fabrication, and testing
 - Specifies features to control load following challenges
- ANSI N14.6, “Radioactive Materials—Special Lifting Devices for Shipping Containers Weighing 10 000 Pounds (4500 kg) or More for Nuclear Materials”
 - Provides criteria for lifting device design and testing
 - Specifies inspection and testing to verify continued compliance

RG 1.244 Endorsed Standards

- American Society of Mechanical Engineers (ASME) Standard NML-1-2019, “Rules for the Movement of Loads Using Overhead Handling Equipment in Nuclear Facilities”
 - Replacement for NUREG-0612
 - Qualitative risk-informed approach
 - Scope expanded for wider use at nuclear facilities
 - Updated to reflect operating experience
 - Restrictions on use of slings
 - Simplified compliance testing for special lifting devices

Endorsed Standards (cont.)

- ASME Std. NOG-1-2020, “Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)”
 - Replacement for NUREG-0554
 - Reflects current top-running overhead crane technologies
- ASME Std. BTH-1-2017, “Design of Below-the-Hook Lifting Devices,” Chapters 1-3 (mechanical devices)
 - Provides criteria for the design and fabrication of special lifting devices and load lifting attachments
 - NML-1 and BTH-1 combined address scope of ANSI N14.6

Significant Changes in Guidance

- Incorporates lessons from several decades of operating experience
 - Administratively restricts sling usage for nuclear safety critical lifts
 - Straight connections between specially designed attachment points
 - Basket configurations around large diameter rounded objects
 - Reduced burden for design, fabrication, and testing of special lifting devices
- Supports standardization of programs
 - Lifts conducted by contracted personnel during refueling outages
 - Adds riggers to scope of training included in program

Changes in Guidance (Con't)

- Flexible lifting system design guidance included for special conditions:
 - Large component replacement (e.g., steam generator replacement)
 - Space/structural limitations
 - Outside nuclear power plant structures (e.g., ISFSI operations)

Safety Significance

- Standard nuclear overhead handling systems provide reliable performance
 - Reasonably low frequency of uncontrolled load motion based on nuclear plant operating experience
 - Acceptable when safety function accomplishment would not be challenged by handling system problems
 - NML-1 provides controls for standard and special lifts
- Enhanced safety handling systems
 - Reduces frequency of uncontrolled load motion
 - Acceptable for Nuclear Safety Critical Lifts

Public Comments

- Availability of Draft Guide 1381 for public comment published in Federal Register on May 4, 2021
- Public comment period ended on July 5, 2021
- 24 Nuclear Energy Institute (NEI) comments:
 - 11 related to clarification of specific items
 - 5 related to licensing basis change control process
 - 4 related to endorsement of additional standards
 - 4 related to enhance flexibility through credit for administrative controls or alternative design elements
- Two individuals provided additional comments that overlapped with NEI comments.

Comment Response

- Background
 - Explained ANSI-N14.6 and ASME BTH-1 relationship
 - Clarified that controlled ranges of motion and enhanced safety handling systems constitute complete acceptable methods of evaluation
 - Explained basis for sling restrictions during critical lifts
- Regulatory guidance
 - Seismic qualification of cranes used for nuclear safety critical lifts with controlled range of motion
 - Clarified alternative enhanced safety crane design criteria
 - Clarification of sling restrictions for critical lifts

Conclusion

- The staff endorsed three consensus standards
- The NRC staff expects the revised guidance to provide safety and efficiency benefits
- The NRC staff expects substantial adoption of NML-1 control of heavy loads program guidance through the provisions of licensing basis change control regulations