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# 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

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# 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

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# 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

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# 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

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# 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

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# 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

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# 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)



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# 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

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# 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.

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# 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

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# 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