5.7 CONTROL OF HEAVY LOADS

The NRC issued NUREG-0612, "Control of Heavy Loads at Nuclear Power Facilities" in July 1980 to document the results of Unresolved Safety Issue (USI) A-36. NUREG-0612 provided a set of guidelines intended to minimize the possibility of load drops on safe shutdown or decay heat removal systems. In response to Generic Letters dated December 22, 1980 (Unnumbered), and February 3, 1981 (Generic Letter 81-07), Baltimore Gas and Electric Company submitted a two-phase report reviewing provisions for handling and control of heavy loads at Calvert Cliffs, and evaluating these provisions with respect to the guidelines of NUREG-0612. The NRC accepted our Phase I evaluation (Reference 1). In a safety evaluation report on the implementation of Generic Letter 85-11, the NRC declined to review Phase II responses and released all the respondents from any commitments made in them. However, the NRC stated that while not a requirement, they encourage implementation of actions identified in Phase II. As a result, Calvert Cliffs considered the implementation of these actions to be voluntary.

Overhead load handling systems which handle heavy loads (at Calvert Cliffs - loads in excess of 1600 pounds) in the vicinity of the reactor vessel or near spent fuel in the spent fuel pool are subject to the general guidelines of NUREG-0612. Overhead load handling systems that handle any weight in areas where a load drop may damage safe shutdown or decay heat removal systems are subject to the guidelines of NUREG-0612. These guidelines include:

a. Definition of safe load paths
b. Development of load handling procedures
c. Qualifications, training, and specified conduct of operators
d. Special lifting devices should satisfy the guidelines of American National Standards Institute (ANSI) N14.6-1978
e. Lifting devices that are not specially designed should be installed and used in accordance with the guidelines of ANSI B30.9
f. Periodic inspection and testing of cranes
g. Design of cranes to ANSI B30.2 or CMAA-70

The Calvert Cliffs equipment identified as meeting the criteria of NUREG-0612 are listed in Table 5-10. The remainder of the overhead load handling equipment existing at the time was excluded from NUREG-0612 by the Phase II submittal. The Spent Fuel Cask Handling Crane was designated "single failure proof" using NUREG-0612 and NUREG-0554 criteria. The change in status of the Spent Fuel Cask Handling Crane was acknowledged by the NRC via license amendment (Reference 2). These amendments allow the movement of heavy loads by the Spent Fuel Cask Handling Crane over the spent fuel pool. More information on this crane can be found in Section 9.7.2. The two monorails installed to handle the containment purge system blind flanges, the Containment Auxiliary Crane, and the four containment roof (exterior) jib cranes were evaluated as meeting the criteria of NUREG-0612. Table 5-10 states whether each piece of load handling equipment is subject to NUREG-0612 guidance and what the exemptions are based on.

The NRC accepted our method of compliance with NUREG-0612 (Reference 3). A Phase II report was submitted, but the NRC announced a blanket acceptance of Phase II via Generic Letter 85-11 (Reference 4). Based upon our method of compliance with the seven general guidelines of NUREG-0612, fuel damage events resulting from heavy loads incidents will result in offsite doses, due to the release of gap activity, of less than one-fourth of the 10 CFR Part 100 limits. Calvert Cliffs Nuclear Power Plant maintains various controlling procedures providing guidance on load path and lift height restrictions for those cranes subject to compliance with NUREG-0612 and Reference 10.

Restrictions on movement of heavy loads:

a. When minimum electrical conditions as defined in Technical Specifications are not met, movement of heavy loads over irradiated fuel is prohibited during shutdown conditions.
b. Operations involving movement of recently irradiated fuel in or movement of loads over recently irradiated fuel on a spacer in the spent fuel pool, other than with the single-failure-proof spent fuel cask handling crane, require at least an operable charcoal absorber bank, an operable exhaust fan and an operable high efficiency particulate air filter in the spent fuel pool ventilation system. Additionally, these operations also require that the spent fuel pool water level must be at or above 21 1/2' above the irradiated fuel assemblies.
c. When either unit is shut down, the fuel storage oil tank for the emergency diesel generator supporting the shut down unit must be operable for movement of heavy loads over irradiated fuel assemblies.

On December 1, 2008, the NRC issued Regulatory Issue Summary 2008-28 (Reference 10), which endorsed Nuclear Energy Institute (NEI) 08-05. The NEI guidance addressed a concern about lifting the reactor vessel head. An Engineering Evaluation was performed to document a reactor vessel head drop analysis that used the NEI guidance. The analysis concluded that the reactor vessels in both Units, attached piping, and support systems are capable of withstanding the impact loads of a hypothetical reactor vessel head drop concentrically onto the reactor vessel flange from a height of 29'. All stresses in steel components would be well within allowable limits; however, there would be significant damage to the concrete beneath the reactor vessel nozzle supports. Due to the damage in the concrete, the reactor vessel would come to rest fully supported by the RCS piping.

Procedures are used to control the lift and replacement of the reactor pressure vessel head. These procedures establish limits on load height, load weight, and medium present under the load.

Heavy load equipment is inspected to:

Code		Equipment
B30.2-1976		Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist) (Reference 5)
B30.9-1971		Slings (Reference 5)
B30.11-1973		Monorails, Underhung Cranes and Jib Cranes (Reference 6)
B30.16		Overhead Hoists (underhung) and Chain Falls (Reference 5)
	-1987	Same equipment in the Societe Alsacienne De Constructions Mecaniques De Mulhouse Emergency Diesel Generator Building (Reference 7)
CMAA-70-1975		Electric Overhead Traveling Cranes (Reference 8)
	-1983	Same equipment in the Independent Spent Fuel Storage Installation (Reference 9)
B30.22-2000		Articulating Boom Cranes

5.7.1 REFERENCES

1. Letter from R. A. Clark (NRC) to A. E. Lundvall, Jr. (BGE), dated May 27, 1983, Evaluation of Phase I of Control of Heavy Loads
2. Letter from D. G. McDonald, Jr. (NRC) to G. C. Creel (BGE), dated January 17, 1992, Issuance of Amendments for Calvert Cliffs Nuclear Power Plant

3. Letter from S. A. McNeil (NRC) to G. C. Creel (BGE), dated August 7, 1989, Supplement to Phase I Safety Evaluation of the Control of Heavy Loads

4. Generic Letter 85-11, NRC to Licensees, dated June 28, 1985, Completion of Phase II of Control of Heavy Loads at Nuclear Power Plants, NUREG-0612

5. Letter from A. E. Lundvall, Jr. (BGE) to D. G. Eisenhut (NRC), dated January 4, 1982, Calvert Cliffs Nuclear Power Plant Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318, Control of Heavy Loads

6. Letter from R. F. Ash (BGE) to D. G. Eisenhut (NRC), dated August 2, 1982, Calvert Cliffs Nuclear Power Plant Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318, Control of Heavy Loads

7. Letter from R. E. Denton (BGE) to NRC Document Control Desk, dated July 20, 1993, Calvert Cliffs Nuclear Power Plant Unit Nos. 1 & 2; Docket Nos. 50-317 & 50, Emergency Diesel Generator Project – SACM Diesel Generator and Mechanical Systems Design Report

8. Letter from A. E. Lundvall, Jr. (BGE) to D. G. Eisenhut (NRC), dated March 1, 1982, Calvert Cliffs Nuclear Power Plant Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318, Control of Heavy Loads

9. Letter from G. C. Creel (BGE) to NRC, Director, Division of Industrial and Medical Nuclear Safety Office of Nuclear Material Safety and Safeguards, dated July 20, 1993, Calvert Cliffs Independent Spent Fuel Storage Installation (ISFSI) Application

10. NRC Regulatory Issue Summary 2008-28, dated December 1, 2008, Endorsement of Nuclear Energy Institute Guidance for Reactor Vessel Head Heavy Load Lifts

TABLE 5-10

EQUIPMENT MEETING NUREG-0612 CRITERIA

LIFTING EQUIPMENT	NUREG-0612	REASON FOR EXCLUSION FROM NUREG-0612
Polar Crane	Y	
Intake Structure Semi-Gantry Crane	Y	
Transfer Machine Jib-Crane	Y	
Purge Flange Monorail (2)	Y	
Spent Fuel Cask Crane	Y	
Containment Roof (Exterior) Jib Crane (4)[(a)]	Y	
Containment Auxiliary Crane	Y	
Turbine Building Main Crane	N	Sufficient separation
Turbine Building Auxiliary Crane	N	Sufficient separation
Filter Cask Monorail	N	No floor penetration
Solid Waste Disposal Trolley	N	No safe shutdown or decay heat removal systems endangered
Diesel Generator Room Monorail	N	Sufficient separation
Main Steam Room Monorail	N	Sufficient separation; No safe shutdown or decay heat removal systems endangered
Main Steam (MSIV) Room Access Hoist	N	Sufficient separation; No safe shutdown or decay heat removal systems endangered
Machine Shop Monorail	N	Sufficient separation
Containment Equipment Hatch Hoist	N	Sufficient separation
Component Cooling Water Room Hoist	N	No floor penetration; No safe shutdown or decay heat removal systems endangered
Switchgear Room Monorail Hoist	N	Sufficient separation
Chlorine House Monorail	N	Sufficient separation
Condensate Demineralizer Area Monorail	N	Sufficient separation
Condenser Waterbox Removal Monorail	N	Sufficient separation
Vertical Lifting Rail	N	Sufficient separation
Hot Machine Shop Crane	N	Sufficient separation
Decontamination Room Hoist	N	Sufficient separation

[(a)] These cranes have been classified as Augmented Quality and meet the criteria of NUREG-0612. These cranes are unique in that they do not have their own motorized hoisting systems. As such, they are inspected prior to use in lieu of the codes specified in Section 5.7.