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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: **Docket Nos. 50-361 and 50-362 NRC Bulletin 96-02, "Movement of Heavy Loads Over Spent Fuel, Over Fuel in the Reactor Core, or Over Safety Related Equipment" San Onofre Nuclear Generating Station Units 2 and 3**

References: 1) Letter from Walter C. Marsh (Edison) to the Document Control Desk (NRC) dated May 14, 1996; Subject: Docket Nos. 50-361 and 50-362 Response to NRC Bulletin 96-02, "Movement of Heavy Loads Over Spent Fuel, Over Fuel in the Reactor Core, or Over Safety Related Equipment," San Onofre Nuclear Generating Station Units 2 and 3

2) Letter from Walter C. Marsh (Edison) to the Document Control Desk (NRC) dated August 29, 1996; Subject: Docket Nos. 50-361 and 50-362 NRC Bulletin 96-02, "Movement of Heavy Loads Over Spent Fuel, Over Fuel in the Reactor Core, or Over Safety Related Equipment" San Onofre Nuclear Generating Station Units 2 and 3

This letter transmits an informational copy of the 10 CFR 50.59 safety evaluation and the load path drawing for the heavy load lift of a 480 V non-1E transformer during any plant Mode. Although Southern California Edison (Edison) does not plan on performing this lift in the immediate future, the purpose of this evaluation is to have the capability to change out a 480 V non-1E transformer if the need occurs.

In the May 14, 1996, response to NRC Bulletin 96-02, Reference 1, Edison stated that a license amendment application would be submitted requesting approval to lift a 480 V auxiliary transformer during Mode 1. This plan to submit the amendment application was revised by letter dated August 29, 1996, Reference 2, because Edison had reevaluated the plans for the lift and decided to use diverse independent lifting systems and independent full capacity rigging for the portion of the lift that will be over safety related equipment. This precluded the need for a license amendment.

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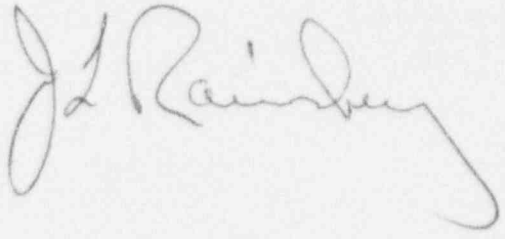
If you have any questions in this matter, please call me.

Very truly yours,



Enclosure

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Penetration Area 480V Transformer Replacement
NUREG 0612 Heavy Loads Evaluation

Description:

This evaluation addresses the heavy load lifts and safe load paths for installation and removal of the 480V non-1E auxiliary transformers at any time. As stated in the August 27, 1984 NRC Safety Evaluation Report (SER), these heavy load lifts (approximately 7000 lbs.) will be consistent with the guidelines in NUREG-0612 for lifting heavy loads (>1500 lbs.).

Section 5.1.1 of NUREG-0612 provides seven (7) guidelines for handling of heavy loads, summarized as follows:

1. Safe Load Paths should be defined for the movement of heavy loads to minimize the potential, if dropped, of impacting irradiated fuel or safe shutdown equipment. The safe load paths should be defined in procedures or drawings. Any deviation for a safe load path should have written procedures approved by the plant review committee.

2. Procedures should define the safe load path, required equipment, criteria, and any precautions.

3. Crane operators should be trained and conduct themselves in accordance with Chapter 2-3 of ANSI B30.2-1976, "Overhead and Gantry Cranes."

4. Special Lifting Devices should satisfy ANSI N14.6-1978, "Standard for Special Lifting Devices for Nuclear Materials."

5. Lifting devices that are not specifically designed should be installed in accordance with ANSI-B30.9-1971, "Slings."

6. The crane should be inspected, tested, and maintained in accordance with Chapter 2-2 of ANSI B30.2-1976, "Overhead and Gantry Cranes."

7. The crane should be designed to meet criteria of Chapter 2-1 of ANSI B30.2-1976, "Overhead and Gantry Cranes," and of CMAA-70, "Spec. for Electric Overhead Traveling Cranes."

For the purpose of addressing the specific lifts considered within this safety evaluation, the requirements of Sections 5.1.5 and 5.1.6 of NUREG-0612 are also considered. Accordingly, the load handling system used will be upgraded via redundancy or duality between the crane structure and the lifted load. Therefore, in addition to meeting ANSI

B30.9-1976, "Slings," lifts through or over the open roof hatch will have dual or redundant slings or lifting devices. To meet this requirement during lifts of the transformers, redundant rigging will be provided.

Summary of Heavy Load Paths to be used:

Summarized below is a breakdown of the individual lifts to be carried out in order to achieve the required transport of the Load Center Transformer from the Elevation (El.) 30' yard area (outside) to inside the El. 45' or El. 63' Penetration Area:

(1) From ground El. 30' to corner of El. 95' roof of Penetration Area. (Lifted via Badger Crane) - Area 1, Pick-up Zone on Figure 1.

(2) From the Penetration Area roof to El. 95' roof plug lay down area. (Lifted via 6-ton pivoting jib crane) Area 2, Second Lift on Figure 1.

(3) From El. 95' roof plug lay down to El. 63' or 45' of Penetration Area. (Lifted/lowered via 6-ton jib crane) Area 3, Roof Opening on Figure 1.

The sequence described is for installation of the transformer. Removal is accomplished using the same sequence in reverse order.

Compliance Summary with NUREG-0612, and existing Safe Load Paths:

For each of the three lifts, all seven (7) guidelines from NUREG-0612, Section 5.1.1 will be followed. Figure 1 provides the safe load path guidelines for this lift.

Current NUREG-0612 submittals (References 3 through 7) state that removal and lifting of the transformer will be deferred until the next cold shutdown during which time the risk of load-drop damage to non-safe-shutdown electrical and mechanical items is acceptable. The following text below describes the portions of the lift which are not included as a part of the existing NUREG-0612 submittals. Furthermore, the resolutions to these deviations are also discussed and demonstrate that the requirements of NUREG-0612 are satisfied.

(1) Initial Lift, Area 1

This lift will begin over the El. 30' grade adjacent to the exterior walls of the Penetration Area and the containment structure. During this portion of the lift, the Badger crane and the lifted load will be located and positioned in an area that has no safety-related equipment below the lift. There are safety related

electrical cables located nearby in an underground, enclosed, concrete duct bank. However, neither the crane nor the load will at any time lift directly over the duct bank. Therefore, the objectives of NUREG-0612 are satisfied since a potential drop cannot affect any safety-related equipment.

The load is lifted over the 4-foot high ledge/parapet on the roof of the Fuel Handling Building in the Penetration Area. The load will be suspended approximately 4-feet above the El. 95' roof. There is safety-related equipment present at lower levels below the roof. However, as shown on drawing 716037, this roof area is an existing analyzed safe load path for load heights of up to 9-feet above the roof. Therefore, for this portion of the lift, the objectives of NUREG-0612 are satisfied.

(2) Lift Over Containment Exhaust Duct, Area 2

This lift will be performed over the roof of the Penetration Area, including a brief pass over the Containment Purge and Plant Vent Stack (PVS) ducts. From the lay down area adjacent to the roof parapet, the transformer will then be rolled across the roof and picked up by the 6-ton capacity pivoting jib crane. The jib crane will lift the transformer over the ducts, and set it down on the roof adjacent to the Penetration Area roof plug. As previously stated, and shown in drawing 716037, this roof area is an approved (analyzed) safe load path for load heights of up to 9-feet above the roof. Therefore, for this lift, the objectives of NUREG-0612 are satisfied.

Note: As a defense in depth measure, Operations will be notified prior to performing the lift over containment purge and PVS ducts to be aware of the potential need for alternate radiation monitoring in case the load drops on the duct. Since a postulated drop is not analyzed specifically for the duct, the potential for damage to this non-safety duct is considered. There is narrow range radiation monitoring upstream of the jib area portion of the PVS duct. This monitor can be credited while additional wide range monitoring can be established. The lift would not be performed during any accident conditions where the wide range monitor would be essential.

(3) Roof Opening Lift, Area 3

This lift begins over the El. 95' roof of the Penetration Area and will remain within the safe load path height restriction of 9' while above the roof (drawing 716037). The roof and floor plugs will be removed using the jib crane. The concrete plug weights are greater than 1500 lbs. but significantly less than the transformer weight. The transformer will be lowered via the jib crane, down through the roof opening, and through the subsequent open floor at El. 63'.

Note: During removal of roof and floor plugs, all restrictions and compensatory measures as specified in the barrier safety evaluation must be followed. The barrier safety evaluation is prepared in accordance with the site barrier program and takes into account any other barrier impairments at the time this activity is performed.

In order to prevent any potential damage to existing equipment in the Penetration Area, single failure protection will be provided while making lifts over or through the open roof hatch during plant Modes 1 through 4. The following provisions will be implemented to meet the guidelines of Section 5.1.5 and 5.1.6 of NUREG-0612:

(1) The 6-ton jib crane has a maximum critical load of 4 tons for this lift.

(2) An additional 6-ton plain trolley is placed on the jib with the existing 6-ton hoist.

(3) A 4-ton minimum capacity lug type chain or wire rope hoist is attached to the trolley added in (2). A 6-ton minimum capacity chain fall may be substituted for the hoist.

(4) Independent slings will be used to attach to each hoist. Each hoist will be loaded with a portion of the load to minimize the potential shock load if either system fails. At no time during the lift, shall either hoist have more than 6 inches of slack cable or chain.

Each of the two independent load handling devices are uniquely capable of supporting the entire lifted load in the event one of the lifting devices were to fail. The redundant rigging will be maintained until the transformer is placed onto the concrete floor at El. 45' or El. 63' of the Penetration Area. By providing the necessary redundancy or duality of the load handling system throughout the lift, the objectives of NUREG-0612 are satisfied for this lift.

The jib hoist is not qualified as a single failure lifting device. However, the following provisions are implemented to ensure that there are two independent load systems maintained between the structure and the load:

(1) The jib hoist structure is designed and constructed in accordance with the American Institute of Steel Construction, "Manual of Steel Construction" and the Crane Manufacturers Association of America, "Specification #70," design requirements including the allowable stress limits as specified therein. A dynamic load factor of 15 percent was used for the design. The structure is designed for a 6-ton capacity. The mast and hood of the jib are A53 steel pipe. All other steel members are A36.

(2) A seismic analysis was performed to ensure that the crane structure could support and hold a load during a design basis earthquake. The analysis concluded that the jib structure has only a 4-ton capacity during a seismic event. As such, the crane must be limited to loads less than 4 tons for lifts over or through the open roof hatch.

(3) The jib crane has been load tested at 125 percent of the rated load of 6 tons. The test load is 87 percent higher than the maximum critical load of 4 tons.

(4) The hoists are independent. The existing 6-ton hoist is a "Yale EEW-7½-107ST-25-S2" electric wire rope hoist. The hoist has dual braking and limit switches. Maximum hoist speed is 25 feet per minute. The new hoist may be electric or hand operated. The hoist will be tested to 125 percent of the rated load and will be certified prior to use.

(5) A minimum of two operators is required to perform the lift -- one operating each hoist. Both operators must be in communication with each other because the hoists are operated with independent controls simultaneously.

(6) Each hoist will have independent rigging between the hoists and the load. In the event of a rigging failure each set of slings is capable of supporting the entire load.

Provisions (1) and (2) are consistent with design requirements for NUREG-0554. Although material testing has not been performed, the crane structure and hoist have been load tested to 187 percent of the maximum critical load of 4 tons. This demonstrates the adequate structural capability of the jib structure. The two completely independent hoists between the jib structure and the load also satisfy the intent of single failure protection. The climate at SONGS is temperate and the lift will not be made during cold or adverse weather conditions. Since the lift will be made during temperate weather conditions and the jib crane has been adequately load tested, Charpy V-notch testing is not required to establish a minimum operating temperature.

NRC Comment #2 of the SER letter (Reference 2) required temporary markings and/or controls will be provided to indicate safe load paths for loads handled near safety-related equipment. The safe load path for the transformers on the roof is not required to be marked since the path is restricted by the limits of the jib crane travel. The roof is also an intervening structure that provides adequate protection from potential drops over any safety related equipment below.

Background:

Minor Modification Package (MMP) 2&3-6974.00SE provides for replacement of existing Class 1E, and Non-1E, 480V Load Center Transformers in various buildings of Units 2 & 3. Included within the scope of the MMP are the 1000 KVA and 1500 KVA, Non-1E Transformers located at El. 45' and El. 63' of the Penetration Areas. The associated equipment I.D. numbers are as follows:

2B01X	3B01X	(El. 45', 1500 KVA)
2B02X	3B02X	(El. 45', 1000 KVA)
2B08X	3B08X	(El. 63', 1000 KVA)
2B09X	3B09X	(El. 63', 1500 KVA)

In lieu of replacing the transformers during an outage, it is proposed that replacement be based on the surveillance of the condition of each of the above transformers by Station Engineering. Under this approach, the potential need for urgent replacement of a transformer during Mode 1 could occur at any time, and without prior warning. A Mode 1 installation is of particular concern for the Penetration Area, since performing this lift in Mode 1 is a deviation from the existing NUREG-0612 heavy load SER which states that this lift will be made only during cold shutdowns. This change evaluates lifting activities in the Penetration Area for transformer replacements while the plant is operating.

A Barrier Safety Evaluation will also be performed just prior to removing any floor plugs, or other barriers, per site procedure SO23-XV-4.500 to assure that no previously unanticipated interactions are created. Compensatory measures will be established in accordance with that procedure prior to breaching barriers.

The method chosen for transporting the transformers into the Penetration Area consists of lifting the transformers from the ground to the El. 95' roof of the Penetration Area via a ground crane. From the roof, the transformer would be maneuvered, lifted, and ultimately lowered into the Penetration Area through the roof/floor plugs via use of the 6-ton pivoting jib crane.

The jib crane is presently an exempt load handling system as listed in Table 2.6-3 of DBD-SO23-TR-HZ. The NUREG-0612 submittal dated April 30, 1982 from K. Baskin to F. Miraglia, it states:

> "Jib Cranes 1 and 3 for Unit 2 are shown in Figure 3-8. Lifts of the Tendon Surveillance Platform and Load Center Transformer will be restricted to a maximum height of 9 feet above the roof to allow the loads to clear ducts in the area. Analyses have demonstrated that the resultant impact load is within the capability of the structure roof. In addition to

movement over the roof slab, removal of the transformer through the equipment hatch at the roof requires a total lift of 59 ft over the floor at elevation 45'-0." A potential load drop from this height may result in extensive cracking or perforation of the floor at elevation 45'-0". Damage to safety related electrical and mechanical items housed below elevation 45'-0" including component cooling water (CCW) Train B, could potentially result. However, this transformer serves non-safety related systems and electrical backup is available. Removal and lifting of the transformer will be deferred until the next cold shutdown during which time the risk of load-drop damage to the non-safe-shutdown electrical and mechanical items is acceptable. In order to assure the safe removal of the transformer during a shutdown period, the Component Cooling Water (CCW) Train A will be in operation and Train B will be secured at the time of transformer removal."

When required for Mode 1 installation, the new replacement Load Center Transformer will be transported from the SONGS warehouse to plant yard area adjacent to the Penetration Area exterior wall. From the grade El. 30', the transformer will be lifted up to the corner of the El. 95' roof of the Penetration Area for either Unit 2 or 3, via the Badger Crane. The transformer will then be rolled across the El. 95' roof to the 6-ton pivoting jib crane. The jib crane will lift the transformer over the PVS duct, and lowered down through the Penetration Area roof plug (hatch) to El. 63' or El. 45', as needed. In order to safely perform the lift, the jib crane will have a maximum critical load of 4 tons and will be supplemented with a second hoist and rigging to meet single failure criteria as described in NUREG-0612 Section 5.1.6 and Appendix C. The transformer would then be rolled into position for installation in the Penetration Area.

The Badger Crane will be in vicinity of Reserve Auxiliary Transformers during the lift to the Penetration Area roof. However, the crane will be positioned next to the containment structure equipment hatch with the rear of the crane facing the auxiliary transformers to preclude any interaction with the Auxiliary Transformers. In addition, no swinging, rotating, or pivoting of the crane will be necessary to perform the lift. Crane operators will be trained and procedure controls established for making this lift. This will serve to further restrict the crane's motion. Also, use of the crane in this area will be limited to one (1) hour duration. The lift will not be made simultaneously at each Unit.

References:

1. Letter from W. C. Marsh to NRC Document Control Desk, dated May 14, 1996; Subject: Docket Nos. 50-361 and 50-362, Response to NRC Bulletin 96-02, "Movement of Heavy Loads Over Spent Fuel, Over Fuel in the Reactor Core, or Over Safety Related Equipment at San Onofre Nuclear Generating Station Units 2 and 3.

2. Letter from George W. Knighton, (NRC) to K. P. Baskin (Edison), dated August 27, 1984; Subject: Safety Evaluation Report Relating to Control of Heavy Loads (Phase I) at San Onofre Units 2 and 3

3. Letter from K. P. Baskin to F. Miraglia (NRC), dated July 7, 1981; Subject: Docket Nos. 50-361 and 50-362 San Onofre Nuclear Generating Station Units 2 and 3

4. Letter from K. P. Baskin to F. Miraglia (NRC), dated April 30, 1982; Subject: Docket Nos. 50-361 and 50-362 San Onofre Nuclear Generating Station Units 2 and 3

5. Letter from K. P. Baskin to F. Miraglia (NRC), dated June 30, 1982; Subject: Docket Nos. 50-361 and 50-362 San Onofre Nuclear Generating Station Units 2 and 3

6. Letter from K. P. Baskin to F. Miraglia (NRC), dated August 3, 1982; Subject: Docket Nos. 50-361 and 50-362 San Onofre Nuclear Generating Station Units 2 and 3

7. Letter from K. P. Baskin to F. Miraglia (NRC), dated August 25, 1982; Subject: Docket Nos. 50-361 and 50-362 San Onofre Nuclear Generating Station Units 2 and 3

10CFR50.59 SAFETY EVALUATION

1. **May the proposed activity increase the probability of occurrence of an accident evaluated previously in the safety analysis?**

Response: No

The NUREG-0612 Heavy Loads Evaluation for the 480V transformer lift in the Penetration Area describes how each of the lifting activities and load handling systems meet the requirements of NUREG-0612 to the extent that the potential drop of a transformer or concrete plug onto safety-related equipment is precluded. Acceptable drop consequences are maintained through lift height restrictions which prevent any spalling or structural collapse of the concrete on any equipment located below the load path. Where acceptable drop consequences cannot be controlled, specifically during lifts through the open roof hatch, independent diverse lifting systems are used. No safety-related equipment will be impacted or in any way adversely affected by the lifts, since each of the redundant lifting systems is diverse and is capable of supporting the entire load during a seismic event. The supporting structure for the lifting systems has been analyzed to ensure that, even during a design basis seismic event, it is capable of supporting the load. The analysis for the acceptable lift heights and jib structure are contained in Calculation C-260-08. By changing to a single failure proof hoist arrangement, the probability of dropping the load and causing a previously analyzed accident is substantially reduced.

The overturning of the mobile badger crane toward the feeder cables between the reserve auxiliary transformers and the switchyard is prevented by positioning the crane such that the rear of the crane is pointed toward the transformer. The adjacent Unit (i.e., the other Unit) may need to enter an action statement for one offsite power feed per Technical Specification 3.8 in the unlikely event that the crane overturns and damages the feeder cables between the reserve auxiliary transformers and the switchyard. If the crane boom falls toward containment there would be no potential for damage since the structure is fully capable of absorbing the impact and that the tendon anchorages are located sufficiently away from the potential impact area. The badger crane while in the vicinity of reserve auxiliary transformers will be strictly controlled to preclude any potential contact or interaction with the auxiliary transformers. Crane activity in this area will be restricted to only one side of the plant at a time (one unit), and for a maximum duration of time of one (1) hour at a time. As such, there will be no risk to on-site power distribution as discussed in Chapter 8 of the UFSAR, and Tech. Spec. 3.8.

Thus, the probability of occurrence of any accident evaluated previously in the UFSAR is not increased.

2. **May the proposed activity increase the consequences of an accident evaluated previously in the safety analysis report?**

Response: No

The consequences of an accident evaluated previously in the safety analysis report is not increased because no equipment important to safety could be damaged from a failure during the lifting process. Measures are taken to ensure that the drop consequences do not result in unacceptable damage or through preventing a drop by single failure protection. The lifting activities also do not directly involve any safety systems for completing this activity.

The potential for a drop through the Penetration Area Roof is precluded through the use of diverse independent lifting systems and independent full capacity rigging. The potential drop consequences on the Penetration Area Roof were found to be acceptable and could not potentially damage any equipment or components located below the roof. The lift height restrictions and redundant lifting systems preclude the drop of a transformer or concrete plug through the roof opening which could result in damage to portions of the component cooling water system located below the floor at elevation 45'-0". Possible damage to the reserve auxiliary transformers is prevented by orienting the crane so that in the event of an overturning accident, the load and boom would fall away from the transformers.

As a defense in depth measure, the Component Cooling Water (CCW) Train A will be in operation and Train B will be secured at the time of the transformer replacement lifts. The most limiting malfunction of equipment important to safety would be loss of train A CCW and shutdown cooling. The consequences would be less in mode 1, than in mode 5, because steam generators are available for decay heat removal.

Therefore, the proposed changes in lifting activities will not increase the consequences of an accident evaluated previously in the UFSAR.

3. **May the proposed activity increase the probability of occurrence of a malfunction of equipment important to safety evaluated previously in the safety analysis report?**

Response: No

The potential for occurrence of an accident evaluated previously in the safety analysis report is not increased because no equipment important to safety could be damaged from a single failure during the lifting process. Measures are taken to ensure that the drop consequences do not result in unacceptable damage or through preventing a drop by single failure protection. The lifting activities also do not directly involve any safety systems for completing this activity.

The potential for a drop through the Penetration Area Roof is precluded through the use of diverse independent lifting systems and independent full capacity rigging. The potential drop consequences on the Penetration Area Roof were found to be acceptable and could not potentially damage any equipment or components located below the roof. The lift height restrictions and redundant lifting systems preclude the drop of a transformer or concrete plug through the roof opening which could result in potential damage to portions of the component cooling water system located below the floor at elevation 45'-0". Possible damage to the reserve auxiliary transformers is prevented by orienting the crane so that in the event of an overturning accident, the load and boom would fall away from the transformers.

As such, no safety-related equipment nor any accident mitigating systems will be affected from the proposed lifts. Therefore, the lifting activities will not increase the probability of occurrence of an accident evaluated previously in the UFSAR.

4. **May the proposed activity increase the consequence of a malfunction of equipment important to safety evaluated previously in the safety analysis report?**

Response: No

The potential consequence of a malfunction of equipment important to safety is not increased because equipment important to safety is not modified or directly affected from the lifting activities. Measures are taken to ensure that the drop consequences do not result in unacceptable damage or through preventing a drop by single failure protection in accordance with NUREG-0612. The lifting activities also do not directly involve any safety systems for completing this activity.

The potential consequence from a jib crane failure is not increased because the lifting activities will use single failure protection for lifts through the roof opening. Single failure protection precludes the potential for a load drop. Two independent load systems from the load to the jib structure ensure that if a failure occurs in one system, the other system can hold the load even during a seismic event. To ensure that adequate seismic margins are provided, the crane will have a maximum critical load of 4 tons for this lift. In addition, the jib crane is load tested every four years to 125% of its maximum rated load of 6 tons. This is 187 percent of the required load capacity for the lift. By preventing the potential load drop through the open roof, the consequences from a failure are not increased.

As a defense in depth measure, the CCW Train A will be in operation and Train B will be secured at the time of the transformer replacement lifts. The most limiting malfunction of equipment important to safety would be loss of train A CCW and shutdown cooling. The consequences would be less in mode 1, than in mode 5, because steam generators are available for decay heat removal.

As such, no safety-related equipment nor any accident mitigating systems will be affected from the proposed lifts. Therefore, the lifting activities will not increase the consequences of a malfunction of equipment important to safety evaluated previously in the UFSAR.

5. **May the proposed activity create the possibility of an accident of a different type than any evaluated previously in the safety analysis report?**

Response: No

Each of the lifting activities and load handling systems meets the heavy load requirements of NUREG-0612, Section 5.1.1. Safe Load Paths are provided. Procedures are used which define the safe load path, required equipment, criteria, and any precautions. Crane operators are trained and conduct themselves in accordance with Chapter 2-3 of ANSI B30.2-1976, "Overhead and Gantry Cranes." There are no special lifting devices used for this lift. However, rigging is provided and used in accordance with ANSI B30.9-1971, "Slings." As described in the SER, the crane is inspected, tested, and maintained in accordance with ANSI B30.11-1973, "Monorail systems and Underhung Cranes" and ANSI B30.16-1973, "Overhead Hoists." The structural guidelines for the jib crane meet the criteria of CMAA-70, "Spec. for Electric Overhead Traveling Cranes."

For the purpose of addressing the specific lifts considered within this safety evaluation, the requirements of Sections 5.1.5 and 5.1.6 of NUREG-0612 are also considered. Accordingly, the load handling system used is upgraded via redundancy or duality in the active components of the handling system.

The potential for dropping a transformer or concrete plug onto any safety-related equipment is precluded. No new equipment is added or modified as part of this activity. Any potential failures during the lifting activities will not create any new or unanalyzed accidents. Accordingly, no safety-related equipment or systems will be impacted or in any way adversely affected by the lifts. Thus, the lifting activities will not create the possibility of an accident of a different type than any evaluated previously in the UFSAR.

6. **May the proposed activity create the possibility of a malfunction of equipment important to safety of a different type than any evaluated previously in the safety analysis report?**

Response: No

The potential for creating equipment malfunctions that are different from those evaluated previously in the safety analysis report is not increased because no equipment important to safety could be damaged from a failure during the lifting process. Measures are taken to ensure that the drop consequences do not result in unacceptable damage or through preventing a drop by single failure protection. The lifting activities also do not directly involve any safety systems for completing this activity.

The potential for a drop through the Penetration Area Roof is precluded through the use of diverse independent lifting systems and independent full capacity rigging. The potential drop consequences on the Penetration Area Roof were found to be acceptable and could not potentially damage any equipment or components located below the roof. The lift height restrictions and redundant lifting systems preclude the drop of a transformer or concrete plug through the roof opening which could result in potential damage to portions of the component cooling water system located below the floor at elevation 45'-0". Possible damage to the reserve auxiliary transformers is prevented by orienting the crane so that in the event of an overturning accident, the load and boom would fall away from the transformers.

No safety-related equipment or systems are potentially affected by the lifting activities. In addition, no modifications are made to any existing equipment

important to safety. The lifting activities do not introduce any new accidents or create the possibility of any equipment malfunctions that are different from previously analyzed. Therefore, the lifting activities will not create the possibility of a malfunction of equipment important to safety of a different type than any evaluated previously in the UFSAR.

7. **Does the proposed activity reduce the margin of safety as defined in the basis for any technical specification?**

Response: No

The lifting activities and load handling systems are not discussed in the Technical specifications or Licensee Controlled Specifications. The heavy loads program is described in the August 27, 1984, Safety Evaluation Report. The jib crane is presently an exempt load handling system as listed in Table 2.6-3 of DBD-SO23-TR-HZ. The NUREG-0612 submittal dated April 30, 1982 from K. Baskin to F. Miraglia, it states:

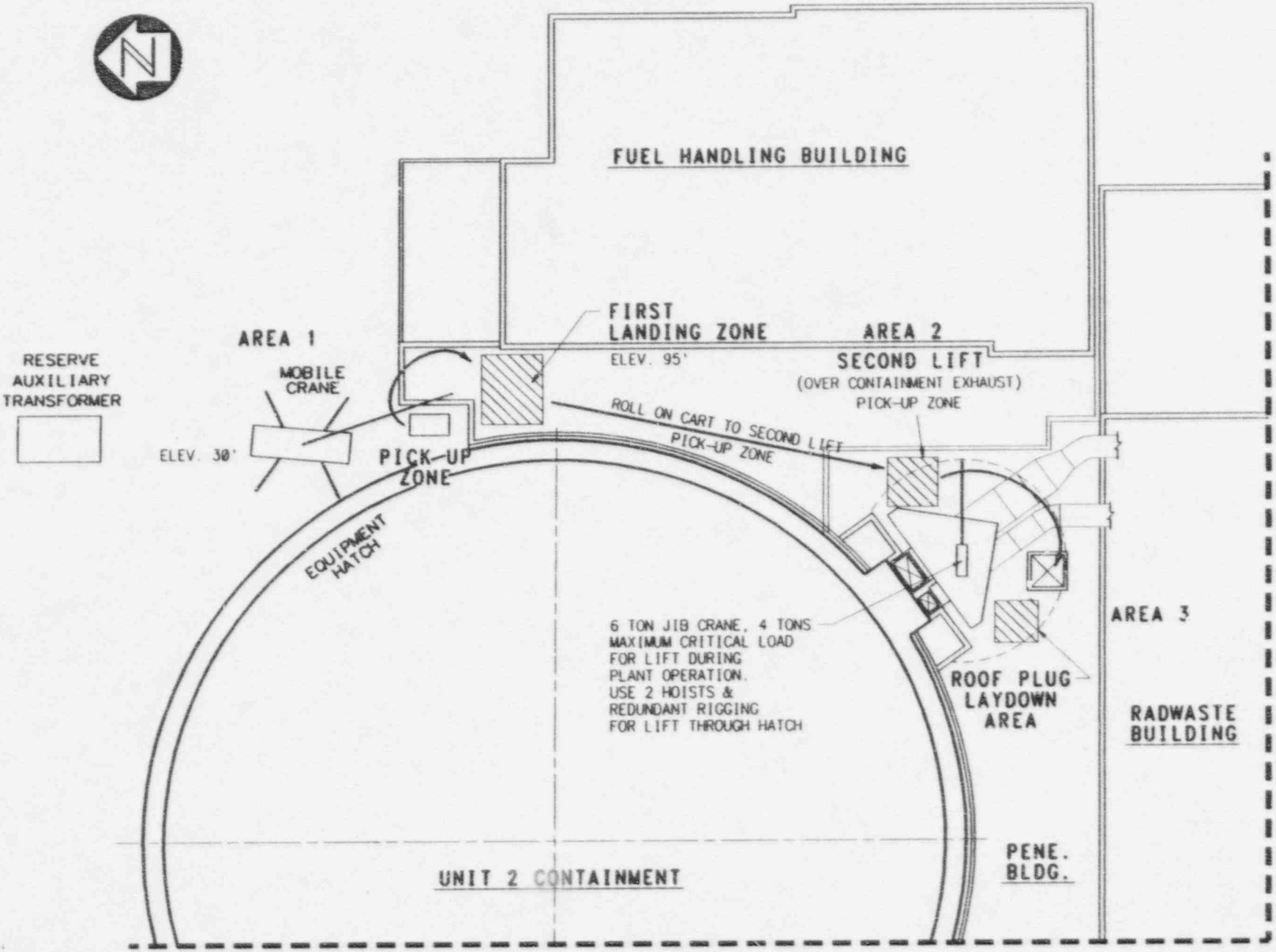
> "Jib Cranes 1 and 3 for Unit 2 are shown in Figure 3-8. Lifts of the Tendon Surveillance Platform and Load Center Transformer will be restricted to a maximum height of 9 feet above the roof to allow the loads to clear ducts in the area. Analyses have demonstrated that the resultant impact load is within the capability of the structure roof. In addition to movement over the roof slab, removal of the transformer through the equipment hatch at the roof requires a total lift of 59 ft over the floor at elevation 45'-0." A potential load drop from this height may result in extensive cracking or perforation of the floor at elevation 45'-0." Damage to safety related electrical and mechanical items housed below elevation 45'-0" including component cooling water (CCW) Train B, could potentially result. However, this transformer serves non-safety related systems and electrical backup is available. Removal and lifting of the transformer will be deferred until the next cold shutdown during which time the risk of load-drop damage to the non-safe-shutdown electrical and mechanical items is acceptable. In order to assure the safe removal of the transformer or concrete plug during a shutdown period, the Component Cooling Water (CCW) Train A will be in operation and Train B will be secured at the time of transformer or concrete plug removal."

This activity will now allow the transformer or concrete plug lift to be performed while the plant is operating. Single failure protections in

accordance with the guidelines in NUREG-0612 are adequately met to preclude the possibility of a load drop. Potential damage to the component cooling water system components are prevented by providing two independent lifting systems between the load and jib structure. Accordingly, no operations of safety-related equipment or systems will be impacted or in any way adversely affected by the transformer or concrete plug lift. As such, the lifting activities will not reduce the margin of safety as defined in the basis for any technical specification or as described in the August 27, 1984 Safety Evaluation Report.

Conclusion:

The proposed lifting activities for the transformer replacement in the Penetration Area can be safely accomplished using dual independent and diverse protection for lifts through the open roof. The consequences of a potential drop of the transformer on the roof or at grade on elevation 30'-0" have been analyzed and found to have acceptable consequences. All of the safety evaluation questions have negative responses. Therefore, the replacement of the transformers during plant operation can be safely performed using all measures as specified in this safety evaluation report.



PENETRATION AREA
LIFT SEQUENCE

FIGURE 1