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SUBJECT: Forwards partial response to EG Tourigny 870716 request for addl info re 870612 application for amend to license. Util will respond to certain portions of request in near future. Phased response acceptable by NRC.
SEE @ DRAWINGS

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L-87-374

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

Gentlemen:

Re: St. Lucie Unit 1
Docket No. 50-335
Spent Fuel Rerack

By letter L-87-245, dated June 12, 1987, Florida Power & Light Company (FPL) submitted a proposed license amendment to permit replacement of the spent fuel pool racks at St. Lucie Unit 1 to ensure that sufficient future capacity exists for storage of spent fuel.

By letter dated July 16, 1987 (E. G. Tourigny to C. O. Woody) the NRC Staff requested additional information in the area of plant systems it needed to continue its review of this proposed license amendment.

Attached is FPL's partial response to this request. As identified in the Attachment, FPL will respond to certain portions of this request in the near future. This phased response has been found acceptable by the NRC Staff.

If additional information is required, please contact us.

Very truly yours,

C. O. Woody
Group Vice President
Nuclear Energy

COW/EJW/gp

Attachments

cc: Dr. J. Nelson Grace, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

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QUESTION #1

QUESTION: In the June 12, 1987 submittal, Table 3-11 specifies the coolant flow rate for the spent fuel pool cooling systems to be 3560 gpm. Indicate whether this is the flow rate with one spent fuel pool cooling system pump running or with both pumps running.

RESPONSE: The coolant flow specified in Table 3-11 of the June 12, 1987 submittal refers to the component cooling water (CCW) flow to the spent fuel pool cooling system (SFPCS) heat exchanger. The CCW system at St Lucie Unit 1 consists of 3 pumps; two pumps run during all normal operating conditions, while the third is maintained in standby. The CCW system provides the coolant for the SFPCS heat exchanger and the CCW flow remains constant at 3560 gpm during normal operating conditions.

The number of spent fuel pool cooling pumps operating is described in Subsection 3.2.1 of the Safety Analysis report dated June 12, 1987. Tables 3-13/3-14 and 3-16/3-17 provide the bulk temperature versus time data for the maximum pool temperatures with the cooling system in operation. For normal refueling discharge conditions, one fuel pool pump (SFPCS flow rate 1500 gpm) and the fuel pool heat exchanger are in service. During abnormal refueling conditions, such as full core discharge, two fuel pool pumps (SFPCS flow rate 3000 gpm) and the heat exchanger are in service.

QUESTION #2

QUESTION: The submittal specifies that the spent fuel pool cooling system consists, in part, of two spent fuel pool cooling system pumps and one heat exchanger. Since all heat exchangers require maintenance at some point in time, it is not clear how the spent fuel pool will be cooled during the time that thé single spent fuel pool cooling system heat exchanger is out of service for maintenance. Provide a discussion of how the spent fuel pool is cooled and the temperature is maintained below the Technical Specification temperature limit for the following conditions:

1. The heat exchanger is out of service for plugging of failed tubes.

2. The heat exchanger is out of service for cleaning of the tubes.

3. The heat exchanger is out of service for replacement.

RESPONSE: Due to the low pressure, low temperature service environment, and the carefully controlled water chemistry, (of both the CCW and SFPCS) the SFP heat exchanger will only infrequently require maintenance. Maintenance operation such as cleaning and tube plugging can normally be scheduled in advance for periods of low pool decay heat loads (just before a normal refueling). The spent fuel pool heat exchanger is designed for the life of the plant, therefore its replacement is not postulated. However, in the extremely unlikely event that replacement is required, alternate means of providing cooling to the SFP could be implemented during replacement.

If there were no cooling provided to the SFP such that boiling were to occur, redundant sources of makeup water to the SFP are available, as discussed in St Lucie Unit 1 FSAR Amendment No 6, Section 9.1.3.4 and in Section 3.2.3 of the Safety Analysis Report for the Spent Fuel Pool Rerack date June 12, 1987. Boiling of the water in the SFP is adddressed in Section 9.1.3.4 of the FSAR and in Section 3.2.2.4 of the Safety Analysis Report. (There is no Technical Specification temperature limit for the SFP.)

QUESTION #3

QUESTION: Provide a drawing (or drawings as necessary) which shows the arrangement of the spent fuel pool cooling system piping in and around the spent fuel pool.

RESPONSE Sketches SK-83-02-M-002 and SK-83-02-M-003 (attached) show the arrangement of the spent fuel pool cooling system in and around the spent fuel pool.

Prior to installation of the new racks, piping in the spent fuel pool will be modified to provide clearance for the new racks. These modifications are to 1) Fuel Pool Cooling discharge sparger and 2) Fuel Pool Purification suction piping. These modifications are being implemented independent of the rerack pursuant to 10 CFR 50.59.

The Fuel Pool Cooling discharge sparger will be modified by cutting off the sparger section leaving a tee at the end of the discharge pipe. The net result will be that the water will no longer be discharged over the length of the sparger but exit in two streams along the pool wall. Since the water will still enter the pool on the opposite side from the suction and the new racks will tend to distribute the flow, no negative affect on the Spent Fuel Pool Cooling system will occur. All the analyses have been done with the modified sparger configuration. The modified configuration of the sparger is shown on the attached sketches.

The Fuel Pool purification suction piping will be modified to bring it closer to the wall to clear the new racks. The new design will maintain the existing functions. This system is not required for cooling and is not required for any safety related function. It's sole purpose is to provide purification of the pool water to maintain visibility and keep radiation exposures as low as possible. Since the design of the suction piping is not presently finalized, the existing configuration of the suction piping is shown.

QUESTION #4

QUESTION: Page 4-28 states that the fuel assembly drop accident was evaluated with the dropped assembly being positioned 36 inches above the top of the spent fuel storage racks. It is not clear that this represents the maximum height that the fuel assembly will be carried over the spent fuel storage racks. Specify the maximum carrying height for fuel assemblies within the spent fuel pool area and discuss the physical design features which prevent a fuel assembly from being carried higher than the specified height, or verify that the fuel assembly drop accident analysis is bounding by assuming total failure of all affected fuel assemblies.

RESPONSE: The design of the spent fuel handling machine provides for a normal upper limit on the hook travel of Elevation 85'-7 (palm of hook). This corresponds to an elevation of 37'-5 1/2 at the bottom of the shortest fuel assembly. The top of the high density spent fuel racks is at elevation 36'-2 5/8, resulting in a clearance of 14 7/8" between the top of the racks and the bottom of the fuel assembly under normal conditions. Should all interlocks fail, the physical limitations of the spent fuel handling machine will prevent the hoisting of the fuel assembly above an elevation at which 9' of water cover remains above the top of the active fuel. This condition corresponds to an elevation of 39'-3 1/8 at the bottom of the shortest fuel assembly, resulting in a clearance of 36 1/2" between the top of the racks and the bottom of the fuel assembly. This is the maximum possible drop height for the design of the racks. The analysis performed for a 36" drop is sufficiently conservative that re-doing the analysis for 36 1/2" is not required.

QUESTION #5

QUESTION: Provide drawings which show the movement of both the existing and the new racks throughout their entire path of travel from outside of the fuel handling building until their final location in the spent fuel pool (and the reverse for the existing racks).

RESPONSE: For the removal of the racks from the spent fuel pool cask storage area to outside the spent fuel pool (see General Arrangement sketch SK-83-02-M-001 attached) each rack module will be removed individually following a path that does not carry the rack over any other racks containing spent fuel (see response to question number 6). Each rack module will be removed by crane and transported over a prescribed path to the spent fuel cask storage area. The old racks will be washed down and dried. The dried racks will then be placed in polyethylene bags and removed to the cask equipment decontamination area. The polyethylene bags will be removed and discarded and the racks will be cleaned until desired results are achieved. The racks will be inserted in clean polyethylene bags and moved to a designated rack storage area on site.

For installation of the new spent fuel racks the racks will be brought from their onsite storage location to the cask washdown area and cleaned as required. After cleaning is complete each rack module will be transported into the spent fuel cask storage area. From the spent fuel cask storage area the module will be transported over the spent fuel pool (see response to number 6) to its proper location, where it will be placed. During the process the racks will not be carried over racks containing spent fuel.

QUESTION #6

QUESTION: For each step in the replacement of the racks, provide drawings which show the location of the spent fuel and the movement of the fuel which demonstrates that no heavy load will be carried over spent fuel or over any rack which contains spent fuel. (Note: This information can be placed on the set of drawings provided in response to question 5).

RESPONSE: The attached drawing shows the various locations of the spent fuel during the rack installation. Described below is the sequence of rack removal and installation.

1. Following the removal plan (see question #5), remove Racks 1 and 2 from the pool as shown in Figure #1.

2. Following the installation plan (see question #5), install Racks F1-G2-G1 as shown in Figure #2.

3. Relocate all of the 238 fuel assemblies stored in Rows "L through T" to new racks F1-G2-G1 as shown in Figure #3.

4. Following the removal plan (see question #5), remove all four racks, which are in Rows "L through T", removing 3, 4, 5 and 6 shown in Figure #3.

5. Following the installation plan (see question #5), install new Racks D2, C3, C1, as shown in Figure #4.

6. Relocate all the assemblies stored in old racks into new racks as shown in Figure #5.

7. Following the removal plan (see question #5), remove all eight Racks 7, 8, 9, 10, 11, 12, 13 and 14 shown in Figure #5.

8. Following the installation plan (see question #5), install new Racks D3, B2, C4, B1, C2, A2, A1, D1, H1, E2 and E1 shown in Figure #6.

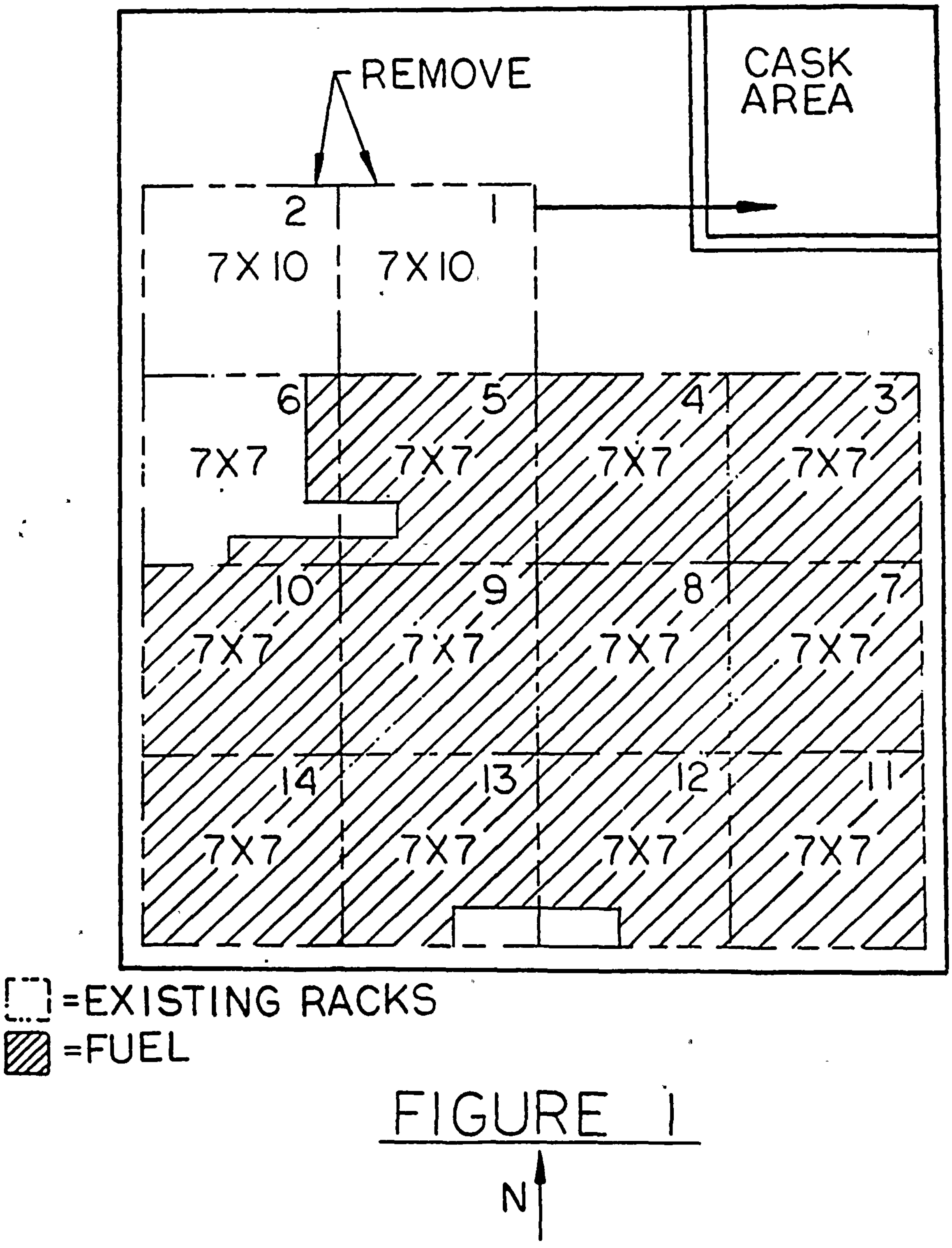


FIGURE 1

NUC nuclear utility construction

TITLE: SEQUENCE OF RACK REMOVAL AND INSTALLATION

ENCLOSURE: 1 of 6

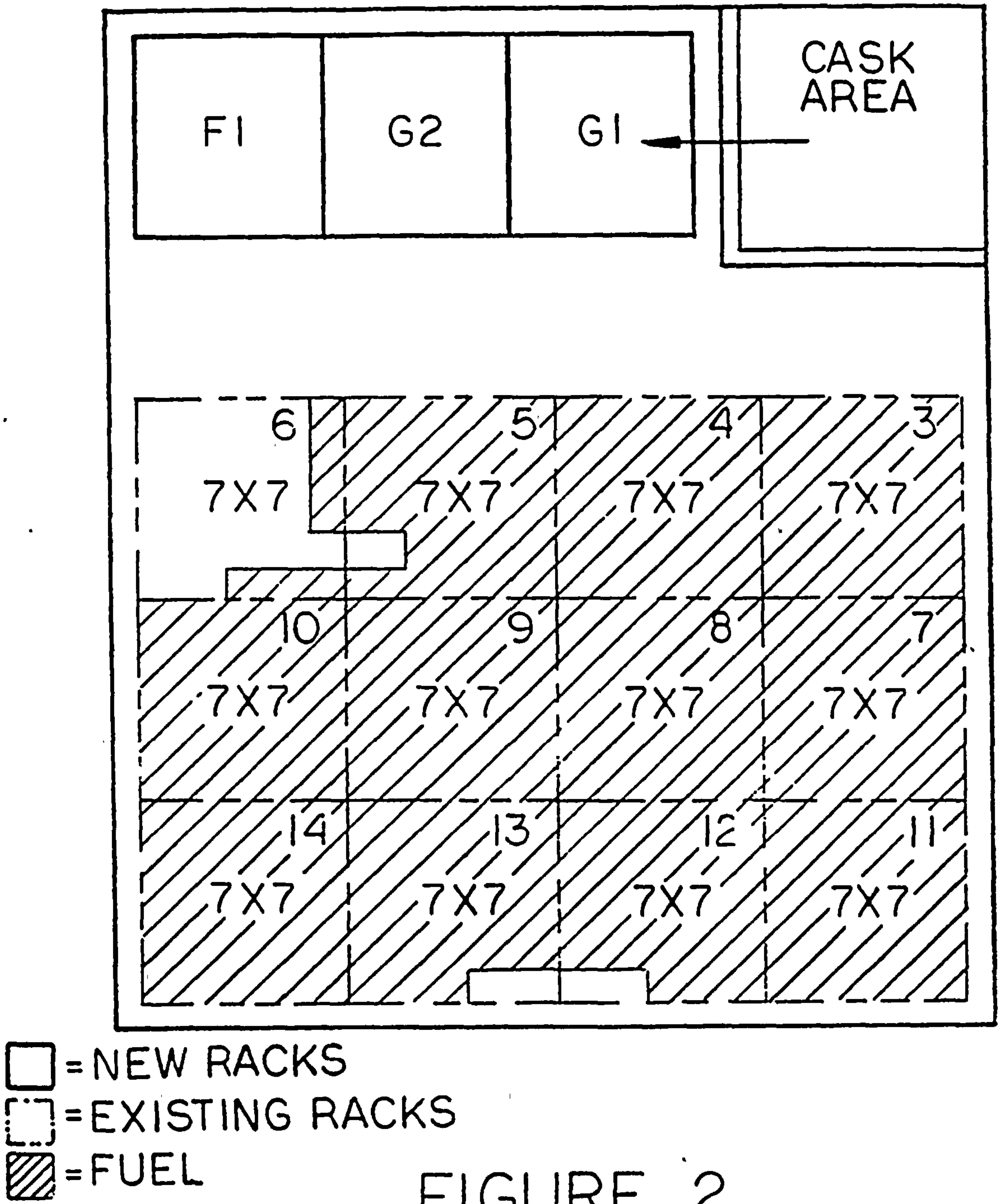


FIGURE 2

N

nuclear utility construction	TITLE: SEQUENCE OF RACK REMOVAL AND INSTALLATION ENCLOSURE: 2 of 6

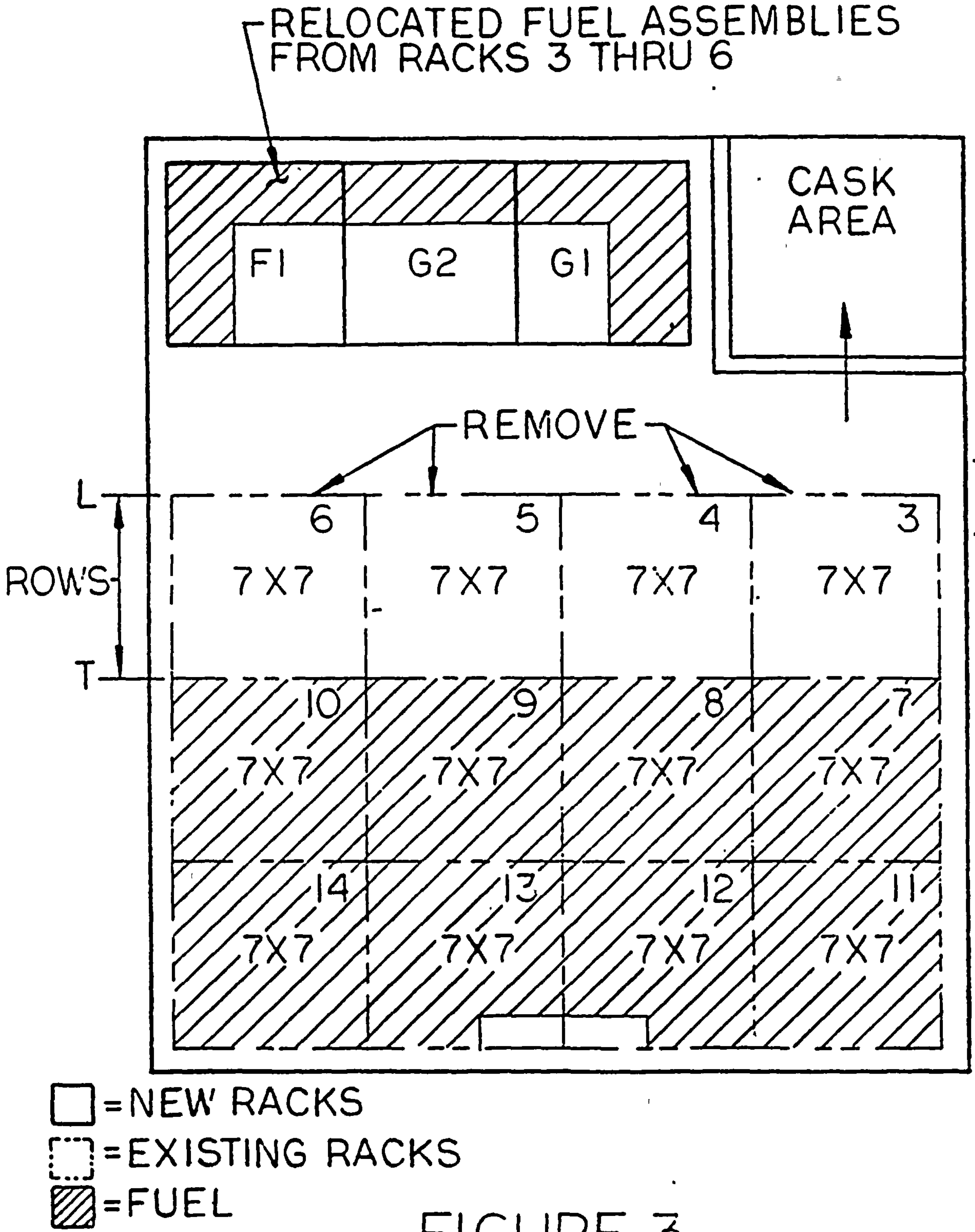


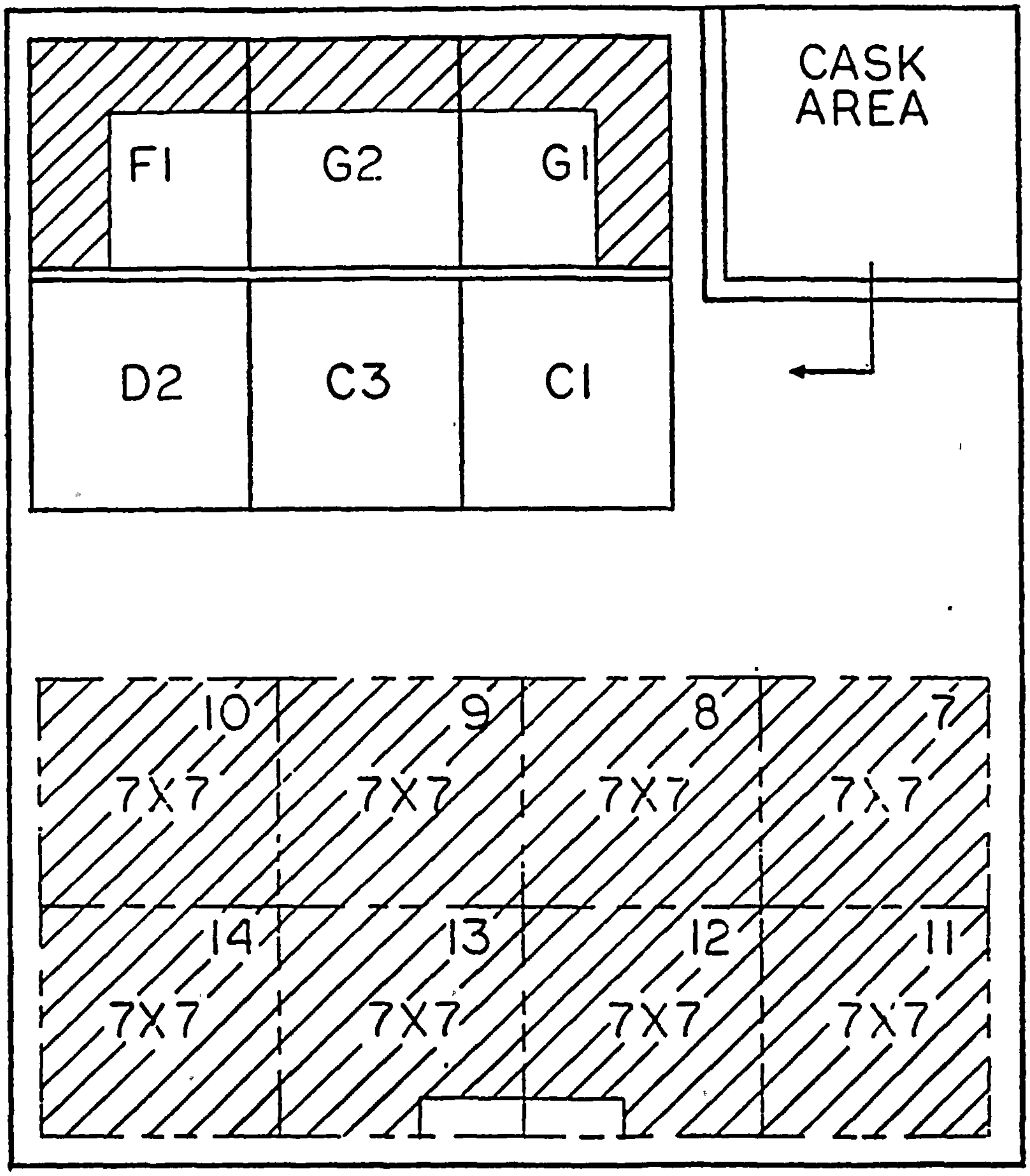
FIGURE 3

N

nuclear utility construction

TITLE: SEQUENCE OF RACK REMOVAL AND INSTALLATION

ENCLOSURE: 3 of 6



□ = NEW RACKS
⬚ = EXISTING RACKS
▨ = FUEL

FIGURE 4

N

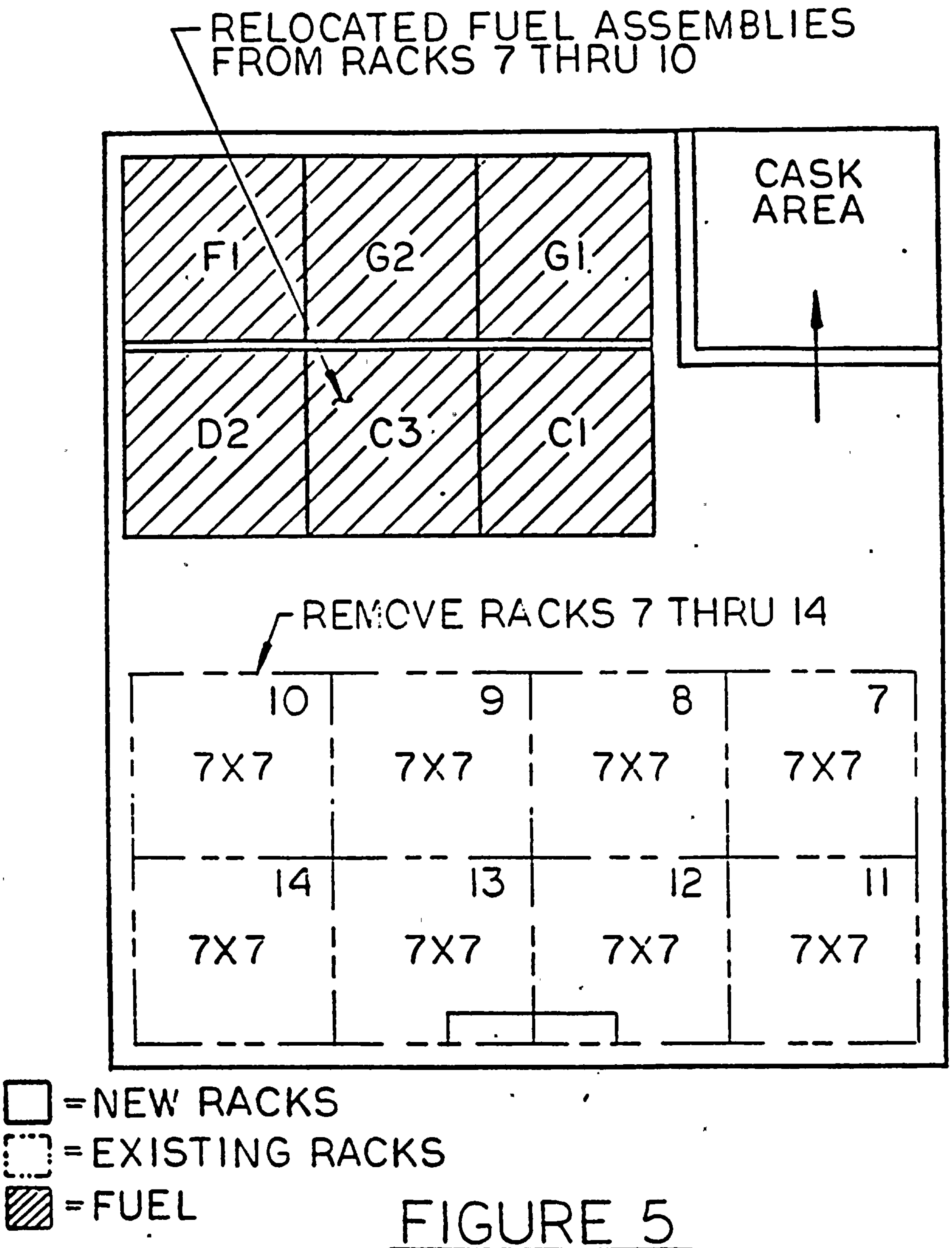


FIGURE 5

NUC nuclear utility construction

TITLE: SEQUENCE OF RACK REMOVAL AND INSTALLATION

ENCLOSURE: 5 of 6

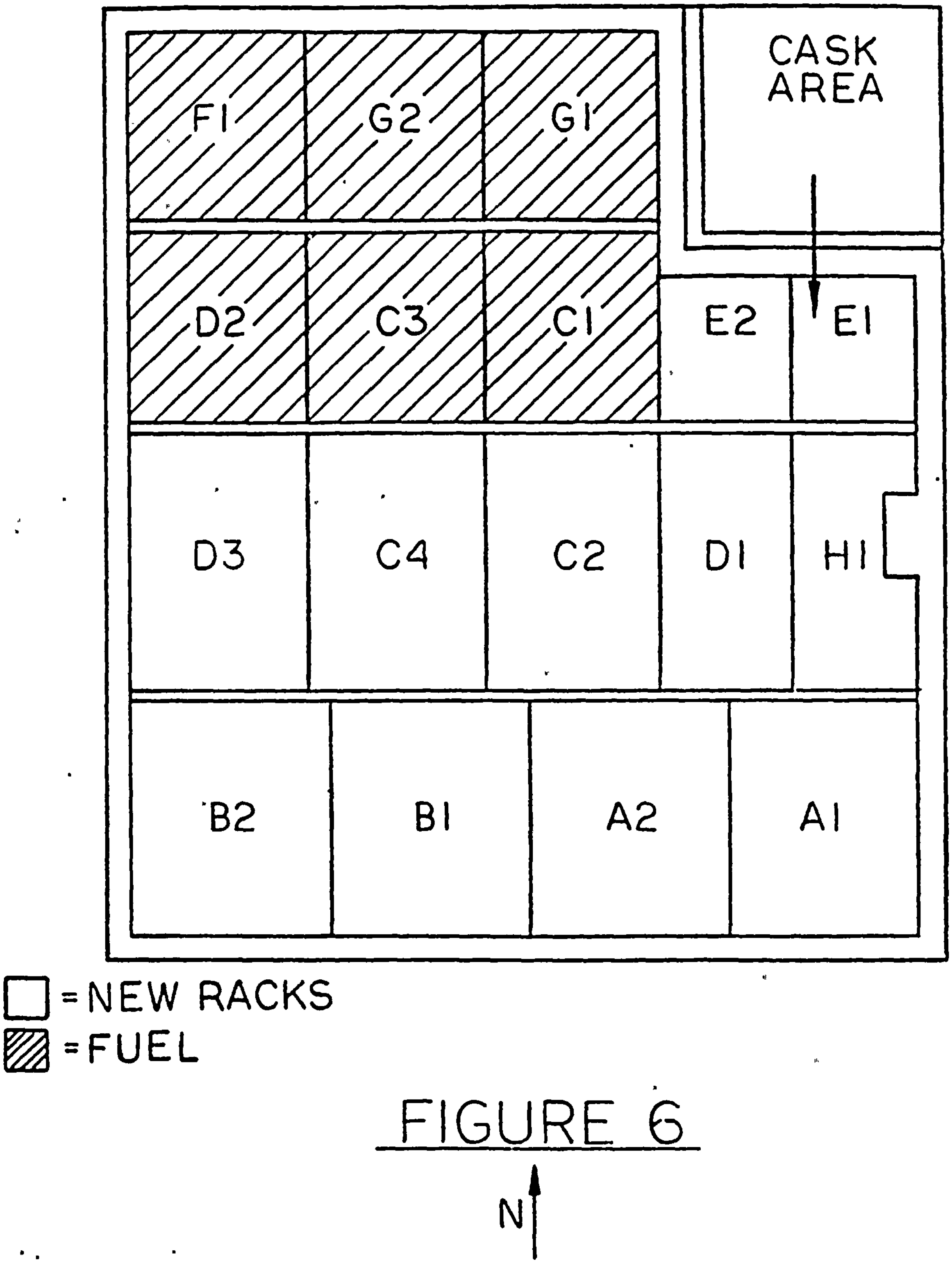


FIGURE 6

NUC nuclear utility construction

TITLE: SEQUENCE OF RACK REMOVAL AND INSTALLATION

ENCLOSURE: 6 of 6

QUESTION #7

QUESTION: Provide additional discussion on the temporary crane that will be used to handle the spent fuel storage racks within the fuel building. As part of the discussion, specify 1) whether the crane is single failure proof; 2) whether the temporary crane will be carried over the spent fuel pool; and 3) the load path that the fuel building crane will take to carry the temporary crane. Provide drawings of the temporary crane and pertinent details which demonstrates the crane's compliance with the guidelines of NUREG-0612 and NUREG-0554. If the temporary crane is not single failure proof, provide the results of the analysis which demonstrates that the appropriate safety factors have been applied to the crane and that load handling by the crane will be in accordance with the guidelines of NUREG-0612.

RESPONSE: [At present information concerning the following aspects of the temporary crane are unavailable:

1. Guidelines

2. Single Failure Proof

3. Safety Factors

The temporary crane will not be carried over the spent fuel. FPL is developing detailed drawings of the temporary crane. The load pattern that the fuel building crane (fuel cask handling crane) will take to carry the temporary crane as well as the requested temporary crane information is being developed.]

QUESTION #8

QUESTION: Provide drawings of the lifting rigs. Verify that the lifting rigs are single failure proof and meet the guidelines of NUREG-0612.

RESPONSE: The lifting rig used for the installation of the new racks meets the requirements of NUREG-0612. The rig is provided with four support points; in the event of the failure of any one of these attachment points, the remaining three would be capable of retaining the load in a safe condition, thus satisfying the single-failure-proof criterion. See attached drawing 8770-11891 Rev 1.

[Information regarding the lifting rig used for the removal of the existing racks is being developed.]

QUESTION #9

QUESTION: Assuming that a rack is dropped, provide a discussion of how it will be verified that no damage has been done to the pool liner, spent fuel pool cooling system piping in the spent fuel pool, or to other racks.

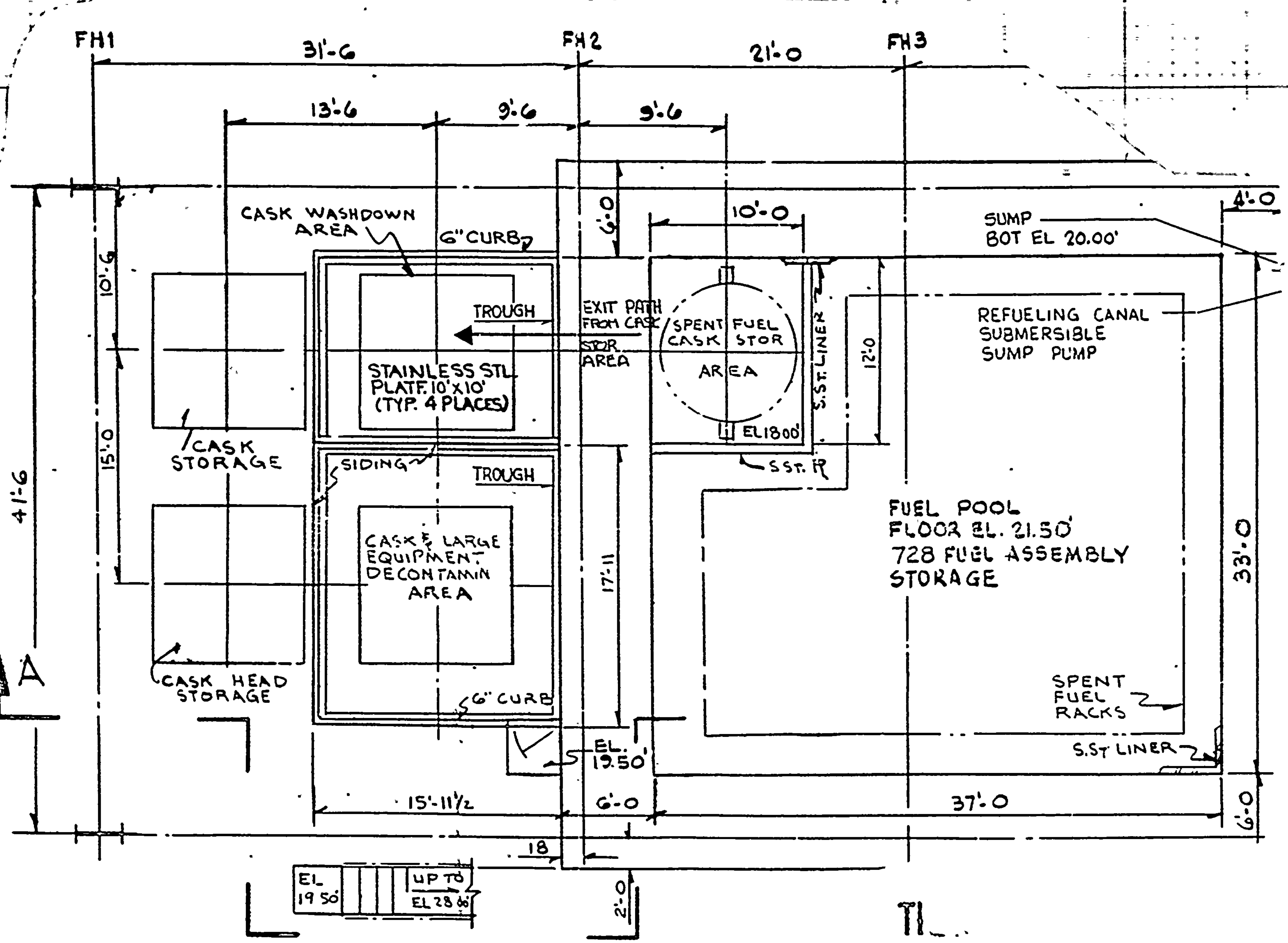
Assuming that the dropped load was the result of the lifting attachment, describe how you would provide a new lifting attachment that makes the lift single failure proof.

Provide a discussion of the potential splashing effects from the dropped rack on the loss of suction for the spent fuel pool cooling system and with respect to the effects on plant personnel in the area.

RESPONSE: Assuming that a rack is dropped in the pool, it would be possible to assess potential damage to the pool liner, pool cooling system, or other racks by the use of remote video equipment, by the leak chase system, or, if the above methods prove inconclusive, by divers. The leak chase system is discussed in the St Lucie Unit 1 FSAR Amendment No. 6 section 9.1.2.2.

Assuming that a rack has been dropped into the pool, reattachment to the lifting rig, or the second available lifting rig assuming the first is damaged, would be made by either a long handled tool or by divers if attachment cannot be made by the long handled tool.

In the unlikely event splashing does occur Health Physics personnel will be available to decontaminate any personnel contaminated by splashing. It is not postulated that splashing/wave action resulting from the drop of a rack into the SFP would result in the loss of suction for the SFP cooling system, due to transient wave action, because of the location of the suction line. (Approximately 6 feet below the water surface). In the unlikely event that suction is lost, the cooling system could be vented and returned to service by operator action.



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GENNERAL ARRANGEMENT
FUEL HANDLING BUILDING PLAN

SK-83-02-M-001

BRUNING 44-132 50168-C

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