ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8803170289 DOC.DATE: 88/03/11 NOTARIZED: NO DOCKET #
FACIL:50-361 San Onofre Nuclear Station, Unit 2, Southern Californ 05000361
50-362 San Onofre Nuclear Station, Unit 3, Southern Californ 05000362
AUTH.NAME AUTHOR AFFILIATION
MEDFORD,M.O. Southern California Edison Co.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Forwards descriptions of fuel handling sys,design basis fuel handling accidents & spent fuel cask drop accidents.

DISTRIBUTION CODE: A001D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 22
TITLE: OR Submittal: General Distribution

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD5 LA	1	0	PD5 PD	5	5
	HICKMAN,D	1	1			
INTERNAL:	ACRS	6	6	ARM/DAF/LFMB	1	0
	NRR/DEST/ADS7E4	1	1	NRR/DEST/CEB8H7	1	1
	NRR/DEST/MTB 9H	1	1	NRR/DEST/RSB 8E	1	1
	NRR/DOEA/TSB11F	1	1	NRR/PMAS/ILRB12	1	1
	OGC 15-B-18	1	0	REG FILE 01	1	1
	RES/DE/EIB	1	1			
EXTERNAL:	LPDR	1	1	NRC PDR	1	1
	NSIC	1	1			

R I D S / A D D S

R I D S / A D D S

TOTAL NUMBER OF COPIES REQUIRED: LTTR 26 ENCL 23

Southern California Edison Company

P. O. BOX 800

2244 WALNUT GROVE AVENUE

ROSEMEAD, CALIFORNIA 91770

M. O. MEDFORD
MANAGER OF NUCLEAR ENGINEERING
AND LICENSING

TELEPHONE
(818) 302-1749

March 11, 1988

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

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
TAC Nos. 66970 and 66971
San Onofre Nuclear Generating Station
Units 2 and 3

References:

1) December 30, 1987 letter from M. O. Medford (SCE) to Document Control Desk (NRC); Subject: same as above

2) January 12, 1988 letter from M. O. Medford (SCE) to Document Control Desk (NRC); Subject: same as above

3) February 22, 1988 letter from M. O. Medford (SCE) to Document Control Desk (NRC); Subject: same as above

4) February 26, 1988 letter from Donald E. Hickman (NRC) to Kenneth P. Baskin (SCE) and Gary D. Cotton (SDG&E); Subject: Request for Additional Information, San Onofre Units 2 and 3 (TAC Nos. 66970 and 66971)

By Reference 1, Southern California Edison (SCE) submitted Proposed Change PCN-242 to the San Onofre Units 2 and 3 Facility Operating Licenses and provided supplemental information by Reference 2 to allow storage of spent fuel produced by the operation of San Onofre Unit 1 at Unit 2 and Unit 3. By Reference 3, a formal application for Amendments 38 and 24 to the Units 2 and 3 Facility Operating Licenses, respectively, was submitted to the NRC. In response to Reference 4, SCE is providing, in an enclosure to this letter, descriptions of the Fuel Handling System, Design Basis Fuel Handling Accidents and Spent Fuel Cask Drop Accidents relevant to receipt and storage of Unit 1 spent fuel at Units 2 and 3.

Approval by the NRC of Amendment Applications 38 for Unit 2 and 24 for Unit 3 is necessary prior to receipt of Unit 1 fuel at either Units 2 or Unit 3. Approval is needed by March 16, 1988 so that transshipment may begin on

A001
1/1

March 17, 1988 to provide for transshipment of a cask with 7 spent fuel elements from Unit 1 to Units 2 and 3 before the end of the current Unit 1 outage. Your prompt action would be most appreciated.

If you have any questions or would like additional information, please let me know.

T. D. Mercurio
for M.O. Medford

Enclosure

cc: D. Hickman, NRR Senior Project Manager, San Onofre Units 2 and 3
J. B. Martin, Regional Administrator, NRC Region V
F. R. Huey, NRC Senior Resident Inspector, San Onofre Units 1, 2 and 3
J. O. Ward, California Department of Health Services

ENCLOSURE

SHIPMENT OF SAN ONOFRE UNIT 1 SPENT FUEL TO THE SAN ONOFRE UNITS 2 AND 3 SPENT FUEL POOLS

Introduction

The purpose of this document is to present the background and procedures for the shipment of San Onofre Unit 1 spent fuel to San Onofre Units 2 and 3. Shipment of spent fuel will allow the continued operation of Unit 1 until the year 2004 (date of anticipated license expiration) and provide for the ability to offload the Unit 1 core for the next ten year reactor vessel inservice inspection.

Description

The proposed shipment method will utilize a 70 ton, seven (7) element cask instead of the previously evaluated 125 ton cask for transport of the spent fuel from Unit 1 to Units 2 and 3. All other procedures for the handling of spent fuel and cask remain the same at San Onofre Units 2 and 3. In order to perform the shipment, the following areas need to be addressed:

1. Spent Fuel Cask
2. Load Path Between Units 1, 2 and 3
3. Units 2 and 3 Spent Fuel Pool Cask Drop Accidents
4. Fuel Handling Accident with Unit 1 Fuel in Unit 2/3 Spent Fuel Pool

Handling of the spent fuel cask at Units 2 and 3 is included in the Heavy Load Control Program at San Onofre. The handling of heavy loads including movement of a spent fuel cask at Units 2 and 3 was reviewed and approved by the NRC in the safety evaluation transmitted by NRC letter to SCE dated August 27, 1984. In the safety evaluation it was concluded the heavy load handling operations associated with the shipment of spent fuel satisfy the seven Phase I guidelines of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants." In addition, it is the conclusion of the NRC, as documented in their letter to All Licensees of Operating Reactors dated June 28, 1985, that the NUREG-0612 Phase I guidelines are adequately providing the intended level of protection against load drop accidents. Specifically, the NRC concluded that "the risks associated with damage to safe shutdown systems are relatively small because: 1) nearly all load paths avoid this equipment, 2) most equipment is protected by an intervening floor, 3) of the general independence between crane failure probability and safety-related systems which has been observed, and 4) redundancy of components".

The Units 2 and 3 FSAR addresses spent fuel cask handling operations, operations for Units 2 and 3 fuel movement, and the storage of Unit 1 fuel at Units 2 and 3. The cask crane described in FSAR Section 9.1 is a 125 ton crane. Use of the 70 ton spent fuel cask does not pose any new concerns for the crane for the heavy loads program. The Units 2 and 3 spent fuel handling machines will be used to handle Unit 1 fuel with the existing procedures and the fuel handling accident evaluation in the Units 2 and 3 FSAR Section 15.7.3.4 for Units 2 and 3 spent fuel is bounding for a potential fuel handling accident with Unit 1 fuel.

The procedures for the Heavy Loads Control Program have been reviewed for the handling of the 70 ton spent fuel cask. Training of crane operators, handling and checkout of the cranes and testing of lift rigs have been implemented as part of the program. Handling of the spent fuel cask and use of the cranes is controlled by SO123-I-1.13, "Cranes, Rigging, and Lifting Controls," and SO23-I-3.32, "Cask Handling Crane Checkout and Operation."

Since the NRC previously reviewed and approved the handling of heavy loads and fuel handling accidents at San Onofre, the implementation of the proposed shipment process has been evaluated by SCE and found to be covered by those reviews and approvals. The handling of the spent fuel cask will be done in accordance with the NRC's guidelines from NUREG-0612. Therefore, the concerns with lifts and movements of the spent fuel cask are satisfied in accordance with the approved Heavy Loads Control Program. Therefore, it is concluded that the handling of the San Onofre Unit 1 spent fuel cask in accordance with the existing San Onofre Units 2 and 3 Heavy Load Control Program and procedures is consistent with the NRC's previous review and resolution of heavy loads issues documented in the August 27, 1984 SER.

Specific concerns in certain areas need to be addressed in detail. The areas have been identified above. The reason for a more detailed discussion of these areas is to demonstrate how the receipt of Unit 1 spent fuel at Units 2 and 3 falls within previous heavy loads and accident evaluations. The areas are addressed below.

1. Spent Fuel Cask

   The spent fuel cask to be used for the shipment is the GE-IF-300. This cask weighs 70 tons and carries seven spent fuel assemblies. It has a Certificate of Compliance for Radioactive Material Packages which means it is licensed by the NRC for use on public roadways. The cask will be used entirely within the San Onofre site for the shipment. The cask will not be transported over any highways or public roads during the shipment process or while it is located at San Onofre. Shipment of the cask back to the vendor will be done without spent fuel assemblies and in accordance with the 10 CFR 71 requirements.

   The Unit 1 spent fuel being shipped is bounded by the GE-IF-300 Consolidated Safety Analysis Report (CSAR) NEDO-10084-3 (see Table 1). The fuel shipments will be conducted entirely onsite and do not fall under 10 CFR 71. It is specifically stated in 10 CFR 71.0(c) that "The regulations in this part apply to any licensee authorized by specific license issued by the Commission to receive, possess, use or transfer licensed material if the licensee delivers that material to a carrier for transport or transports the material outside the confines of the licensee's facility, plant or other authorized place of use." This is the San Onofre site bounded by the owner controlled area. This does not alleviate licensees from transporting radioactive material in a safe manner. Therefore, an NRC licensed cask is being utilized for the shipment. The shipments will be done in a safe manner in accordance with the cask's certificate of compliance with the following deviations. These deviations have been concurred in by the cask vendor.

Table 1

GE-IF-300

7-Element/70-Ton Cask

Certificate of Compliance - Number 9001, expires May 30, 1990

Currently being used to ship BWR fuel to the GE facility in Morris, Illinois.

	PWR Boundaries	SONGS 1 Fuel
Fuel form	Clad U02 pellets	Clad U02 pellets
Cladding material	Zr or SS	SS
Maximum initial U content/assembly, kg	465	425
Maximum initial U-235 enrichment, w/o	4.0	4.0
Maximum bundle cross section, in	8.75	7.63
Fuel pin array	14x14/15x15	14x14
Fuel diameter, in	0.380-0.460	.422
Fuel pin pitch range, in	0.502-0.582	.556
Maximum active fuel length, in	145	120
Maximum decay heat per package for dry shipment	40,000 BTU/hr	40,000 BTU/hr*
Maximum decay heat per assembly for dry shipment	5,725 BTU/hr	5,725 BTU/hr*
Maximum burnup	35,000 MWD/MTU	34,777 MWD/MTU**

* This is the decay heat approximately 2 years 8 months after shutdown. The last refueling shutdown was November 21, 1985. The last assemblies discharged from the core will meet the decay heat criteria for dry shipment on July 14, 1988. These include batch H and G-29.

** Two assemblies are above 35,000 MWD/MTU - (F-27 at 38,756 MWD/MTU and G-29 at 38,001 MWD/MTU).

A. The lifting trunnions will not be removed and the valve box covers will not be in place for movement between units. This will facilitate handling of the cask at each unit. The cask and trailer will be moved entirely on site. The travel speed between units will be no greater than 5 mph and ensures there will be no transport accidents with the cask.

B. Some shipments may be wet, to increase cooling capacity, or to reduce the cross contamination of irradiated fuel particles between units.

C. Some fuel assemblies may slightly exceed the 35,000 MWD/MTU over the road licensed burnup limit.

D. The helium leak test will be performed by station personnel to track the degradation of the gasket to facilitate a change out when fuel is not involved. A leak test satisfying the requirements of 10 CFR 71 will be performed prior to shipping the cask back to the vendor.

These deviations are considered acceptable since the shipments will be conducted entirely on site. Cask drops are addressed in Item 3 below. Transport accidents with the cask are precluded by shipping entirely onsite and by the fact that the tractor trailer will not travel at speeds greater than 5 mph onsite. The transport path is such that the cask will be outside the protected area in the owner controlled area for a very short distance (approximately 200 yards). It is anticipated that the travel time from the Unit 1 cask area to the Unit 2 or Unit 3 cask area will be less than 1/2 hour. The transport speed of the cask will be less than five miles per hour, and other traffic in the area will be less than ten miles per hour. Station security will accompany the case during transport between units. Health Physics will be monitoring the operation throughout the procedure to maintain ALARA considerations. This monitoring will ensure neutron, beta and gamma radiation are within the limits ALARA Engineering has set for this program. Attached documentation from Pacific Nuclear (the vendor) supports the use of the GE-IF-300 as described. Fuel assemblies that have a heat generation greater than 5725 BTU/HR, and fuel assemblies that have a burnup greater than 35,000 MWD/MTU and less than 40,000 MWD/MTU with less than 4 years cooling time must be shipped wet. The procedure contains positive steps to ensure that the heat load and burnup (the only deviations in Table 1) are met.

2. Load Path Between Units 1, 2 and 3

The spent fuel cask will be moved on a tractor trailer from the Unit 1 south turbine deck extension to the Units 2 and 3 Fuel Handling Buildings. The tractor trailer will exit the Protected Area at the Unit 1 railroad gate. It will be escorted by Security and Health Physics while in the Owner Controlled Area. The vehicle and cask will travel at a speed of 5 miles per hour. It will reenter the Protected Area through the railroad gate at Unit 2 east of the Diesel Generator Building. It will then move south towards the Unit 2 or 3 Fuel Handling Building loading bay.

When moving from the Unit 1 south turbine deck extension through the protected area the tractor trailer does not travel over any underground safety related equipment, components or systems. When traversing the Owner Controlled Area the trailer passes over a communication duct bank. The top of the concrete duct bank which carries cable for the Public Address system is located 7'-5" below grade. The duct bank is buried sufficiently to be safe from the tractor trailer load. At Units 2 and 3 there is no safety related equipment, component or system located underground in the path of the tractor trailer.

3. Units 2 and 3 Spent Fuel Pool Cask Drop Accidents

The cask drop accidents analyzed for the Units 2 and 3 spent fuel pools were based on using a 125 ton cask.

The cask loading area of the spent fuel storage pool is designed to withstand the impact load of a dropped 125 ton fuel shipping cask from a maximum height of 28 feet 6 inches without water leakage from the Fuel Handling Building. Water leakage from the pools is collected by a leak chase system behind the pool liner plate and transferred to a sump at the bottom level of the structure. This is discussed in the Units 2 and 3 FSAR. The water is then sent to the Radwaste Area for processing.

The FSAR discusses in detail the analysis of the drop of the 125 ton spent fuel cask in the cask storage pool. An evaluation of the drop of the 70 ton cask indicates the results are within the allowable limits specified in the previous analysis for the 125 ton cask. Specifically, the 125 ton cask drop governs the structural responses of the concrete slab and basemat and the 70 ton cask governs the perforation and spalling thickness calculations. Using the Ballistic Research Laboratory (BRL) equation for perforation of steel plates, the plate thickness required to prevent perforation for a drop of the 70 ton cask is 1.15 inches which is less than the total plate thickness of 1.31 inches provided (1 inch backing plate plus 3/16 inch liner plate and 1/8 inch reliner plate). This is a conservative approach which neglects the fact that the plates are fully bearing on a relatively unyielding concrete surface. When the steel plates are evaluated for their actual condition of being fully supported on concrete, the failure mechanism becomes bearing or crushing instead of perforation. The impact force of the 70 ton cask on the pool floor is calculated as 240 kips which equates to a bearing stress of 48 ksi (four 1 1/2 inch thick fins are assumed to strike simultaneously). The allowable bearing stress for stainless steel is 1.5 Fu or 105 ksi per AISC. Even using the previously described conservative BRL approach, only the 1/8 inch and 3/16 inch plates will be perforated but water leakage into the soil is precluded by the leak chase system.

During cask handling operations, the spent fuel cask cannot travel over the spent fuel pool where spent fuel is stored due to physical limitations in crane travel (refer to Figure 9.1-24 of the FSAR). There are no conceivable cask drops that could result in dropping a cask directly into the spent fuel pool.

Exposure to cask drop exists only in the spent fuel cask storage pool which is adjacent to the spent fuel pool. A 4-foot thick reinforced concrete wall separates the spent fuel pool from the spent fuel cask storage pool. This concrete wall ensures that a cask dropped into the spent fuel cask storage pool will not damage the spent fuel racks in the spent fuel pool.

The east-west direction of cask approach and regress into the spent fuel cask storage pool ensures that a dropped cask will not directly impact the 4-foot thick separation wall. The prescribed east-west direction of travel for the crane is dictated by limit switches provided in the cask handling crane. Operation of the crane with travel path restricted by limit switches is enforced by administrative control. In addition, physical obstructions consisting of 10-inch square steel posts and a 1-foot thick, 20-foot high concrete wall are provided to preclude operator-initiated movement of the cask along paths other than the prescribed east-west direction of travel. The physical obstructions are not crash barriers but are effective to preclude crane movement of the cask over unauthorized paths in the event that administrative controls fail to enforce operation of the crane under restricted path mode. Since the cask handling crane is prohibited from traveling over the spent fuel pool or any unprotected safety-related equipment, an accident resulting from dropping a cask or other major load into the spent fuel pool is not credible.

The Units 2 and 3 Technical Specification 3/4.9.7 limits the load carried over the spent fuel pool to the nominal weight of a Unit 2 and 3 fuel assembly. The Unit 1 fuel weighs approximately 240 pounds less than the Unit 2 and 3 fuel.

During handling operations, the spent fuel cask does not travel over essential equipment. There is no essential equipment located on the operating floor of the Fuel Handling Building. The 4 foot thick operating floor is designed to withstand a cask drop of 6 inches, and the lift height is limited to 6 inches above the operating floor. The operating floor provides a protective barrier for the spent fuel pool heat exchangers and cooling pumps and HVAC equipment which are located at the lower elevations below the operating floor of the Fuel Handling Building.

During handling operations, the spent fuel cask is not exposed to a direct vertical drop of more than 30 feet onto an unyielding surface. The maximum lift height (34 feet to grade) occurs at a point above the open hatch to a 3 foot high rail car addressed in the FSAR. A tractor trailer will be used instead of the rail car. The tractor trailer has a minimum height of 3 feet 1 inch and will be positioned on an 8 inch high steel ramp. Administrative controls will be employed to ensure that the trailer and cask skid, which provide a yielding surface, and the ramp is in place during cask handling operations. The resultant maximum vertical drop, therefore, will be less severe than a 30-foot vertical drop onto an unyielding surface.

As discussed in Subsection 9.1.4 of the FSAR, the potential vertical drop of a spent fuel cask is limited to less than an equivalent 30-foot vertical drop onto a flat, essentially unyielding, horizontal surface. Thus, the radiological consequences of this accident are not evaluated because this drop is within the design basis of the cask.

The Fuel Handling Building post accident cleanup filter system which includes charcoal filtration will be operable in accordance with Technical Specification 3/4.9.12 when the hatches are closed. The hatches to the outside will only be opened to move the cask in or out of the building. During such times the integrity of the cask will protect the fuel inside the cask and no operations will be performed over the spent fuel pool.

The water level in the spent fuel pool is required to be maintained at 23 feet above stored fuel by Technical Specification 3/4.9.11. The water level will be lowered from a normal level of 27 feet 6 inches to 24 feet 6 inches above the fuel to allow cask handling without placing the cask crane block in the water. The spent fuel pool low level alarm has been lowered accordinglay to ensure the Technical Specification value of 23 feet is maintained.

4. Fuel Handling Accident With Unit 1 Fuel in Units 2/3 Spent Fuel Pools

Based on the Units 2 and 3 FSAR, Section 15.7.3.4, the limiting fuel handling accident for a SONGS 2/3 fuel assembly at SONGS 2/3 facilities is a maximum vertical drop of a vertically-oriented assembly to an end-on initial impact on the spent fuel pool floor, followed by a toppling over to a final impact of the side of the assembly on a hypothetical sharp, unyielding edge on the pool floor. This would be the limiting fuel handling accident for a SONGS 1 fuel assembly at SONGS 2/3 facilities.

The stress at final impact in a SONGS 1 assembly would be smaller than for the SONGS 2/3 assembly because the momentum at impact would be less, due to the SONGS 1 assembly's lower mass and shorter length (1209 pounds vs. 1451 pounds and 136.4 inches vs. 176.8 inches) and Unit 1 fuel will be transferred at the same or less height above the pool floor as a Units 2/3 assembly. Since the strength of the fuel rods in a SONGS 1 assembly is comparable to that in a SONGS 2/3 assembly, the number of failed rods in the SONGS 1 assembly would be no more than in a SONGS 2/3 assembly.

The analysis in FSAR Section 15.7.3.4 of the SONGS 2/3 fuel final impact indicated failure of the impacted row of sixteen fuel rods. Based on considerations in the previous paragraph, the SONGS 1 assembly would experience failure of its impacted row of fourteen fuel rods.

FSAR Section 15.7.3.4 demonstrates that the failure of sixteen fuel rods in a SONGS 2/3 fuel assembly would result in a release of radioactivity that is well within the limits of 10CFR100. The failure of fourteen fuel rods in a SONGS 1 fuel assembly would release a lesser amount of radioactivity, since there are fewer failed fuel rods with less radioactivity contained in each rod.

A comparison of gross radioactivity released to the spent fuel pool would involve consideration of all but very short-lived noble gases and volatile iodines for both SONGS 1 and SONGS 2/3. However, a good indication of gross activity release can be obtained by comparing gap inventory of Kr-85 for the two cases, since it is a long-lived isotope and there would be total release of gap inventory in both cases.

Based on SONGS 2/3 FSAR (Table 15.7-5) the Kr-85 gap inventory for 16 peak pins is 1.54×10^3 Ci. SONGS 1 FSAR (Table 11.7) gives a value of Kr-85 gap inventory as 1.8×10^2 Ci/MWT. Using an overall radial peaking factor of 3.0 (actual is 2.89) and assuming a peak burnup of twice that of the FSAR, this value can be converted to $.72 \times 10^3$ Ci for 14 peak pins. Thus, the SONGS 1 fuel handling accident consequences would be bounded by the (acceptable) consequences predicted for SONGS 2/3.

The comparison in the previous paragraph was based on a decay time of 72 hours for San Onofre Units 2/3 and of 90 hours for San Onofre Unit 1. In the actual case of transferring Unit 1 fuel assemblies to Units 2/3 spent fuel pools, the Unit 1 fuel will have decayed a minimum of 120 days. This additional decay time provides added conservatism to the comparison made in the previous paragraph.

There is less radioactivity to be released from each Unit 1 fuel rod because there is less uranium initially, the Unit 1 burnup is less and the decay time is longer.

	Unit 1	Unit 2/3
Enrichment	4.0%	4.1%
Burnup MWD/MTU	38,756	45,000

Safety Evaluation

The shipment process, as discussed above, shall be deemed to constitute an unreviewed safety question if positive findings are made in any of the following areas.

1. Will operation of the facility utilizing the shipment methodology involve an increase in the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated?

   Response

   Operation of the facility utilizing this shipment methodology will provide for the shipment of spent fuel from San Onofre Unit 1 to San Onofre Units 2 and 3. This methodology involves the use of a GE IF-300 multi-element 70 ton spent fuel cask.

   Handling of the 70 ton spent fuel cask will be done in accordance with the Heavy Loads Control Program at San Onofre. The issue of the handling of heavy loads has been resolved by the NRC. A safety evaluation has been issued for the program at Units 2 and 3 by letter dated August 27, 1984. In addition, the NRC has indicated in their June 28, 1985 letter that the Phase I guidelines of NUREG-0612 adequately provide the intended level of protection against load drop accidents. This level of protection is maintained by the evaluation of the NUREG-0612 guidelines relative to the 70 ton spent fuel cask. Therefore, handling of the cask in accordance with the Heavy Load Control Program is consistent with the NRC's review and resolution of heavy loads issues, such that the probability of the occurrence of an accident or the malfunction of equipment important to safety is unchanged. Furthermore, since the Heavy Loads Control Program is sufficient to preclude load drop accidents in accordance with the NUREG-0612 guidelines, consequences of load drop accidents need not be evaluated. This is consistent with the NRC's June 28, 1985 letter. The Unit 1 fuel will be handled in accordance with existing Units 2 and 3 procedures and the consequences of a Unit 1 fuel element handling accident are conservatively bounded by the existing Units 2 and 3 fuel handling accident evaluation.

Notwithstanding the above resolution of issues, certain areas are addressed in more detail. These areas were previously evaluated prior to the NRC's resolution of heavy loads issues as part of the NRC's earlier approval of the shipment of spent fuel at Unit 1 as documented in their February 1981 safety evaluation.

Spent Fuel Cask

A GE-IF-300, 70 ton, 7 element spent fuel cask, which has been licensed by the NRC, will be used for the shipment. This cask will be handled in a manner similar to other spent fuel casks. Drops of the cask are addressed in those sections where lifts are discussed. Transport accidents with the cask are precluded by the speed of the tractor trailer not exceeding 5 mph and the vehicle speed in the area of the cask being 10 mph. Probabilities or consequences of accidents associated with this particular spent fuel cask are no different than those for any other NRC licensed cask.

Load Path Between Units 1, 2 and 3

Since there is no safety-related equipment located underground in the load path, there are no possibilities of the cask and tractor trailer assembly affecting safety-related equipment during transport between units. Therefore, the accident probabilities or consequences or the malfunction of equipment associated with the movement of the cask between units is not affected by the tractor trailer load path.

Units 2 and 3 Spent Fuel Pool Cask Drop Accidents

Handling of the 70 ton spent fuel cask will be done in exactly the same manner as any other spent fuel cask at Units 2 and 3. The Units 2 and 3 FSAR evaluates the use of a 125 ton spent fuel cask in the Fuel Handling Building. At Units 2 and 3, the spent fuel cask is prevented from traveling over the spent fuel pool by physical and administrative controls. Therefore, a drop of the cask in the spent fuel pool is not credible. Also, a drop of the cask will not affect essential equipment since it is located below the Fuel Handling Building operating floor. In addition, the maximum lift height of the cask over the operating floor is limited to 6 inches and the floor is designed to withstand a drop from 6 inches of the 125 ton cask. The previous analysis of the 125 ton cask was evaluated for the drop of the 70 ton cask and the consequences resulting from the drop are not changed.

For the Units 2 and 3 spent fuel pools, the analysis of the cask drop in the cask storage area is documented in the FSAR. Again, that analysis used a 125 ton cask. The consequences of that accident analysis are not changed based on the evaluation of the drop of the 70 ton cask.

Handling of Unit 1 Spent Fuel

The Units 2 and 3 spent fuel pool storage racks are designed to store Unit 1 fuel. The spent fuel pool level will not be lowered below the minimum level required for Unit 1 fuel handling activities nor below the technical specification limit for Unit 2 and 3 spent fuel storage. Administrative controls shall be implemented which prevent Units 2 and 3 fuel handling and refueling activities at the lowered spent fuel pool level. Additionally, the Unit 2 and 3 fuel cannot be picked up inadvertently due to design differences between the Units 2 and 3 (CE) fuel and Unit 1 (Westinghouse) fuel. All previously evaluated fuel handling accidents in the FSAR still apply as conservatively bounding. The spent fuel handling tool length for the Unit 1 fuel is sized to prevent raising the Unit 1 fuel above the minimum safe water cover depth when the hoist is at the upper limit. The spent fuel pool low water level alarm setpoint ensures that this minimum safe water cover depth is maintained for the Unit 1 fuel. Therefore, the accident probabilities or consequences have not increased with the handling of the Unit 1 fuel in the Units 2 and 3 spent fuel pools.

In summary, the methodology in which the shipment is being carried out does not increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated.

2. Will operation of the facility utilizing the shipment methodology create the possibility of an accident or malfunction of a different type than any previously evaluated?

Response

Operation of the facility utilizing the shipment methodology will provide for the shipment of spent fuel from San Onofre Unit 1 to San Onofre Units 2 and 3. This methodology involves the use of a multi-element 70 ton GE IF-300 spent fuel cask instead of the previously evaluated 125 ton cask.

The handling of the 70 ton spent fuel cask will be done in accordance with the Heavy Load Control Program at San Onofre. This program is the result of the NRC's review and resolution of the heavy loads issue. The NRC's resolution of that issue did not identify accidents or malfunctions that were different from those that had been previously reviewed. The inclusion of the spent fuel cask within the Heavy Load Handling Program involved the revision as necessary of procedures, training and testing to accommodate the new load. The evaluation of the new load in accordance with the NUREG-0612 guidelines ensures the conclusions resulting from the NRC's resolution are still maintained for the new load. Therefore, the addition of the new load, the 70 ton spent fuel cask, does not create the possibility of a different accident or malfunction than any previously analyzed.

Handling of Unit 1 spent fuel will be in accordance with existing Units 2 and 3 procedures.

Notwithstanding the above resolution of issues, certain areas are addressed in more detail. These areas were previously evaluated prior to the NRC's resolution of heavy loads issues as part of the NRC's earlier approval of the shipment of spent fuel at Units 2 and 3 as documented in the February 1981 NRC safety evaluation.

Spent Fuel Cask

A spent fuel cask which has been licensed by the NRC will be used for the shipment. This cask will be handled in a manner no different than other spent fuel casks. Drops of the cask are addressed in those sections where lifts are discussed. Transport accidents are precluded by the tractor trailer speed being no greater than 5 mph. Therefore, no different accidents or malfunctions are created by the handling of the cask.

Load Path Between Units 1, 2 and 3

Since there is no safety-related equipment located underground, transporting the cask from Unit 1 to Units 2 and 3 does not affect any safety-related equipment. Therefore, no different accidents or malfunctions have been created as a result of transporting the cask between units.

Units 2 and 3 Spent Fuel Pool Cask Drop Accidents

The Fuel Handling Building at Units 2 and 3 have been designed to accommodate a 125 ton spent fuel cask. This is addressed in detail in the FSAR. Use of the 70 ton cask does not create a different accident or malfunction from any of those previously evaluated.

Handling of Unit 1 Spent Fuel

Administrative controls shall be implemented which prevent the fuel handling activities of Units 2 and 3 irradiated fuel at the proposed lower spent fuel pool alarm setpoint. In addition, the fuel handling tool for Unit 1 fuel cannot pick up Unit 2 and 3 fuel due to design difference. Only activities associated with the movement of Unit 1 fuel will be done with the lowered setpoint. Administrative controls shall also be implemented to reset (raise) the spent fuel pool low level alarm to the existing low level alarm setpoint for future Unit 2 and 3 fuel handling and refueling operations. Therefore, no different accident or malfunction is possible with the handling of the Unit 1 fuel in the Units 2 and 3 spent fuel pools.

In summary, the methodology in which the shipment is being carried out does not create any different accidents or malfunctions than any previously evaluated.

3. Will operation of the facility, in accordance with the proposed change, involve a significant reduction in a margin of safety?

Response

Operation of the facility utilizing this shipment methodology will provide for the shipment of spent fuel from San Onofre Unit 1 to San Onofre Units 2 and 3. This methodology involves the use of a multi-element 70 ton GE IF-300 spent fuel cask.

The lowering of the water level at the Units 2 and 3 spent fuel pool does not affect the technical specifications. The change provides a Units 2 and 3 spent fuel pool low level alarm setpoint specifically for Unit 1 fuel during shipment activities. The basis for Technical Specification 3/4.9.11 ensures that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The change will not impact the basis nor require a change to Technical Specification 3/4.9.11 as the lowered spent fuel pool alarm setpoint for the Unit 1 fuel shipment is still above the minimum level of 23 feet above the top of the Unit 2 and 3 irradiated fuel assemblies seated in the storage racks. All other specifications will be complied with and their margins maintained. Therefore, the margins of safety, including those defined in the bases for the technical specifications, are not changed by the use of this shipment methodology.

ATTACHMENT

PACIFIC NUCLEAR SYSTEMS

February 29, 1988

Mr. Thomas Raldy
Southern California Edison
P.O. Box 128
San Clemente, CA 92672

Dear Tom:

Shipments of fuel between SONGS Unit 1 and Units 2/3 can be accomplished with the IF-300 in the following configuration:

1) The Valve Box Covers can be removed.

2) The Lifting Trunnions can remain in place.

3) Shipments can be made with the cask full of water. Mr. T.E. Tehan, the PNSI representative at the SONGS site will provide specific wet shipment requirements.

Shipment of fuel with burn-up of less than 40,000 MWd/KgU can be made dry so long as the cooling time exceeds 4 years. High burn-up fuel with cooling time of less than 4 years must be shipped "wet" that is ie. the cask must be filled with water.

The leak test requirements and the use of helium is discussed in my letter to you dated January 14, 1988.

Please call me if you have any questions.

Sincerely,

PACIFIC NUCLEAR SYSTEMS, INC.

Wallace C. Wheadon

Wallace C. Wheadon

cc: Roger Shingleton
Tom Tehan

PACIFIC NUCLEAR SYSTEMS

January 14, 1988

Mr. Thomas W. Raidy
Southern California Edison
P. O. Box 128
San Clemente, CA 92672

Dear Tom:

The leak test requirements for the IF-300 fuel shipping cask are defined in the section X of the CSAR and in the PNSI supplied Operating Instruction Manual (GEI-92817C). These tests and the acceptance criteria apply when spent fuel or irradiated hardware is being shipped between two separate points. These requirements as well as those contained in the cask C of C and in 10CFR71 do not apply so long as the cask does not leave the SONGS property boundary line. SCE is, therefore, in a position to define the type of leak testing to be performed on the IF-300 during such time as shipments are confined between Unit 1 and Units 2/3. The bounding condition appears to be the site specific requirements contained in your Tech Specs.

The following recommendations are provided for your consideration.

1. When the water is drained from the cask cavity clean air can be used instead of helium. The helium purge is not required.

2. The helium leak test can be eliminated. All areas normally subjected to the helium leak test should, of course, be monitored for radiation streaming.

3. When a new Graylock seal is installed the gap between the cask head and the body is approximately 3/8". As the head is removed and replaced this gap decreases. The gasket should be replaced when this gap reaches 1/8". This should allow for approximately 15-16 closures. This criteria must be followed in the event the helium leak test is eliminated.

It is recommended that your testing procedure be reviewed by PNSI/GE and with your local NRC office. Once the cask is prepared for shipment off site then the requirements of the C of C apply and must be strictly followed.

Sincerely,

Wally Wheadon

Wallace C. Wheadon

Spent Fuel Services Division 1010 South 336th Street Federal Way, Washington 98003 (206) 874-2235 Telex: 152667 PNSI UD