BEFORE THE UNITED STATES NUCLEAR REGULATORY COMMISSION

Application of SOUTHERN CALIFORNIA EDISON COMPANY and SAN DIEGO GAS & ELECTRIC COMPANY for a Class 104(b) License to Acquire, Possess, and Use a Utilization Facility as Part of Unit No. 1 of the San Onofre Nuclear Generating Station	)	DOCKET NO. 50-206 Amendment No. 148

SOUTHERN CALIFORNIA EDISON COMPANY and SAN DIEGO GAS & ELECTRIC COMPANY, pursuant to 10 CFR 50.90, hereby submit Amendment Application No. 148.

This amendment consists of Proposed Change No. 181 to Provisional Operating License No. DPR-13. Proposed Change No. 181 modifies Provisional Operating License No. DPR-13 and the Technical Specifications incorporated as Appendix A and requests NRC approval of the transshipment of spent fuel at San Onofre Unit 1.

Proposed Change No. 181 requests the NRC approval of the transshipment of San Onofre Unit 1 spent fuel to San Onofre Units 2 and 3. The methodology is described in detail in the report entitled, "The Transshipment of San Onofre Unit 1 Spent Fuel," dated April 1988.

Proposed Change No. 181 is a request to revise License Condition 3.C. This condition was made effective on January 15, 1976 by NRC Amendment No. 18. The condition required that modifications and tests on the turbine building shall be completed prior to use of the air pallet system for spent fuel shipment. This proposed change would revise the license condition to indicate that shipment of spent fuel will be conducted in accordance with the methodology described in SCE's report entitled, "The Transshipment of San Onofre Unit 1 Spent Fuel," dated April 1988, as approved by the NRC. The proposed method for spent fuel shipment does not include the air pallet system.

Proposed Change No. 181 deletes Appendix A Technical Specifications 4.13, "Turbine Deck Load Bearing Test and Visual Inspection." This specification was approved by the NRC in connection with the use of the air pallet system. It requires a turbine deck load bearing test and inspection every four years. Since the proposed method for spent fuel shipment does not include the air pallet system, this specification is no longer applicable and should be deleted.

In the event of conflict, the information in Amendment Application No. 148 supersedes the information previously submitted in letters dated December 24, 1987 and February 4, 1988.

Based on the safety evaluation provided in the Description and Safety Analysis of Proposed Change No. 181, it is concluded that (1) the proposed change does not involve significant hazards considerations as defined in 10 CFR 50.92, and (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change.

The fee of $150 that is required pursuant to 10 CFR 170.12 has been remitted in conjunction with the December 24, 1987 submittal.

ACL:9225F

Subscribed on this 28th day of April, 1988.

Respectfully submitted,
SOUTHERN CALIFORNIA EDISON COMPANY

By: Kenneth P. Baskin
Kenneth P. Baskin
Vice President

Subscribed and sworn to before me this 28th day of April, 1988.

C. Sally Sebo
Notary Public in and for the County of
Los Angeles, State of California

OFFICIAL SEAL
C. SALLY SEBO
Notary Public-California
LOS ANGELES COUNTY
My Comm. Exp. Apr. 20, 1990

My Commission Expires: Apr. 20, 1990

Charles R. Kocher
James A. Beoletto
Attorneys for Southern
California Edison Company

By: James A. Beoletto
James A. Beoletto

Subscribed on this 25 day of April, 1988.

Respectfully submitted,
SAN DIEGO GAS & ELECTRIC COMPANY

By: Gary D. Cotton
Gary D. Cotton
Senior Vice President

Subscribed and sworn to before me this

25 day of April.

OFFICIAL SEAL
STEPHANIE E. HITT
NOTARY PUBLIC-CALIFORNIA
PRINCIPAL OFFICE IN
SAN DIEGO COUNTY
My Commission Exp. Aug. 30, 1991

Stephanie E Hitt
Notary Public in and for the County of
San Diego, State of California

My Commission Expires: 8/30/1991

David R. Pigott
Samuel B. Casey
Orrick, Herrington & Sutcliffe
Attorneys for San Diego
Gas & Electric Company

By: David R Pigott
David R. Pigott

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of SOUTHERN CALIFORNIA EDISON COMPANY and SAN DIEGO GAS & ELECTRIC COMPANY (San Onofre Nuclear Generating Station Unit No. 1	)	Docket No. 50-206

CERTIFICATE OF SERVICE

I hereby certify that a copy of Amendment Application No. 148 was served on the following by deposit in the United States Mail, postage prepaid, on the 28th day of April, 1988.

Henry J. McGurren, Esq.
Staff Counsel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20545

David R. Pigott, Esq.
Samuel B. Casey, Esq.
Orrick, Herrington & Sutcliffe
600 Montgomery Street
San Francisco, California 94111

L. G. Hinkleman
Bechtel Power Corporation
P.O. Box 60860, Terminal Annex
Los Angeles, California 90060

Michael L. Mellor, Esq.
Thelen, Marrin, Johnson & Bridges
Two Embarcadero Center
San Francisco, California 94111

Huey Johnson
Secretary for Resources
State of California
1416 Ninth Street
Sacramento, California 95814

Janice E. Kerr, General Counsel
California Public Utilities Commission
5066 State Building
San Francisco, California 94102

James McGuffin
Western Regional Manager
Westinghouse Electric Corporation
Post Office Box 2728
Pittsburgh, Pennsylvania 15230

A. I. Gaede
23222 Cheswald Drive
Laguna Niguel, California 92677

Frederick E. John, Executive Director
California Public Utilities Commission
5050 State Building
San Francisco, California 94102

Docketing and Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

James A. Beoletto

DESCRIPTION AND SIGNIFICANT HAZARDS
CONSIDERATION ANALYSIS OF PROPOSED CHANGE NO. 181
TO PROVISIONAL OPERATING LICENSE DPR-13 AND TECHNICAL SPECIFICATIONS

DESCRIPTION

At the present time, San Onofre Unit 1 is licensed to ship fuel using the air pallet system. This system is described in SCE's March 21, 1975 submittal regarding Spent Fuel Shipping Cask Handling. This method of shipment was approved by the NRC staff in their safety evaluation dated January 15, 1976. The proposed transshipment method will utilize a heavier multi-element cask and the San Onofre Unit 1 turbine gantry crane for transport of the spent fuel cask above the turbine deck instead of the air pallet. All other types of equipment for the handling of spent fuel and cask remain the same at San Onofre Units 1, 2 and 3. Specific detailed actions which encompass the entire transshipment operation beginning with removing the Unit 1 spent fuel from the Unit 1 spent fuel pool through deposit of the Unit 1 spent fuel into the Units 2 and 3 spent fuel pools, are controlled by a special procedure SO123-X-9, "Transshipment of Spent Fuel Using the IF-300 Cask." In order to perform the transshipment, the following areas need to be addressed. The reason for a detailed discussion of these areas is due to the previous NRC evaluations of heavy loads handling and the shipment of spent fuel at Unit 1 as documented in the NRC's January 15, 1976 safety evaluation and issues raised during meetings and discussions with NRC representatives.

A. Heavy Loads
B. Spent Fuel Cask
C. Turbine Gantry Crane
D. Turbine Building
E. Decontamination Pad
F. Spent Fuel Pool
G. Load Path Between Units 1, 2 and 3

The storage of Unit 1 spent fuel at Units 2 and 3 is described in UFSAR Sections 9.1.2 and 9.1.3 and was approved by the NRC in the NRC Safety Evaluation Report, Sections 9.1.2 and 9.1.3, dated February 1981. Under separate action, a licensing amendment has been approved by the NRC which allows the storage of Unit 1 spent fuel at the Units 2 and 3 spent fuel pools. There are no modifications to Units 2 and 3 that are associated with the transshipment process.

A. HEAVY LOADS

The entire transshipment process at Units 1, 2 and 3 will be performed in accordance with the Heavy Load Control Program at San Onofre. The handling of heavy loads at Unit 1 has been reviewed and approved by the NRC in their safety evaluation transmitted by letter dated November 5, 1985. The heavy loads issues associated with the movement of a spent fuel cask at San Onofre Unit 1 were reviewed relative to the seven guidelines of Phase I of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants" and the results of this review are provided in Attachment 1. The review concluded, in a

manner similar to the approach used by the NRC in their review of other San Onofre Unit 1 heavy load handling operations documented in the safety evaluation, that the heavy load handling operations associated with the shipment of spent fuel from San Onofre Unit 1 satisfy the Phase I guidelines of NUREG-0612. 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 NRC also determined that "the greatest risk is associated with carrying heavy loads over or in a location where spent fuel could be damaged. The single most important example of this concerns loads handled over the open reactor vessel during refueling (such as the reactor vessel head). However, as previously mentioned, this is limited to the extent practical and where necessary, is performed with a specifically implemented program in conformance with the Phase I guidelines." It is noted that specific information is provided in Attachment 1 regarding SCE's special program and procedure requirements for the handling of the spent fuel cask at San Onofre Unit 1. Therefore, it is concluded that the handling of the San Onofre Unit 1 spent fuel cask in accordance with the existing San Onofre Unit 1 Heavy Load Control Program and procedures is consistent with the NRC's previous review and resolution of heavy loads issues documented in the November 5, 1985 SER.

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 SO1-I-7.27, "Turbine Gantry Crane Checkout and Operation," and SO123-I-1.13, "Cranes, Rigging, and Lifting Controls".

B. SPENT FUEL CASK

The spent fuel cask to be used for the transshipment 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. SCE has received NRC certification as a user of the IF-300 cask by NRC letter from Charles E. MacDonald dated March 8, 1988. This certification includes evaluation of the general SCE Quality Assurance program which encompasses the Quality Assurance requirements of 10 CFR 71 related to spent fuel shipment. The cask will be used entirely within the San Onofre site for the transshipment. The cask will not be transported over any highways or public roads during the transshipment evolution 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 CSAR contains the structural analysis, thermal analysis, criticality analysis, shielding analysis, fission product release, fuels and contents acceptability. 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." As long as the shipments remain within the owner controlled area at San Onofre, they are within an authorized place of use. This does not alleviate licensees from transporting radioactive material in a safe manner. Therefore, an NRC licensed cask is being utilized for the transshipment. The shipments will be done in a safe manner in accordance with the cask's certificate of compliance with the following deviations. These deviations are the only exceptions which may be taken to the cask certification and have been concurred in by the cask vendor.

Lifting Trunnions and Valve Covers

The lifting trunnions must be removed and the valve box covers must be in place for the cask to be certified to withstand potential impact accidents that could occur during over-the-road shipment at highway speeds. These accidents will not occur because the loaded cask will be traveling only on site at five miles per hour. This procedure is consistent with onsite cask handling operations at other nuclear plants. The IF-300 cask will be lifted using supplied trunnions and then secured in its companion skid atop a wheeled trailer. No single failure of the companion skid/trailer will cause the cask to fall from the trailer.

This deviation is considered acceptable since the shipments will be conducted entirely on site. Cask drops are addressed in the areas where lifts of the cask are discussed. 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 Turbine Building area to the Unit 2 or Unit 3 Fuel Handling Building 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 cask during

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 UO2 pellets	Clad UO2 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 per assembly for dry shipment	35,000 MWD/MTU	34,777 MWD/MTU

transport between units. Health Physics will be monitoring the operation throughout the procedure to maintain ALARA considerations. Attachment 2 is the correspondence from Pacific Nuclear (the cask vendor) which supports the use of the GE IF-300 as described. Accidents which would result in exposure of the fuel in the cask to the environment are not considered credible. This is due to the fact the cask is licensed in accordance with 10 CFR 71 which requires qualification of the cask to design basis accident testing. This testing will ensure the cask will not be breached in the event of an accident during handling and shipment.

The Unit 1 FSA and the "Spent Fuel Shipping Cask Handling" submittal dated March 21, 1975, do not address cask accidents. The GE IF-300 cask is a 7 element cask with a current license to be used for shipping assemblies offsite. The cask is designed to withstand drops and transportation accident without a release of radioactivity to the environment per the regulations.

Other accidents that are generic to cask handling would be:

1) The cask tip over and the fuel spill out

   This is prevented by the procedure of maintaining a minimum of four head studs/nuts in place at all times when the cask is outside the pool.

2) The head dropped over the cask damaging the fuel inside

   This is prevented through geometry of the cask and head. The fuel sits down 1 1/2 inches below the top of the cask body and the head cannot impact any spent fuel unless the head was dropped perpendicular, which is prevented since the head is suspended by 4 independent cables. No combination of cables suspending the head will allow it to drop perpendicularly. Each cable is capable of holding the head. The cables are certified by the vendor.

Most over-the-road shipping casks are not configured to withstand the 30' drop tests when being handled onsite. Many use detachable overpacks that are only used during over-the-road use. The GE IF-300 cask is designed to sustain a 30' vertical drop onto an unyielding surface and maintain its integrity and protect the fuel. During the evolution of raising and lowering the cask between the vertical and horizontal position, the cask is positioned so the valve boxes are on top when horizontal, and the trunnions are on either side. Therefore, a drop during this evolution would be bounded by existing cask accident scenarios and the cask and contents would remain safe. There will be lifts of the cask greater than 30 feet on the south end of the turbine building and the spent fuel pool. These lifts are addressed in Sections D, Turbine Building, and F, Spent Fuel Pool, and is demonstrated that the greater than 30 foot lifts over a yielding surface and the pool are no worse than the 30 foot lift over an unyielding surface.

A spent fuel assembly drop during loading of a cask has not been specifically analyzed at San Onofre Unit 1. However, dropping of a spent fuel assembly in the spent fuel pool or the refueling pit during refueling has been previously addressed. This accident was assumed to occur 90 hours following shutdown; the assembly from the highest power core location was damaged; and, all fuel rods within the assembly are ruptured. The accident analysis results in doses less than the 10 CFR 100 guideline values. This accident was reevaluated in letters to the NRC dated March 25, 1977 and November 8, 1977 and excluded the 90 hour shutdown time before handling the assemblies. The results still were within the 10 CFR 100 guidelines. The analysis remained unchanged. The spent fuel assemblies handled for transshipment will have been stored in the spent fuel pool over 2 years. Dropping of a spent fuel assembly during loading in the cask is no worse than the drop of the assembly in the fuel handling accident.

C. TURBINE GANTRY CRANE

The turbine gantry crane will be used for the transshipment process at San Onofre Unit 1. The spent fuel cask will be lifted at the south end and the north end of the Turbine Building by the crane. The cask will travel between the north and south ends of the Turbine Building on the horizontal beam of the west A-frame leg of the turbine gantry crane. The west A-frame has been modified to securely hold the cask in place. The crane structure has been evaluated for Seismic Category B criteria while transporting the spent fuel cask because cask movement will only occur during a plant outage. Modifications to the crane structure are not required to support the 70 ton load.

The cask will be positioned on a platform built onto the horizontal beam of the turbine gantry crane west A-frame leg. A 6 foot square plate has been welded on top of the beam. The platform has a raised ring that will prevent the cask from sliding off the platform during crane movement. The top of the cask will also be restrained by cables attached to 1 1/4 inch thick lugs welded to the crane legs. The lugs will be used for attachment of the cask cable restraints between the crane and cask to prevent the lateral movement of the cask while on the support platform. The other end of the cables will be attached to the cask. A ladder has been installed on each leg of the A-frame to provide access to the lugs. The crane modifications (platform and cable restraints) were evaluated for Seismic Category B requirements with a 100 ton cask load. The modifications are designed specifically to accommodate the 70 ton GE IF-300 cask. The crane main hook will not be released during the cask movement along the turbine deck. Since the platform and lateral restraints are redundant to the crane hoist and hook, the spent fuel cask will be supported by two independent systems during its movement along the turbine deck. Therefore, failure of the crane hoisting mechanism will not result in a cask drop since the cask is restrained on the horizontal beam.

The lift on the north end will occur in the area of the decontamination pad. Lift height restrictions and use of the impact limiter for the lift in this area are addressed in Section E, Decontamination Pad. In order to restrict the 70 ton cask height to no greater than 27 inches above the decontamination

pad without the impact limiter, the limit switch on the gantry crane hook will be reset from its current height restriction of 16 inches to 27 inches. The limit switch will be actuated when there is no impact limiter under the cask while the cask is on the decontamination pad. In order to provide additional safety from potential concrete spalling, a protective shield will be installed under the decon pad. The shield will be made of 11 gauge chain-link fence and attached to steel beam flanges with clamps. (Note: This protective shield will enable a lift height of 30 inches without the impact limiter.) Lift heights above the decon pad are restricted to 10 feet 6 inches by a limit switch while over the 4 foot section of the impact limiter and 4 feet 6 inches by administrative controls while over the 2 foot section.

On the south end the lift will be beyond the turbine building in the area of the crane rail extension. The lift will be directly from the cask skid on the trailer which will be adjacent to the south wall of the turbine building.

D. TURBINE BUILDING

Movement of the spent fuel cask along the Turbine Building was previously done using the air pallet. This system was approved for use by the NRC and documented in their January 15, 1976 SER. Experience with the air pallet at Unit 1 has demonstrated that it is an inefficient and unreliable mode of transportation. The air pallet will not be used as part of the proposed transshipment method.

The spent fuel cask will be transported on the turbine gantry crane between the north and south ends of the Turbine Building. Since the cask is restrained on the turbine gantry crane west A-frame horizontal beam and simultaneously supported by the crane hoist and hook, a drop of the cask during this movement is not considered credible. The cask will be lifted by the crane beyond the south end of the turbine building. The height from plant grade onto the crane leg will be approximately 33 feet. Since the tractor trailer and cask skid will be under the cask during this lift, the lift height will be less than 30 feet which is the design basis for the cask. The height of the trailer is a minimum of 3 feet 1 inch and the cask skid is located on the trailer above this height. They provide a yielding surface that is less severe than the cask drop onto an unyielding surface. There is no safety-related equipment located in this area or underground. On the north end, the spent fuel cask will be lifted in the area of the decontamination pad. Precautions associated with that lift are discussed in Section E, Decontamination Pad.

The San Onofre Unit 1 Turbine Building has been reevaluated and upgraded to withstand a .67g modified Housner seismic event as part of the Systematic Evaluation Program. This reevaluation included the effects of the turbine gantry crane on the dynamic response of the structure. The turbine gantry crane was included in the reevaluation analysis. A lifted load was not assumed in the analyses because the crane is not normally or regularly used during plant operation. Additionally, the Turbine Building and the safety related systems within the structure were qualified for the condition of the crane parked on the south extension during plant operation. The air pallet

system was specifically not included in the scope of the seismic reevaluation of the turbine building. This was agreed to with the NRC since the movement of spent fuel with the air pallet system was not considered a normal operating load. (The Seismic Reevaluation Program reanalyzed structures, systems and components for seismic loads in combination with "normal operating loads.") As part of the use of the air pallet system, the turbine gantry crane was used to make lifts of the spent fuel cask at the south and north ends of the turbine building, therefore, this use of the turbine gantry crane was also not included in the scope of the seismic reevaluation of the turbine building. Although this agreement with the NRC regarding the turbine gantry crane was not explicitly documented, it is understood that the crane is required when using the air pallet. The turbine gantry crane is also used for performing other maintenance activities which require the crane, such as work on the turbine, that are not considered normal plant loads.

Additional evaluations were performed to determine the load on the crane that would be seismically acceptable. These evaluations concluded that acceptable seismic response for the structure and piping would occur with the turbine gantry crane located on the turbine pedestal or the south turbine deck extension with a load up to 35 tons, and that unacceptable seismic response would occur with the turbine gantry crane located on the north turbine deck extension (with or without a load) due to the potential affects of seismic induced loads on safety-related piping systems located under the north turbine deck extension. The turbine gantry crane can be located on the north turbine deck extension during Modes 5 and 6 with a 10 ton load when there is not a concern about piping functionality in this area.

Since the seismic design of the turbine building limits the location and load use of the turbine gantry crane for continuous use (i.e., as a normal operating load), deviations from these conditions are permitted for only very limited time periods. To ensure this, the turbine gantry crane will be allowed on the turbine building with loads in excess of the seismic evaluated loads for a total accumulated time of no more than 1% per year. This comes to approximately 87 hours for a year.

The 1% time is recorded when:

A. The crane is on the north extension with or without a load during plant operation (Modes 1-4).

B. The crane is on the north extension during a plant outage (Modes 5&6), with a load exceeding 10 tons.

C. The crane is south of the north extension with a load greater than 35 tons during plant operation (Modes 1-4).

This 1% limit is consistent with maintaining the overall risk of seismic consequences acceptably low, considering the low probability of an adverse seismic event and load/location combinations on the turbine building and the availability of shutdown equipment.

During plant operation the turbine gantry crane is not normally used. During shutdowns and refuelings the turbine gantry crane is used in support of the outage. The 87 hour limit will be used almost entirely during plant shutdown. It is expected that the majority of the crane use will be associated with spent fuel transshipment during plant shutdown (Modes 5 and 6). Transshipment of spent fuel will only be done during Modes 5 and 6 at the request of the NRC following the September 25, 1987 meeting.

The Turbine Building has also been assessed for Seismic Category B criteria while the turbine gantry crane is supporting the 70 ton cask, and determined to require no modifications.

E. DECONTAMINATION PAD

A lift of the spent fuel cask occurs in the area of the decontamination (decon) pad. The cask will also be located on the decon pad for extended periods of time. Cable trays containing safety related circuits are located beneath the decon pad and turbine deck in this area.

The decontamination pad consists of a 9" thick reinforced concrete slab with approximately 9" concrete topping over the existing liner plate. The pad is supported by steel beams. The spent fuel cask will be placed on the decontamination pad during cask handling and for decontamination. The decontamination pad can withstand a DBE event with a 70 ton cask on it, provided that the cask is placed on the pad directly over the location of two W 24x94 beams. When the cask is on the decon pad, it will be over two W 24x94 beams in accordance with the procedures. With the cask on the decon pad, the entire structure can withstand the .67g modified Housner seismic event.

As part of the lifting procedure for the spent fuel cask over the decon pad area, an impact limiter will be used. The impact limiter will be located under the cask as it is removed from the cask platform on the crane leg. As the cask is lowered, the impact limiter will be placed under the cask for two allowable cask lift heights. The purpose for using the impact limiter is to ensure the structural integrity of the north turbine deck extension and decon pad and preclude damage to cables located below the lift area in the unlikely event of a spent fuel cask drop. Calculations were performed to check that the ductility ratios are less than 10, the impact forces are less than the plastic resisting forces of structural elements and the slab thickness will preclude perforation and spalling.

Four vertical cask drops were postulated on the decontamination pad and on the north turbine deck extension.

A. The cask is postulated to drop from a height of 10'-6" on the north turbine deck extension and the decontamination pad when lifted on and off the shear beam of the turbine gantry crane west leg. During this lift, the four foot high section of the impact limiter is directly under the cask. The impact limiter will reduce the impact force on the structures.

B. The cask is postulated to drop from a height of 4'-6" on the decontamination pad with the two foot high section of the impact limiter under the cask.

C. The cask is postulated to drop from a height of 2'-3" on the decontamination pad (over two W 24x94 beams) when the impact limiter is completely removed.

D. The cask is postulated to drop from a height of 6 inches when the cask is moved by the gantry crane between the cask laydown area of the pool and the decontamination pad.

The 70 ton cask will not perforate the north turbine deck extension or the decontamination pad, or cause spalling if dropped for all postulated heights. In case C, the concrete slab of the decontamination pad will crack, but cracking will not cause concrete spalling. The impact limiter, made out of polyurethane foam, will be installed on the north turbine deck extension and the decontamination pad to reduce the impact load on the structural members to an acceptable level (the ductility of steel beams is within the allowable limit of 10).

The impact limiter configuration is a two-tiered box that has heights of 4 feet and 2 feet. The width of the box is 6 feet and the length is 12 feet. The box will be constructed with stainless steel and filled with polyurethane foam. The foam density is approximately 5 pounds per cubic foot and has an average crush strength of 150 psi. Angles will be welded to the sides of the box for stiffening and handling. Four wheels will be provided to facilitate the movement of the box on the turbine deck. The 4 foot high section of the impact limiter will be located under the cask during the maximum lift height of 10 feet 6 inches. The 2 foot high section of the impact limiter will be located under the cask for lifts up to 4 feet 6 inches. The maximum lift height over the decon pad without an impact limiter is 27 inches when the 70 ton cask is placed directly over the location of two floor beams. The crane limit switch will be used to prevent lifting the cask above the 27 inch height over the decon pad when the impact limiter is not in place.

The procedure for removing the spent fuel cask from the crane leg will be to place the 4 foot high section of the box adjacent to the crane leg. The cask is lifted off the crane leg and positioned directly over the 4 foot high section of the box. The cask is lowered to within 6 inches of the top of the box. The box is then pulled east under the crane leg so that the 2 foot high section is over the decon pad. The cask is moved horizontally west and lowered over the 2 foot high section of the box. The box is pulled east again under the crane leg to remove the box from under the cask. The cask is then lowered to the decon pad. Placing the cask onto the crane leg will be done in the reverse order.

The surrounding areas of the decon pad during transshipment are as follow:

A. North - The south wall of the cask handling area of the spent fuel storage pool.

B. South - Exterior reinforced masonry wall and decon scaffolding.

C. East - The turbine gantry crane leg.

D. West - Reinforced masonry wall of new fuel storage and decon scaffolding.

Significant damage in the event of a cask drop into these areas is only expected on the masonry walls and decon scaffolding. Local damage to the masonry walls would not have an adverse impact on the Fuel Storage Building because the roof is supported by an independent steel framing. Loose concrete blocks will not impact the new fuel racks or any other safety related components because these items are far enough away from the potentially impacted walls.

F. SPENT FUEL POOL

There is no change in the method for handling the spent fuel cask, fuel assemblies or pool water level in the spent fuel pool at Unit 1. Spent fuel cask handling in the spent fuel pool is performed by the turbine gantry crane. This load handling is limited to the east end of the spent fuel pool away from the spent fuel racks. The spent fuel pool area and the cask handling area are separated by a 2 foot 6 inch thick concrete wall. Due to the turbine gantry crane travel limitations, the crane cannot access the spent fuel pool area. Fuel element handling is performed by the fuel handling crane. The spent fuel cask head which weighs approximately 5,000 pounds will be lifted over spent fuel in the cask when it is placed on the cask. This load path is necessary in order to place the cask head back on the cask. This is the same as lifting the reactor vessel head over the fuel in the reactor vessel when it is necessary to remove the head or place it on the vessel. Furthermore, as indicated in the discussion on the spent fuel cask, the geometry of the cask and head will prevent the head from damaging the fuel in the cask in the event the head was dropped.

In order to prevent damage to the liner in the cask handling area, a 2 1/4 inch stainless steel plate has been installed at the bottom of the cask handling area. The steel plate will minimize the potential for damage to the liner due to cask handling and evenly distributes the load of the cask over the liner. The plate has been sized to provide protection to the liner and concrete basemat in the unlikely event of a vertical cask drop in the cask handling area. As a result of the postulated cask drop, it is expected that the concrete basemat will crack under the installed plate and liner. However, no leakage to the environment will occur even in the presence of existing liner leakage because there is a waterproof membrane between the concrete and soil. There will be local yielding of the concrete but this does not affect

the overall structural capacity of the spent fuel pool and Fuel Storage Building because the cracking of concrete is localized only to the cask handling pool, which is a small percentage of the total basemat area.

Although the cask drop into the pool is greater than 30 feet (distance is 40 feet 3 3/4 inches maximum), the water will retard the cask velocity such that the drop is equivalent to a 30 foot drop. The plate is designed for Seismic Interaction B/A criteria per Regulatory Guide 1.29. The trapezoidal plate has been fabricated with four lifting lugs that are designed to rotate. The lugs are to be flush with the plate when installed in the cask handling area of the pool. The plate was brought into the Fuel Storage Building in the vertical position with the turbine gantry crane and then after rerigging, lowered into the cask handling area of the spent fuel pool. The plate clears the wall liner plate by at least 6 inches on all sides to prevent any damage to the pool liner. The sides and the corners of the plate have been chamfered for the liner protection.

Since the plate will be a permanent installation, it was verified that the plate will not slide during a DBE and there is no adverse impact on the existing liner plate.

G. 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. The tractor trailer will travel over the underground fire water system. The fire water piping will not be adversely affected because the tractor trailer wheel loads are less than the design loads.

LICENSE AND TECHNICAL SPECIFICATION CHANGES

As a result of revising the method for shipping spent fuel at Unit 1, changes to the license and technical specifications are necessary. License Condition 3.C refers to the shipment of spent fuel casks utilizing the air pallet system as described in SCE's March 21, 1975 report. The purpose of this license condition was to ensure that the modifications as described in the

March 21, 1975 report were implemented prior to use of the air pallet system and that a turbine deck load bearing test was conducted prior to the first shipment of spent fuel. This license condition has been satisfied. Since the existing license condition has no relation to the proposed method of shipment it will be revised to indicate that the shipment of spent fuel will continue in accordance with the methodology as described herein.

Technical Specification 4.13, "TURBINE DECK LOAD BEARING TEST AND VISUAL INSPECTION," requires that a turbine deck load bearing test be performed every four years. This test assured the structural integrity of the turbine deck and supporting structure for shipment of spent fuel with the air pallet system. Since a new method for shipment of spent fuel has been proposed which does not use the air pallet system, this technical specification would no longer be applicable. Therefore, the Technical Specification 4.13 will be deleted.

EXISTING TECHNICAL SPECIFICATIONS

Attachment 3

PROPOSED TECHNICAL SPECIFICATIONS

Attachment 4

SIGNIFICANT HAZARDS CONSIDERATION ANALYSIS

1. Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   RESPONSE

   A. HEAVY LOADS

      Operation of the facility utilizing this transshipment 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 spent fuel cask and the Unit 1 turbine gantry crane to lift the cask and transport the cask along the turbine deck. The air pallet system will not be used for this transshipment.

      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 Unit 1 by letter dated November 5, 1985 and for the Units 2 and 3 program 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. This evaluation is documented in Attachment 1. 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.

Notwithstanding the above resolution of heavy loads 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 January 15, 1976 safety evaluation.

B. 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 transshipment. 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. The consequences of a fuel handling accident would be no more severe than the fuel handling accident previously evaluated for Unit 1. Therefore, the probabilities or consequences of accidents associated with this particular spent fuel cask are no different than those for any other NRC licensed cask.

C. TURBINE GANTRY CRANE

The turbine gantry crane at Unit 1 is designed for 125 tons and rated at 100 tons. Use of the crane will be in accordance with the requirements and guidelines of the Heavy Load Control Program. The crane will be lifting the spent fuel cask and transporting the cask along the turbine deck. The crane has been modified to accommodate the cask on the west A-frame horizontal beam. It has been structurally evaluated for carrying the 70 ton spent fuel cask. Since this load is less than the rated capacity of the crane, the crane is not affected by the handling of the 70 ton spent fuel cask. Therefore, the probabilities or consequences of an accident or the malfunction of equipment important to safety have not changed.

D. TURBINE BUILDING

As part of the transshipment methodology, the spent fuel cask will be transported along the Unit 1 turbine deck on the horizontal beam of the turbine gantry crane west A-frame leg. The air pallet system

will no longer be used. Modifications have been completed which provide a platform for the cask on the horizontal beam. The platform contains a raised ring which prevents the cask from sliding during movement of the crane. Cables will be attached to the crane legs and the top of the cask to prevent the cask from tipping during crane movement. In addition, the crane's main hook will be attached to the cask during movement on the crane, such that redundant and independent means of restraining and supporting the cask during the move along the turbine deck are provided. In the unlikely event the crane hoisting mechanisms should fail, the cask would still be restrained on the horizontal beam. Therefore, a drop of the cask on the turbine deck during transport on the crane horizontal beam has been precluded. The air pallet system was designed for Seismic Category B with the spent fuel cask. The turbine gantry crane has been assessed and is acceptable for Seismic Category B criteria while carrying the 70 ton cask. Therefore, the accident probabilities or consequences associated with moving the cask along the turbine deck with the crane are not increased versus moving the cask with the air pallet.

The use of the air pallet system, in conjunction with the turbine gantry crane, was not included in the Seismic Reevaluation Program as concurred in by the NRC. The air pallet system was approved to be used during Modes 1-6 for fuel shipment. Use of the turbine gantry crane for the spent fuel movement on the Turbine Building was also not included in the Seismic Reevaluation Program. However, the movement of spent fuel with the turbine gantry crane is being limited to Modes 5 and 6 only, and the use of the turbine gantry crane is limited to 87 hours a year in load/locations outside of the seismic reevaluation as discussed in Section D, Turbine Building, in the Description, to acceptably limit the probability of unacceptable consequences due to a seismic event. Therefore, the accident probabilities or consequences associated with the use of the crane only are not increased versus use of the air pallet and crane in combination as they both relate to the seismic integrity of the Turbine Building.

E. DECONTAMINATION PAD

On the north extension of the turbine deck, a lift of the cask occurs in the area of the decon pad. For these lifts, an impact limiter will be used under the cask as it is lowered from or raised onto the crane horizontal beam. The impact limiter is designed to prevent the cask from penetrating the turbine deck and decon pad and damaging cables located below. Prior to this, lifts of the cask in this area, with the air pallet system, were done using lift height restrictions. Since the cask is now being carried on the crane leg, the cask will be lifted 10 feet 6 inches above the turbine deck and the impact limiter will be used with the new lift height restrictions. In both cases, measures are employed to prevent the cask from penetrating the turbine deck in the event of a cask drop. Therefore, the accident probabilities and consequences associated with the lift of the cask in this area have not changed.

F. SPENT FUEL POOL

In the area of the spent fuel pool, a stainless steel plate has been installed in the cask handling area for the added protection of the pool liner. As previously discussed, the addition of the protector plate in the cask area of the spent fuel pool will ensure that the safety related liner plate will continue to perform its safety related functions and does not degrade the functions or qualifications of the existing spent fuel pool structure. The plate is designed to withstand a vertical drop of the spent fuel cask. In the unlikely event of a drop, the concrete basemat will crack and have localized yielding but will not affect the overall structural integrity of the Fuel Storage Building. However, leakage through the concrete is prevented because the water is contained by the pool liner and the waterproof membrane under the basemat. These results are similar to those previously evaluated. In addition, there is no possibility of the cask impacting spent fuel in the spent fuel pool. This is due to the design of the spent fuel pool and the turbine gantry crane travel limitations. In addition, fuel handling will be performed in the same manner. Therefore, the accident probabilities or consequences associated with the handling of the cask and the spent fuel assemblies in the spent fuel pool have not changed.

G. 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. The underground fire water system will not be adversely impacted because the tractor trailer loads are less than the design load of the piping. 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.

2. Will operation of the facility in accordance with this proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

RESPONSE

A. HEAVY LOADS

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.

B. SPENT FUEL CASK

A spent fuel cask which has been licensed by the NRC will be used for the transshipment. 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.

C. TURBINE GANTRY CRANE

The turbine gantry crane will be used to lift and transport the cask along the turbine deck. The lift of the cask will be done in accordance with the Heavy Load Control Program. The crane west A-frame leg has been modified to restrain the cask on the horizontal beam during movement. The crane has been structurally evaluated for transporting the spent fuel cask. Use of the crane for the lift and the transport of the cask does not create the possibility of any different accidents or malfunctions than previously evaluated.

D. TURBINE BUILDING

The movement of the cask along the turbine deck has been changed to utilize the turbine gantry crane rather than the air pallet. The turbine gantry crane is considered to be more efficient and reliable. The crane has been modified to provide restraints for the cask on the horizontal beam of the west A-frame leg. A platform has been installed on the horizontal beam. The platform contains a raised ring to prevent the cask from sliding. Cables will be attached to the crane legs and the top of the cask to prevent the cask from tipping. In addition, the main hook will remain attached to the cask during transport along the turbine deck. These modifications ensure the cask will not drop onto the turbine deck during movement along the deck. Therefore, this method of transport does not create the possibility of any different accidents or malfunctions than those previously evaluated with the air pallet.

The seismic reevaluation did not include the air pallet system in conjunction with the turbine gantry crane as agreed to by the NRC. Use of the crane for spent fuel movement was also not included in the Seismic Reevaluation Program. Moreover, spent fuel shipment with the crane is being restricted to Modes 5 and 6 only and use of

the crane on the north extension is limited. Therefore, there are no accidents or malfunctions with the use of just the crane different from using the air pallet and crane combination as it relates to the seismic integrity of the Turbine Building.

E. DECONTAMINATION PAD

In the area of the decon pad, the cask will be lifted and lowered from the crane's horizontal beam or raised onto the horizontal beam. During these lifts, an impact limiter will be used under the cask to prevent the cask from penetrating the decon pad in the event of a drop. The previous evaluation of this event also included the cask drop on the decon pad. Cask penetration through the decon pad was prevented by lift height restrictions on the crane. In this case, the impact limiter will be used with new lift height restrictions. In both cases, the casks were not allowed to penetrate the decon pad. Therefore, no different accidents or malfunctions are created as a result of the lift of the cask with the impact limiter.

F. SPENT FUEL POOL

For the spent fuel pool, the drop of the 70 ton cask was evaluated with the installed stainless steel plate. The conclusions are the same as to those for the previous analysis, i.e., no water leakage from the spent fuel pool. There has been no change in the handling of the spent fuel cask in the area of the spent fuel pool. All cask lifts will be done on the east end of the spent fuel pool in the cask handling area. The turbine gantry crane travel limitations prevent movement of the spent fuel cask over spent fuel. As previously indicated handling of the spent fuel has not changed. Therefore, no different accidents or malfunctions have been created in the area of the spent fuel pool as a result of the handling of the 70 ton spent fuel cask.

G. LOAD PATH BETWEEN UNITS 1, 2 AND 3

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

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

RESPONSE

A. HEAVY LOADS

As previously indicated, the handling of the 70 ton spent fuel cask will be done in accordance with the Heavy Load Control Program at

San Onofre. The program and procedures have been reviewed for use of the 70 ton cask and testing and training will be performed for the new load. This is done in a manner, as with any new load being lifted, that is commensurate with the importance of the load, its lift, when it will be lifted and its travel path. Therefore, the margin of safety associated with the handling of the 70 ton cask has not been reduced.

B. SPENT FUEL CASK

The GE IF-300 is an NRC licensed spent fuel cask. The cask will be handled in an appropriate manner such that the cask certification is complied with. Exceptions to the certification have been discussed and justified since the cask will be used entirely within the owner controlled area. Therefore, the margin of safety associated with the cask has not been reduced.

C. TURBINE GANTRY CRANE

The turbine gantry crane is rated for a lift of 100 tons. It has also been evaluated for carrying the 70 ton cask on the west A-frame horizontal beam. The margin of safety associated with the turbine gantry crane has not been reduced as a result of lifting or carrying the 70 ton load.

D. TURBINE BUILDING

The spent fuel cask will be transported across the turbine building with the turbine gantry crane. The crane has been modified to prevent the cask from falling onto the turbine deck during transport. Previously, fuel shipments with the air pallet were conducted during all modes and there was no limit on the use of the crane outside the seismic design. The turbine gantry crane will be used for transshipment during Modes 5 and 6 only, and use of the crane for any purpose outside the seismic design of the turbine building will be limited. Therefore, the margin of safety associated with the turbine building is not reduced.

E. DECONTAMINATION PAD

The decon pad has been evaluated for a design basis seismic event with the load of the 70 ton spent fuel cask. The results indicate the decon pad can withstand the event with the additional load. In the case of the lifts of the cask over the decon pad, new height restrictions have been determined and an impact limiter will be used to preclude the cask from penetrating the decon pad or damaging equipment below in the event of a drop of the cask. Therefore, the margin of safety associated with the seismic capability of the decon pad and the drop of the cask on the decon pad has not been reduced with the use of the 70 ton cask.

F. SPENT FUEL POOL

A stainless steel plate has been installed in the spent fuel pool such that in the event of a drop of the cask, the integrity of the pool liner will be maintained. Leakage from the spent fuel pool structure is precluded by the waterproof membrane located below the spent fuel pool basemat. Handling of the cask and fuel assemblies will not be changed. Therefore, the margin of safety associated with the spent fuel pool has not been reduced as a result of handling the 70 ton spent fuel cask.

G. LOAD PATH BETWEEN UNITS 1, 2 AND 3

As indicated, there is no safety-related equipment impacted by the movement of the tractor trailer containing the cask from Unit 1 to Units 2 and 3. Therefore, there is no margin of safety affected by the movement of the cask between units.

ENVIRONMENTAL EVALUATION

Summary of Environmental Assessment

The potential environmental impact of the transfer of Unit 1 spent fuel to Units 2 and 3 has been evaluated. Only the Unit 1 spent fuel that has been sufficiently aged would be transferred, and an NRC-approved shipping cask would be used to transfer the fuel between units. The cask is certified for dry shipment, and equivalent accident prevention and mitigation is provided for wet and dry shipments within the site boundary. The only potential radiological environmental impacts that are affected deal with occupational and public radiation exposure.

Radiological Impacts

The occupational exposure for the proposed transfer operation is estimated to be less than 0.088 person-rems per spent fuel assembly with a maximum of 216 assemblies shipped in any year. Exposure estimates for each step in the transfer operation are provided in Table 2. Based on present and projected operations, it is estimated that the proposed transfer of Unit 1 spent fuel between the units should only add a small fraction to the total annual occupational radiation dose at the facility. The total occupational dose for 1986 and 1987 at the site was approximately 760 person-rems per year. Thus, it is concluded that the proposed transfer of spent fuel will not result in any significant increase in doses received by workers.

10 CFR 71.43 provides that a package (shipping cask) must be designed, constructed, and prepared for shipment over-the-road so that under specified tests for normal conditions of operation, there will be no loss or disposal of radioactive contents, no significant increase in external radiation levels and no substantial reduction in the effectiveness of the packaging. 10 CFR 71.47 provides that radiation levels external to the package must not exceed

Table 2

OCCUPATIONAL EXPOSURE
DURING SPENT FUEL TRANSSHIPMENT
FROM UNIT 1 to UNITS 2 AND 3
SAN ONOFRE NUCLEAR GENERATING STATION

DOSE* (person-millirem)	ACTIVITY
0	Pick up cask at south end of Unit 1 turbine deck.
0	Transport cask to Unit 1 decon area.
0	Prepare cask for insertion into Unit 1 pool.
0	Place cask into pool.
0	Load cask with Unit 1 spent fuel.
20	Remove cask from Unit 1 pool.
200	Tension head.
25	Leak test.
200	Decon cask.
20	Pick-up cask.
8	Transport cask to south end of Unit 1 turbine deck.
4	Place cask on tractor trailer.
20	Transport cask to Unit 2 or 3.
0	Open cask hatch to Unit 2 or 3 Fuel Handling Building.
4	Place cask in decon area.
45	Prepare cask for insertion into pool.
0	Close cask hatch to Unit 2 or 3 Fuel Handling Building.
20	Place cask into pool.
20	Unload Unit 1 spent fuel from cask.
0	Remove cask from pool.
0	Tension cask head.
0	Cask head leak test.
0	Decon cask.
0	Open cask hatches.
0	Place cask on truck.
0	Transport cask to Unit 1.
586	

*Dose is for each trip with 7 Unit 1 spent fuel assemblies in the cask. No dose is expected when no spent fuel is in the cask.

10 millirem/hour at any point two meters beyond the outermost sides of the transporting vehicles. For a cask meeting this criterion, the corresponding dose rate is conservatively 0.01 millirem/hour at the nearest site boundary.

It is estimated that the annual total dose commitment to a maximally exposed individual at the nearest site boundary due to the proposed transfer of spent fuel, and found it to be within the limitation of the plant Technical Specifications which are based on the offsite dose requirements of 10 CFR Parts 20 and 30 and 40 CFR Part 190. Likewise, it is estimated that the annual population dose to the general public due to the proposed transfer would be a small fraction of the population doses estimated in the Unit 1 NRC Final Environmental Statement for transportation of fuel to and from a power reactor. This estimate is based on the 10 millirem/hour at a distance of 6 feet from the truck. The estimated annual total population dose including the proposed transfer of spent fuel would be very small compared to the annual dose to this same population from background radiation. Thus, SCE concluded that the proposed transfer of spent fuel would not result in any significant increase in doses received by the public.

SCE has also reviewed the potential consequences of three postulated design basis accidents which involve spent fuel. These accidents are the fuel handling, cask drop, and cask transport accidents and are addressed in the Significant Hazards Consideration Analysis.

Non-Radiological Impacts

SCE has evaluated the potential non-radiological environmental impacts associated with the proposed spent fuel transfer and concluded that they are not significant. SCE has concluded that the proposed method for transshipment would not cause a significant increase in the impact to the environment and will not change any conclusions reached by the Commission in the Final Environmental Statement for Unit 1.

SAFETY AND SIGNIFICANT HAZARDS DETERMINATION

Based on the safety evaluation, it is concluded that: (1) the proposed change does not involve a significant hazards consideration as defined by 10 CFR 50.92; and (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change; and (3) this action will not result in a condition which significantly alters the impact of the station on the environment as described in the NRC Environmental Statement.

ACL:9524F

ATTACHMENT 1

HEAVY LOADS HANDLING ISSUES

The NRC and SCE reviewed the "Heavy Loads" issues for San Onofre Unit 1 under the guidance of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants." The guidance contained in NUREG-0612 identified seven general guidelines to provide the defense-in-depth appropriate for the safe handling of heavy loads at nuclear power plants. The heavy load handling guidelines have been reviewed for San Onofre Unit 1, and the details of this review are documented in the Technical Evaluation Report (TER) and Safety Evaluation (SE) enclosed with the NRC letter dated November 5, 1985. The San Onofre Unit 1 spent fuel cask handling methodology was not reviewed in detail as part of this NRC evaluation due to the fact that spent fuel cask handling had previously been reviewed in 1975. Since that time, SCE has opted to use a larger spent fuel cask and has reevaluated the seven NUREG-0612 heavy load handling guidelines to assure that the larger spent fuel cask is handled in a manner consistent with the NUREG-0612 guidance.

The seven general NUREG-0612 guidelines are:

Guideline 1 - Safe Load Paths

Guideline 2 - Load Handling Procedures

Guideline 3 - Crane Operator Training

Guideline 4 - Special Lifting Devices

Guideline 5 - Lifting Devices (Not Specifically Designed)

Guideline 6 - Cranes (Inspection, Testing and Maintenance)

Guideline 7 - Crane Design

NUREG-0612 states that the seven guidelines should be satisfied for all overhead handling systems that handle heavy loads in the vicinity of the reactor vessel, near spent fuel in the spent fuel pool or in other areas where a load drop may damage safe shutdown systems. Spent fuel cask handling at San Onofre Unit 1 falls into the latter two categories. The review of the spent fuel cask handling methodology as it relates to the seven guidelines is as follows.

Guideline No. 1

"Safe load paths should be defined for the movement of heavy loads to minimize the potential for heavy loads, if dropped, to impact irradiated fuel in the reactor vessel and in the spent fuel pool, or to impact safe shutdown equipment. The path should follow, to the extent practical, structural floor members, beams, etc., such that if the load is dropped, the structure is more likely to withstand the impact. These load paths should be defined in procedures, shown on equipment layout drawings, and clearly marked on the floor in the area where the load is to be handled. Deviations from defined load paths should require written alternative procedures approved by the plant safety review committee."

SCE Evaluation

The chosen load path for the new spent fuel cask will be the same as for the old cask, that is, directly out of the spent fuel pool, onto the decon pad, directly out of the Fuel Storage Building to the turbine

gantry crane and down the turbine deck. This load path is chosen due to its direct nature, accessibility, and to follow, to the extent practical, structural members. Along the load path, cables required for maintaining shutdown are located below the decontamination pad. Lifts of the cask in decontamination pad area will be done using an impact limiter. The impact limiter will prevent the cask from penetrating the decontamination pad and affecting the cables. Spent fuel assemblies are not located within the load path for the spent fuel cask. The illustration of this load path will be included in the spent fuel cask handling procedure. Since any floor markings of the load path would be obscured by the cask during the lifting process, it is not appropriate to have any deck or floor markings, but consistent with the SE, TER and SCE's procedures.

Guideline No. 2

"Procedures should be developed to cover load handling operations for heavy loads that are or could be handled over or in proximity to irradiated fuel or safe shutdown equipment. At a minimum, procedures should cover handling of those loads listed in Table 3-1 of NUREG-0612. These procedures should include: identification of required equipment; inspections and acceptance criteria required before movement of load; the steps and proper sequence to be followed in handling the load; defining the safe path; and other special precautions."

SCE Evaluation

As indicated in past SCE correspondence, there exists a Heavy Load Congrol Program at San Onofre Unit 1 that addresses the general prerequisites, precautions, inspections and acceptance criteria required before movement of a heavy load. The procedure SO123-X-9.0, "Transshipment of Spent Fuel", covers the handling of spent fuel casks at San Onofre Unit 1 and this procedure will account for the 70 ton cask, the revised cask handling process, the safe load path, and additional or different inspection requirements for the cask lift rig.

Guideline No. 3

"Crane operators should be trained, qualified and conduct themselves in accordance with Chapter 2-3 of ANSI B30.2-1976, 'Overhead and Gantry Cranes' [12]."

SCE Evaluation

The crane operator training was reviewed as part of the TER and SE, therefore an additional review for the purposes of determining the acceptability of the spent fuel cask handling methodology is not necessary. The crane operators will be trained on any special requirements of the new spent fuel cask handling methodology.

Guideline No. 4

"Special lifting devices should satisfy the guidelines of ANSI N14.6-1978, 'Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500kg) or More for Nuclear Materials' [13]. This standard should apply to all special lifting devices which carry heavy loads in areas as defined above. For operating plants certain inspections and load tests may be accepted in lieu of certain material requirements in the standard. In addition, the stress design factor stated in Section 3.2.1.1 of ANSI N14.6 should be based on the combined maximum static and dynamic loads that could be imparted on the handling device based on characteristics of the crane which will be used. This is in lieu of the guideline in Section 3.2.1.1 of ANSI N14.6 which bases the stress design factor on only the weight (static load) of the load and of the intervening components of the special handling device."

SCE Evaluation

The new spent fuel cask lifting devices will meet the guidelines of ANSI N14.6-1978, "Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500kg) or More for Nuclear Materials." As previously stated in SCE's August 29, 1985 letter to the NRC, after the initial 150% proof load test, SCE may opt to perform NDE in lieu of periodic (every 5 years) load testing. The choice will be dependent upon SCE's availability of test options. It is noted that the initial proof load test of the lifting device will be a 150% proof load test.

Regarding the Guideline No. 4 discussion of the stress design factor stated in Section 3.2.1.1 of ANSI N14.6 being based upon the combined maximum static and dynamic loads that could be imparted on the handling device based upon the characteristics of the crane which will be used, refer to the information discussed under the NRC review of Guideline No. 5 in the TER. The TER indicates that the dynamic load induced by the San Onofre Unit 1 turbine gantry crane is sufficiently small so as to remove it from consideration. This is based upon the already required 3 to 1 maximum yield strength to weight ratio and 5 to 1 ultimate strength to weight ratio required by Section 3.2.1 1 of ANSI N14.6-1978, and the consideration that the maximum expected dynamic load induced by the turbine gantry crane is only 3.7% of the static load. Therefore, only the weight (static load) of the load and intervening components of the spent fuel cask lift rig need be considered.

Guideline No. 5

"Lifting devices that are not specifically designed should be installed and used in accordance with the guidelines of ANSI B30.9-1971, 'Slings' [14]. However, in selecting the proper sling, the load used should be the sum of the static and maximum dynamic load. The rating identified on the sling should be in terms of the 'static load' which produces the maximum static and dynamic load. Where this restricts slings to use on only certain cranes, the slings should be clearly marked as to the cranes with which they may be used."

SCE Evaluation

Since Guideline No. 4 relating to specifically designed lifting devices applies to the new spent fuel cask handling methodology, this guideline does not apply and no additional review is required.

Guideline No. 6

"The crane should be inspected, tested, and maintained in accordance with Chapter 2-2 of ANSI B30.2-1976, 'Overhead and Gantry Cranes,' with the exception that tests and inspections should be performed prior to use where it is not practical to meet the frequencies of ANSI B30.2 for periodic inspection and test, or where frequency of crane use is less than the specified inspection and test frequency (e.g., the polar crane inside a PWR containment may only be used every 12 to 18 months during refueling operations, and is generally not accessible during power operation. ANSI B30.2, however, calls for certain inspections to be performed daily or monthly. For such cranes having limited usage, the inspections, test, and maintenance should be performed prior to their use)."

SCE Evaluation

The crane inspection, testing and maintenance was reviewed as part of the TER and SE and an additional review for the purposes of determining the acceptability of the spent fuel cask handling methodology is not

necessary. The new spent fuel cask is a lesser weight (70 tons) than the existing largest load (108 tons), so the existing proof load tests of the turbine gantry crane are acceptable. All other inspection, testing and maintenance issues associated with the turbine gantry crane remain applicable to the new spent fuel cask handling methodology. Handling of the cask and use of the turbine gantry crane at San Onofre Unit 1 and the cask handling crane at San Onofre Units 2 and 3 will be controlled by SO1-I-7.27, "Turbine Gantry Crane Checkout and Operation", SO123-I-1.13, "Cranes, Rigging, and Lifting Controls", and SO23-I-3.32, "Cask Handling Crane Checkout and Operation".

Guideline No. 7

"The crane should be designed to meet the applicable criteria and guidelines of Chapter 2-1 of ANSI B30.2-1976, 'Overhead and Gantry Cranes,' and of CMAA-70, 'Specifications for Electric Overhead Traveling Cranes' [15]. An alternative to a specification in ANSI B30.2 or CMAA-70 may be accepted in lieu of specific compliance if the intent of the specification is satisfied."

SCE Evaluation

The turbine gantry crane design issues were addressed in SCE's submittals of April 1, 1982 and October 21, 1982. These submittals provided a point by point comparison of the applicable ANSI B 30.2-1976 and CMAA-70 design criteria to the turbine gantry crane design. The information in these

submittals was reviewed by the NRC in the TER and SER, and found to be acceptable. Since the design allowables and strength ratings are based upon the maximum design load of 108 tons, they remain applicable to handling a spent fuel cask of 70 tons or less, and therefore no further review of the turbine gantry crane is necessary.

The above evaluations of each of the seven NUREG-0612 guidelines as they relate to the new spent fuel cask handling methodology provide sufficient assurance that the heavy loads issues will be appropriately addressed.

0820P

ATTACHMENT 2

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

PACIFIC NUCLEAR SYSTEMS

February 29, 1988

Mr. Thomas Raidy
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

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