Nebraska Public Power District

GENERAL OFFICE
P. O. BOX 499, COLUMBUS, NEBRASKA 68601
TELEPHONE (402) 564-8561

July 10, 1978

Mr. Victor Stello, Jr., Director
Division of Operating Reactors
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Movement of Heavy Loads Near the Spent Fuel Facility -
Request for Information
Cooper Nuclear Station
NRC Docket No. 50-298, DPR-46

Dear Mr. Stello:

In your letter dated May 17, 1978 you requested the Nebraska Public Power District to provide additional information regarding the movement of heavy loads near the spent fuel facility. This letter transmits the information requested as Attachment 1. Attachment 2 contains the procedure for the movement of the fuel casks at Cooper Nuclear Station.

As you requested, the District has reviewed its current procedures for the movement of heavy loads over spent fuel and has concluded that the potential for a handling accident which could result in damage to spent fuel is at a minimum.

Should you have any questions or desire additional information, please contact me.

In addition to one signed original, 39 copies of this information are also submitted for your use.

Sincerely yours,

Jay M. Pilant

Jay M. Pilant
Director of Licensing and
Quality Assurance

JDW/cmk
Attachment

8006220348

STATE OF NEBRASKA)
) ss
PLATTE COUNTY)

Jay M. Pilant, being first duly sworn, deposes and says that he is an authorized representative of the Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska; that he is duly authorized to submit this information on behalf of Nebraska Public Power District; and that the statements in said application are true to the best of his knowledge and belief.

Jay M. Pilant

Subscribed in my presence and sworn to before me this 10th day of July, 1978.

Marilyn R. Hohndorf
NOTARY PUBLIC

My Commission expires Oct. 14, 1980.

GENERAL NOTARY - State of Nebraska
MARILYN R. HOHNDORF
My Comm. Exp. Oct. 14, 1980

Question No. 1

Provide a diagram which illustrates the physical relation between the reactor core, the fuel transfer canal, the spent fuel storage pool and the set down, receiving or storage areas for any heavy loads moved on the refueling floor.

Response

FSAR drawings XII-2-6, 2-7, and 2-8 illustrate the physical relation between the reactor core, the fuel transfer canal, the spent fuel storage pool and the set down, receiving or storage areas.

Question No. 2

Provide a list of all objects that are required to be moved over the reactor core (during refueling), or the spent fuel storage pool. For each object listed, provide its approximate weight and size, a diagram of the movement path utilized (including carrying height) and the frequency of movement.

Response

The only object which is required to be moved over the reactor core (during refueling), or the spent fuel storage pool is the refueling platform which is on rails on either side of the cavities. Movement of the fuel cask is interlocked to include only that area of the spent fuel storage pool directly over the fuel cask storage area. The fuel cask does not move over the spent fuel racks. Discussion of the fuel cask physical dimensions and handling has been submitted in FSAR Amendment No. 33, sections 5.0 and 6.0, respectively.

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What are the dimensions and weights of the spent fuel casks that are or will be used at your facility.

Response

Dimensions and weights of the spent fuel cask were submitted in FSAR Amendment No. 33 and is described in paragraph 5.1.

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Identify any heavy load or cask drop analyses performed to date for your facility. Provide a copy of all such analyses not previously submitted to the NRC staff.

Response

A cask drop analyses has been previously submitted, FSAR Amendment No. 11, response to question No. 10.1.

Question No. 5

Identify any heavy loads that are carried over equipment required for the safe shutdown of a plant that is operating at the time the load is moved. Identify what equipment could be affected in the event of a heavy load handling accident (piping, cabling, pumps, etc.) and discuss the feasibility of such an accident affecting this equipment. Describe the basis for your conclusions.

Response

Heavy loads are not carried over equipment required for the safe shutdown of the plant.

Question No. 6

If heavy loads are required to be carried over the spent fuel storage pool or fuel transfer canal at your facility, discuss the feasibility of a handling accident which could result in water leakage severe enough to uncover the spent fuel. Describe the basis for your conclusions.

Response

The spent fuel cask drop analyses was submitted in FSAR Amendment No. 11 (Question No. 10.1). No other heavy loads are required to be carried over the spent fuel storage pool or fuel transfer canal at Cooper Nuclear Station.

Question No. 7

Describe any design features of your facility which affect the potential for a heavy load handling accident involving spent fuel, e.g., utilization of a single failure-proof crane.

Response

The design features which affect the potential for a heavy load handling accident involving spent fuel is discussed in FSAR Amendment No. 33, Sections 1.0, 2.0, 3.0 and 4.0.

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Provide copies of all procedures currently in effect at your facility for the movement of heavy loads over the reactor core during refueling, the spent fuel storage pool, or equipment required for the safe shutdown of a plant that is operating at the time the move occurs.

Response

Administrative procedures insure that heavy loads are not transported over the exposed reactor core during refueling. Procedures that govern the removal of heavy objects from directly above the core (i.e. shield plugs,

drywell head, etc.) before the core is uncovered, insure that these objects do not pass over the reactor cavity or fuel pool cavity. These procedures are available at Cooper Nuclear Station for review. The only heavy load to be carried over a portion of the spent fuel storage pool will be the fuel cask which is interlocked to include only that area of the spent fuel storage pool directly over the fuel cask storage area. The procedure for the preparation and shipment of spent fuel is discussed in Attachment "2". No heavy loads are carried over equipment required for safe shutdown of the plant while the plant is operating.

Question No. 9

Discuss the degree to which your facility complies with the eight (8) regulatory positions delineated in Regulatory Guide 1.13 (Revision 1, December, 1975) regarding Spent Fuel Storage Facility Design Basis.

a. The spent fuel storage facility (including its structures and equipment except as noted in paragraph f below) should be designed to Category I seismic requirements.

b. The facility should be designed (a) to keep tornadic winds and missiles generated by these winds from causing significant loss of water tight integrity of the fuel storage pool and (b) to keep missiles generated by tornadic winds from contacting fuel within the pool.

c. Interlocks should be provided to prevent cranes from passing over stored fuel (or near stored fuel in a manner such that if a crane failed, the load could tip over on stored fuel) when fuel handling is not in progress. During fuel handling operations, the interlock may be bypassed and administrative control used to prevent the crane from carrying loads that are not necessary for fuel handling over the stored fuel or other prohibited areas. The facility should be designed to minimize the need for bypassing such interlocks.

d. A controlled leakage building should enclose the fuel pool. The building should be equipped with an appropriate ventilation and filtration system to limit the potential release of radioactive iodine and other radioactive materials. The building need not be designed to withstand extremely high winds, but leakage should be suitably controlled during refueling operations. The design of the ventilation and filtration system should be based on the assumption that the cladding of all of the fuel rods in one fuel bundle might be breached. The inventory of radioactive materials available for leakage from the building should be based on the assumptions given in Regulatory Guide 1.25, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors" (Safety Guide 25).

e. The spent fuel storage facility should have at least one of the following provisions with respect to the handling of heavy loads, including the refueling cask:

   1. Cranes capable of carrying heavy loads should be prevented, preferably by design rather than by interlocks, from moving into the vicinity of the pool.

   2. Cranes should be designed to provide single-failure-proof handling of heavy loads, so that a single failure will not result in loss of capability of the crane-handling system to perform its safety function; or

   3. The fuel pool should be designed to withstand, without leakage that could uncover the fuel, the impact of the heaviest load to be carried by the crane from the maximum height to which it can be lifted. If this approach is used, design provisions should be made to prevent the crane, when carrying heavy loads, from moving in the vicinity of stored fuel.

f. Drains, permanently connected mechanical or hydraulic system, and other features that by maloperation or failure, could cause loss of coolant that would uncover fuel should not be installed or included in the design. Systems for maintaining water quality and quantity should be designed so that any maloperation or failure of such systems (including failures resulting from the Safety Shutdown Earthquake) will not cause fuel to be uncovered. These systems need not otherwise meet Category I seismic requirements.

g. Reliable and frequently tested monitoring equipment should be provided to alarm both locally and in a continuously manned location if the water level in the fuel storage pool falls below a predetermined level or if high local-radiation levels are experienced. The high-radiation-level instrumentation should also actuate the filtration system.

h. A seismic Category I makeup system should be provided to add coolant to the pool. Appropriate redundancy or a backup system for filling the pool from a reliable source, such as a lake, river, or onsite seismic Category I water-storage facility, should be provided. If a backup system is used, it need not be a permanently installed system. The capacity of the makeup systems should be such that water can be supplied at a rate determined by consideration of the leakage rate that would be expected as the result of damage to the fuel storage pool from the dropping of loads, from earthquakes, or from missiles originating in high winds.

Response

a. The design of the facility is described in the SAR, Section I-6.1.1.8, and Section X-5.5, page X-5-3.

b. The design of the fuel storage pool is such that tornadic winds and missiles generated by these winds should not cause significant loss of watertight integrity of the fuel storage pool. The wall panels and girts on the reactor building are designed to fail at 75 PSF. This pressure may act in either direction (in or out). Special shear bolts are used to insure this failure. The design pressure for structures in this region is 30 PSF. A discussion of wind and tornado loading on the spent fuel storage facility is contained in SAR Section XII-2.3.3.1 and Amendment 9 as a response to part C of question 12.17.

c. When the crane selector switch is on the "restricted" mode the crane can only be operated within the predetermined restricted boundary. A diagram of the path of restricted movement is included in FSAR Amendment 33. With the crane selector switch on "normal", the crane can be operated throughout the refueling floor.

d. The Reactor Building Ventilation system is described in the SAR for Cooper Nuclear Station, Sections X-10.3.3.3 and VII-12.5. The description of the fuel pool design is included in Section X-3.4 of the SAR. The fuel pool cooling and demineralizer system is described in Volume IV, Section X-5.0 of the SAR.

e. 1. The movement of cranes over the vicinity of the fuel pool is discussed in the response to question c, above.

2. A description of the dual load path hoisting system is included in the FSAR, Amendment No. 33, Sections 1, 2, 3, 4 and 5.

3. Pool design information was provided in FSAR Amendment No. 11 as a response to Question No. 10.1. Crane movement is discussed in question "c" above.

f. Systems for maintaining water quality and quantity are discussed in the SAR, Section X-5.0.

g. Monitoring equipment in the fuel storage pool is discussed in the SAR, Section X-3.0.

h. Descriptions of the fuel pool makeup system is included in the SAR Section X-5.5. Additional information on long term makeup water supplies was provided in FSAR Amendment No. 11 as a response to Question No. 10.4

I. PURPOSE

To provide a detailed procedure to prepare and ship spent fuel off-site.

II. DISCUSSION

Spent irradiated fuel poses a radiation hazard and must be handled accordingly. Extreme distance or shielding is required to protect personnel from unnecessary radiation exposure. For this reason, spent fuel is handled at a specified minimum distance under water in the fuel storage pool.

Spent fuel will be shipped in a shielded container (cask) weighing up to 70 tons and holding up to 18 BWR fuel bundles. An empty spent fuel shipping cask will arrive at the site by truck/railroad car, located under the equipment access hatch, and hoisted to the refueling floor. The cask is then lowered into the spent fuel storage pool, loaded with spent fuel, and decontaminated. The loaded shipping container (cask) is removed from the Reactor Building in the reverse order that it entered. All movements are within the restricted path.

III. REFERENCE MATERIAL

A. Fuel Handling Procedure 3.1: Special Nuclear Materials Control.

B. Operating Instructions for IF 300 Irradiated Fuel Shipping Cask; General Electric Document GEI-92817A.

IV. PREREQUISITES

A. All personnel performing the fuel handling are knowledgeable and experienced in the usage of the equipment.

B. The reactor crane shall be inspected using Procedure 7.2.32.

C. Tag boards are available on the refueling floor and in the Control Room to display the current fuel location.

D. All personnel in contact with fuel operations shall wear a film badge and dosimeter inside their protective clothing.

E. Personnel assigned to fuel handling have been instructed in radiation and criticality control procedures.

F. A limited access area is established around the spent fuel storage pool. All loose and unnecessary material and equipment are removed from this area.

G. The Reactor Building crane shall be operated using Procedure 7.6.1.

H. All decontamination equipment and facilities are operational.

I. The refueling zone ventilating system is in service.

J. The RPV head holding pedestals are removed from the cask decontamination area.

V. LIMITATIONS

A. Technical Specifications.

1. Section 3.2.D - Radiation Monitoring and Isolations.

2. Section 3.7 - Containment System.

3. Section 3.10 - Spent Fuel Cask Handling.

4. Section 5.5 - Fuel Storage.

B. Administrative.

1. The following requirements must be met under Facility Operating License No. DPR-46:

a. Access to the fuel handling area on the refueling floor and to the overhead bridge crane, when fuel handling is in progress, will be permitted only to authorized personnel.

b. All transfers of fuel must be in accordance with Procedure 3.1, Special Nuclear Material Accountability.

2. Refer to Administrative Procedure 1.4.7: Key Control and Maintenance Procedure 7.6.1: Operation of Reactor Building Crane for use of the crane in the key locked restrict mode for fuel cask movements.

3. No more than one fuel bundle should be suspended above the fuel storage array and this at a height no greater than 24 inches to limit penetration displacement if the bundle was dropped.

4. Fuel handling in the fuel storage area should be limited to one fuel assembly or the weight equivalent per crane. An exception to this requirement is a properly designed fuel shipping container or overload test weight. The shipping container or overload test weight should at no time be suspended above the fuel storage array.

5. Surveillance Procedure 6.3.10.10 shall be completed prior to VII. A.6 of this procedure.

VI. PRECAUTIONS

A. Irradiated fuel rods contain fission gases under pressure. The cladding may also be weakened after exposure to the reactor environment. Therefore, all handling of irradiated fuel must be performed with the greatest of care.

B. Equipment used underwater in the spent fuel storage pool is subject to radioactive contamination in verying degrees. Established radiation monitoring and protective measures will be strictly observed to avoid personnel contamination during operation of the equipment.

C. Undue force or careless handling practices which might cause inadvertent radiation exposure or damage to fuel or equipment must be avoided.

D. Special care must be taken to prevent any material from falling into the spent fuel storage pool. Good housekeeping practices must be observed both for cleanliness and removal of all loose and unnecessary material. In addition, personnel on the refueling floor shall have no loose material in their pockets or in their possession. Radiation monitoring badges and pencils shall be taped in place as well as being mechanically fastened to the clothing.

E. When placing the cask in the spent fuel storage pool, do not suspend it over any fuel. Do not leave the cask suspended over the pool longer than necessary.

F. Whenever the fuel cask is being moved above the 931' level of Reactor Building, the "Restricted Mode" of crane operation shall be in service.

G. The fuel cask shall never be over 6" off the refueling floor except to set it on the Decontamination Pad.

H. Spent fuel casks weighing in excess of 140,000 pounds shall not be handled.

I. All personnel shall be aware of Procedure 5.3.5, "Refueling Floor High Radiation".

VII. PROCEDURE

Note: Because of the many different types of fuel shipping casks, shipment of channels, etc. a special procedure will be written to provide a detailed procedure for cask movement. may include head

Caution: Ensure that the RPV head holding pedestals are removed from cask decontamination area.

A. Moving the Spent Fuel Shipping Cask Into the Fuel Pool.

1. Inspect the cask for damage and operability of all its component parts and wash off the road film from the cask and trailer/car.

2. Back the truck/rail car containing the horizontally mounted fuel shipment cask into the Reactor Building through the railroad air lock. Remove the cask hold-down bolts.

3. Using the Reactor Building crane and the lifting yoke provided, pivot the cask to the vertical position by picking up the weight with the crane.

4. Complete Surveillance Procedure 6.3.10.10.

CAUTION

ALL CASK HANDLING ABOVE THE 931' LEVEL OF THE REACTOR BUILDING WILL BE DONE IN THE "RESTRICTED MODE" WHICH WILL CONFINE MOVEMENT TO THE CASK CONTROLLED PATH AS SHOWN IN ATTACHMENT "A".

5. Place the Reactor Building crane in the "Restricted Mode" using the key operated selector switch prior to the time the cask reaches the 931' level.

Note: If during fuel cask movement an equipment failure prevents operation in the "Restricted Mode" movement of the fuel cask is permitted as necessary to get the cask to the closest acceptable stable location.

6. Set the cask down in the decontamination area on the refueling floor, unbolt and remove the cask lid and remove the cask plug. Check radiation and contamination levels inside cask and decontaminate as necessary.

CAUTION

WHEN PLACING THE CASK IN THE SPENT FUEL STORAGE POOL, IT SHALL BE SUSPENDED ONLY OVER THE SPENT FUEL CASK STORAGE LOCATION. IT SHALL NOT BE SUSPENDED OVER ANY FUEL. DO NOT LEAVE CASK SUSPENDED OVER THE POOL LONGER THAN NECESSARY.

CAUTION

THE SPENT FUEL CASK SHALL NOT BE RAISED ABOVE THE REFUELING FLOOR IN EXCESS OF 6" EXCEPT IT MAY BE RAISED TO A HEIGHT OF ∿ 3' FOR INSPECTION IN THE DECONTAMINATION AREA.

Note: All leakers must be placed in encapsulation cans before entering the cask.

7. Use the telescoping fuel grapple of the refueling platform to load the cask with those spent fuel bundles specified on a Special Nuclear Materials Transfer Form (See Procedure 3.1).

8. Using the lifting yoke and the Reactor Building crane, lower the cask plug into the cask cavity. Engage the lifting device.

B. Moving the Spent Fuel Shipping Cask Out of the Building.

1. Place the Reactor Building crane in the "Restricted Mode" using the key operated selector switch.

Note: 1. If during fuel cask movement an equipment failure prevents operation in the "Restricted Mode" movement of the fuel cask is permitted as necessary to get the cask to the closest acceptable stable location.

2. A Special Nuclear Material Transfer form must be executed in accordance with Procedure 3.1 when transferring a cask containing spent fuel.

2. Using the lifting yoke and the Reactor Building crane, raise the loaded cask from the fuel storage pool. Perform a radiation survey and wash the cask down with demineralized water while lifting.

3. Position the cask in the decontamination area.

4. Flush the cavity with demineralized water, sample for activity and perform a radiation survey. If there is any indication of a leaking fuel bundle, the cask must be returned to the pool and the associated fuel bundle removed. Known leakers must be shipped in the defective fuel storage containers. Decontaminate external surface of the cask and survey until within shipping limits.

Note: Detergents may also be used in the cask external decontamination process to reduce the radioactive contamination of the cask to within the legal limits required prior to forwarding to commercial carriers.

5. After the cask has reached a point of temperature equilibrium and the contamination of the externals is within shipping limits, bolt the cask lid in place.

6. Using the Reactor Building crane and the lifting yoke, lower the cask to the truck/railroad car, pivot it to the horizontal position and attach the cask hold-down bolts to secure it in place.

7. Perform a final radiation survey.

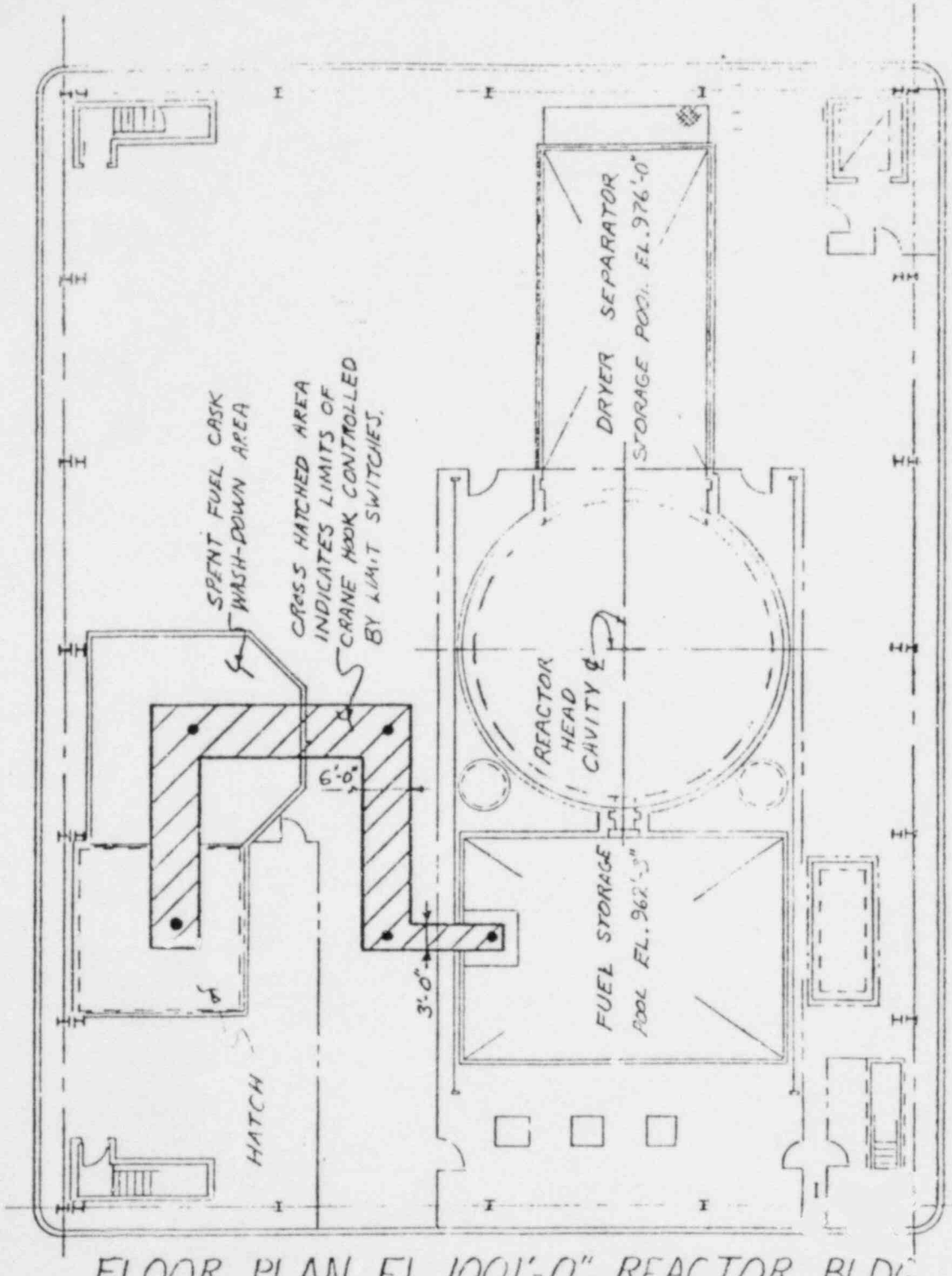
8. After appropriate shipping papers are prepared (FHP 3.1) required labels and placards are placed on cask and truck/railroad car, and all shipping licenses are fulfilled, remove the cask from the Reactor Building.

VIII. ATTACHMENTS

A. Horizontal Controlled Path of Spent Fuel Cask.

B. MBA Transfer Form (Figure 5 of Procedure 3.1).

HORIZONTAL CONTROLLED PATH OF SPENT FUEL CASK



FLOOR PLAN EL. 1001'-0" REACTOR BLDG.

HORIZONTAL CONTROLLED PATH OF SPENT FUEL CASK

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b. The design of the fuel storage pool is such that tornadic winds and missiles generated by these winds should not cause significant loss of watertight integrity of the fuel storage pool. The wall panels and girts on the reactor building are designed to fail at 75 PSF. This pressure may act in either direction (in or out). Special shear bolts are used to insure this failure. The design pressure for structures in this region is 30 PSF. A discussion of wind and tornado loading on the spent fuel storage facility is contained in SAR Section XII-2.3.3.1 and Amendment 9 as a response to part C of question 12.17.

c. When the crane selector switch is on the "restricted" mode the crane can only be operated within the predetermined restricted boundary. A diagram of the path of restricted movement is included in FSAR Amendment 33. With the crane selector switch on "normal", the crane can be operated throughout the refueling floor.

d. The Reactor Building Ventilation system is described in the SAR for Cooper Nuclear Station, Sections X-10.3.3.3 and VII-12.5. The description of the fuel pool design is included in Section X-3.4 of the SAR. The fuel pool cooling and demineralizer system is described in Volume IV, Section X-5.0 of the SAR.

e. 1. The movement of cranes over the vicinity of the fuel pool is discussed in the response to question c, above.

2. A description of the dual load path hoisting system is included in the FSAR, Amendment No. 33, Sections 1, 2, 3, 4 and 5.

3. Pool design information was provided in FSAR Amendment No. 11 as a response to Question No. 10.1. Crane movement is discussed in question "c" above.

f. Systems for maintaining water quality and quantity are discussed in the SAR, Section X-5.0.

g. Monitoring equipment in the fuel storage pool is discussed in the SAR, Section X-3.0.

h. Descriptions of the fuel pool makeup system is included in the SAR Section X-5.5. Additional information on long term makeup water supplies was provided in FSAR Amendment No. 11 as a response to Question No. 10.4.

I. PURPOSE

To provide a detailed procedure to prepare and ship spent fuel off-site.

II. DISCUSSION

Spent irradiated fuel poses a radiation hazard and must be handled accordingly. Extreme distance or shielding is required to protect personnel from unnecessary radiation exposure. For this reason, spent fuel is handled at a specified minimum distance under water in the fuel storage pool.

Spent fuel will be shipped in a shielded container (cask) weighing up to 70 tons and holding up to 18 BWR fuel bundles. An empty spent fuel shipping cask will arrive at the site by truck/railroad car, located under the equipment access hatch, and hoisted to the refueling floor. The cask is then lowered into the spent fuel storage pool, loaded with spent fuel, and decontaminated. The loaded shipping container (cask) is removed from the Reactor Building in the reverse order that it entered. All movements are within the restricted path.

III. REFERENCE MATERIAL

A. Fuel Handling Procedure 3.1: Special Nuclear Materials Control.

B. Operating Instructions for IF 300 Irradiated Fuel Shipping Cask; General Electric Document GEI-92817A.

IV. PREREQUISITES

A. All personnel performing the fuel handling are knowledgeable and experienced in the usage of the equipment.

B. The reactor crane shall be inspected using Procedure 7.2.32.

C. Tag boards are available on the refueling floor and in the Control Room to display the current fuel location.

D. All personnel in contact with fuel operations shall wear a film badge and dosimeter inside their protective clothing.

E. Personnel assigned to fuel handling have been instructed in radiation and criticality control procedures.

F. A limited access area is established around the spent fuel storage pool. All loose and unnecessary material and equipment are removed from this area.

G. The Reactor Building crane shall be operated using Procedure 7.6.1.

H. All decontamination equipment and facilities are operational.

I. The refueling zone ventilating system is in service.

J. The RPV head holding pedestals are removed from the cask decontamination area.

V. LIMITATIONS

A. Technical Specifications.

1. Section 3.2.D - Radiation Monitoring and Isolations.

2. Section 3.7 - Containment System.

3. Section 3.10 - Spent Fuel Cask Handling.

4. Section 5.5 - Fuel Storage.

B. Administrative.

1. The following requirements must be met under Facility Operating License No. DPR-46:

a. Access to the fuel handling area on the refueling floor and to the overhead bridge crane, when fuel handling is in progress, will be permitted only to authorized personnel.

b. All transfers of fuel must be in accordance with Procedure 3.1, Special Nuclear Material Accountability.

2. Refer to Administrative Procedure 1.4.7: Key Control and Maintenance Procedure 7.6.1: Operation of Reactor Building Crane for use of the crane in the key locked restrict mode for fuel cask movements.

3. No more than one fuel bundle should be suspended above the fuel storage array and this at a height no greater than 24 inches to limit penetration displacement if the bundle was dropped.

4. Fuel handling in the fuel storage area should be limited to one fuel assembly or the weight equivalent per crane. An exception to this requirement is a properly designed fuel shipping container or overload test weight. The shipping container or overload test weight should at no time be suspended above the fuel storage array.

5. Surveillance Procedure 6.3.10.10 shall be completed prior to VII. A.6 of this procedure.

VI. PRECAUTIONS

A. Irradiated fuel rods contain fission gases under pressure. The cladding may also be weakened after exposure to the reactor environment. Therefore, all handling of irradiated fuel must be performed with the greatest of care.

B. Equipment used underwater in the spent fuel storage pool is subject to radioactive contamination in verying degrees. Established radiation monitoring and protective measures will be strictly observed to avoid personnel contamination during operation of the equipment.

C. Undue force or careless handling practices which might cause inadvertent radiation exposure or damage to fuel or equipment must be avoided.

D. Special care must be taken to prevent any material from falling into the spent fuel storage pool. Good housekeeping practices must be observed both for cleanliness and removal of all loose and unnecessary material. In addition, personnel on the refueling floor shall have no loose material in their pockets or in their possession. Radiation monitoring badges and pencils shall be taped in place as well as being mechanically fastened to the clothing.

E. When placing the cask in the spent fuel storage pool, do not suspend it over any fuel. Do not leave the cask suspended over the pool longer than necessary.

F. Whenever the fuel cask is being moved above the 931' level of Reactor Building, the "Restricted Mode" of crane operation shall be in service.

G. The fuel cask shall never be over 6" off the refueling floor except to set it on the Decontamination Pad.

H. Spent fuel casks weighing in excess of 140,000 pounds shall not be handled.

I. All personnel shall be aware of Procedure 5.3.5, "Refueling Floor High Radiation".

VII. PROCEDURE

Note: Because of the many different types of fuel shipping casks, shipment of channels, etc. a special procedure will be written to provide a detailed procedure for cask movement.

Caution: Ensure that the RPV head holding pedestals are removed from cask decontamination area.

A. Moving the Spent Fuel Shipping Cask Into the Fuel Pool.

1. Inspect the cask for damage and operability of all its component parts and wash off the road film from the cask and trailer/car.

2. Back the truck/rail car containing the horizontally mounted fuel shipment cask into the Reactor Building through the railroad air lock. Remove the cask hold-down bolts.

3. Using the Reactor Building crane and the lifting yoke provided, pivot the cask to the vertical position by picking up the weight with the crane.

4. Complete Surveillance Procedure 6.3.10.10.

CAUTION

ALL CASK HANDLING ABOVE THE 931' LEVEL OF THE REACTOR BUILDING WILL BE DONE IN THE "RESTRICTED MODE" WHICH WILL CONFINE MOVEMENT TO THE CASK CONTROLLED PATH AS SHOWN IN ATTACHMENT "A".

5. Place the Reactor Building crane in the "Restricted Mode" using the key operated selector switch prior to the time the cask reaches the 931' level.

Note: If during fuel cask movement an equipment failure prevents operation in the "Restricted Mode" movement of the fuel cask is permitted as necessary to get the cask to the closest acceptable stable location.

6. Set the cask down in the decontamination area on the refueling floor, unbolt and remove the cask lid and remove the cask plug. Check radiation and contamination levels inside cask and decontaminate as necessary.

CAUTION

WHEN PLACING THE CASK IN THE SPENT FUEL STORAGE POOL, IT SHALL BE SUSPENDED ONLY OVER THE SPENT FUEL CASK STORAGE LOCATION. IT SHALL NOT BE SUSPENDED OVER ANY FUEL. DO NOT LEAVE CASK SUSPENDED OVER THE POOL LONGER THAN NECESSARY.

CAUTION

THE SPENT FUEL CASK SHALL NOT BE RAISED ABOVE THE REFUELING FLOOR IN EXCESS OF 6" EXCEPT IT MAY BE RAISED TO A HEIGHT OF ~ 3' FOR INSPECTION IN THE DECONTAMINATION AREA.

Note: All leakers must be placed in encapsulation cans before entering the cask.

7. Use the telescoping fuel grapple of the refueling platform to load the cask with those spent fuel bundles specified on a Special Nuclear Materials Transfer Form (See Procedure 3.1).

8. Using the lifting yoke and the Reactor Building crane, lower the cask plug into the cask cavity. Engage the lifting device.

B. Moving the Spent Fuel Shipping Cask Out of the Building.

1. Place the Reactor Building crane in the "Restricted Mode" using the key operated selector switch.

Note: 1. If during fuel cask movement an equipment failure prevents operation in the "Restricted Mode" movement of the fuel cask is permitted as necessary to get the cask to the closest acceptable stable location.

2. A Special Nuclear Material Transfer form must be executed in accordance with Procedure 3.1 when transferring a cask containing spent fuel.

2. Using the lifting yoke and the Reactor Building crane, raise the loaded cask from the fuel storage pool. Perform a radiation survey and wash the cask down with demineralized water while lifting.

3. Position the cask in the decontamination area.

4. Flush the cavity with demineralized water, sample for activity and perform a radiation survey. If there is any indication of a leaking fuel bundle, the cask must be returned to the pool and the associated fuel bundle removed. Known leakers must be shipped in the defective fuel storage containers. Decontaminate external surface of the cask and survey until within shipping limits.

Note: Detergents may also be used in the cask external decontamination process to reduce the radioactive contamination of the cask to within the legal limits required prior to forwarding to commercial carriers.

5. After the cask has reached a point of temperature equilibrium and the contamination of the externals is within shipping limits, bolt the cask lid in place.

6. Using the Reactor Building crane and the lifting yoke, lower the cask to the truck/railroad car, pivot it to the horizontal position and attach the cask hold-down bolts to secure it in place.

7. Perform a final radiation survey.

8. After appropriate shipping papers are prepared (FHP 3.1) required labels and placards are placed on cask and truck/railroad car, and all shipping licenses are fulfilled, remove the cask from the Reactor Building.

VIII. ATTACHMENTS

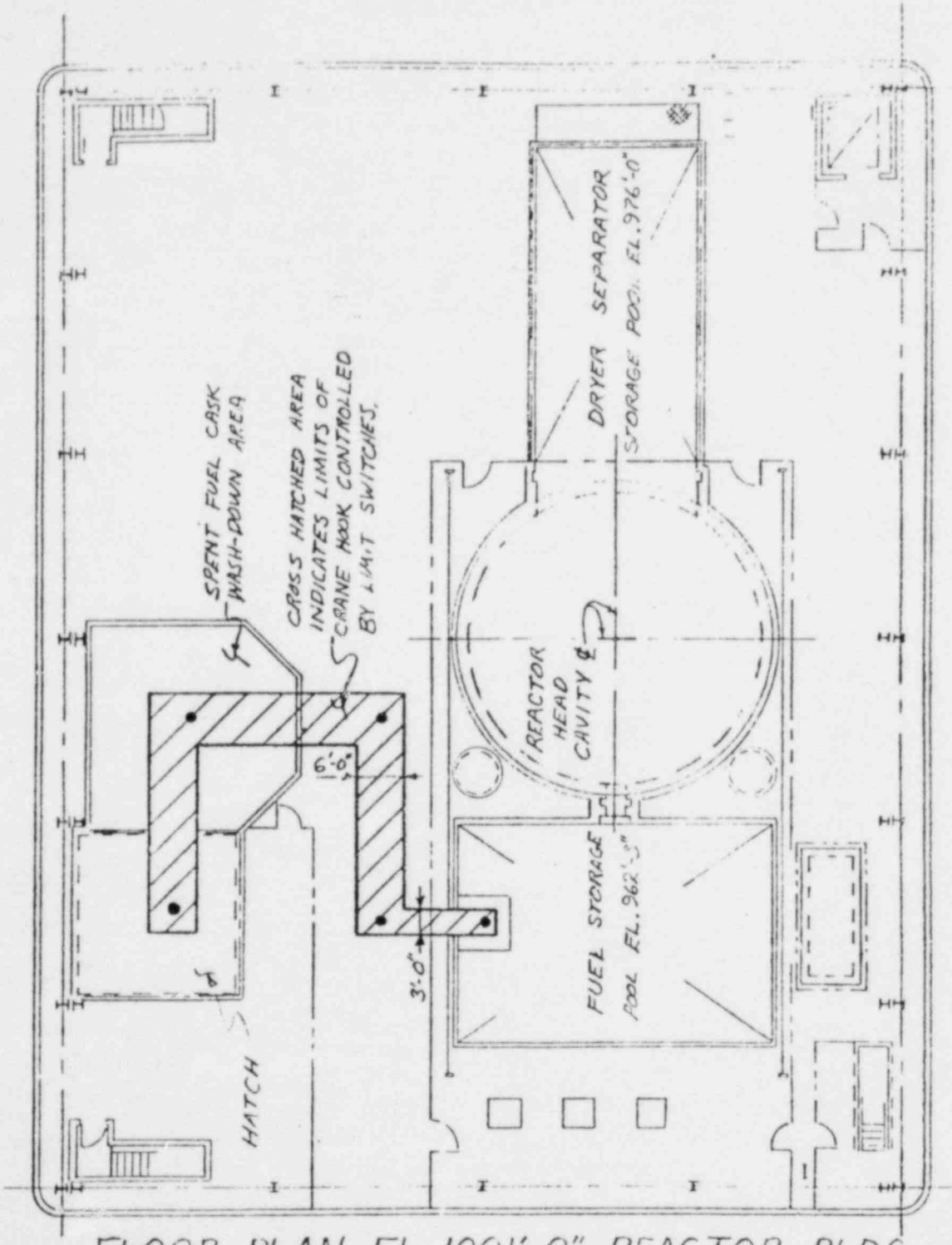
A. Horizontal Controlled Path of Spent Fuel Cask.

B. MBA Transfer Form (Figure 5 of Procedure 3.1).

Procedure 3.7
Attachment A

Attachment No. 2

HORIZONTAL CONTROLLED PATH OF SPENT FUEL CASK



FLOOR PLAN EL. 1001'-0" REACTOR BLDG.

HORIZONTAL CONTROLLED PATH OF SPENT FUEL CASK

SAR AMENDMENT 19

DWG. No. FIG. 1

Nebraska Public Power District

GENERAL OFFICE
P. O. BOX 499, COLUMBUS, NEBRASKA 68601
TELEPHONE (402) 564-8561

July 10, 1978

Mr. Victor Stello, Jr., Director
Division of Operating Reactors
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Movement of Heavy Loads Near the Spent Fuel Facility -
Request for Information
Cooper Nuclear Station
NRC Docket No. 50-298, DPR-46

Dear Mr. Stello:

In your letter dated May 17, 1978 you requested the Nebraska Public Power District to provide additional information regarding the movement of heavy loads near the spent fuel facility. This letter transmits the information requested as Attachment 1. Attachment 2 contains the procedure for the movement of the fuel casks at Cooper Nuclear Station.

As you requested, the District has reviewed its current procedures for the movement of heavy loads over spent fuel and has concluded that the potential for a handling accident which could result in damage to spent fuel is at a minimum.

Should you have any questions or desire additional information, please contact me.

In addition to one signed original, 39 copies of this information are also submitted for your use.

Sincerely yours,

Jay M. Pilant

Jay M. Pilant
Director of Licensing and
Quality Assurance

JDW/cmk
Attachment

STATE OF NEBRASKA)
) ss
PLATTE COUNTY)

Jay M. Pilant, being first duly sworn, deposes and says that he is an authorized representative of the Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska; that he is duly authorized to submit this information on behalf of Nebraska Public Power District; and that the statements in said application are true to the best of his knowledge and belief.

Jay M. Pilant

Subscribed in my presence and sworn to before me this 10th day of July, 1978.

Marilyn R. Hohndorf
NOTARY PUBLIC

My Commission expires Oct. 14, 1980.

GENERAL NOTARY - State of Nebraska
MARILYN R. HOHNDORF
My Comm. Exp. Oct. 14, 1980

Question No. 1

Provide a diagram which illustrates the physical relation between the reactor core, the fuel transfer canal, the spent fuel storage pool and the set down, receiving or storage areas for any heavy loads moved on the refueling floor.

Response

FSAR drawings XII-2-6, 2-7, and 2-8 illustrate the physical relation between the reactor core, the fuel transfer canal, the spent fuel storage pool and the set down, receiving or storage areas.

Question No. 2

Provide a list of all objects that are required to be moved over the reactor core (during refueling), or the spent fuel storage pool. For each object listed, provide its approximate weight and size, a diagram of the movement path utilized (including carrying height) and the frequency of movement.

Response

The only object which is required to be moved over the reactor core (during refueling), or the spent fuel storage pool is the refueling platform which is on rails on either side of the cavities. Movement of the fuel cask is interlocked to include only that area of the spent fuel storage pool directly over the fuel cask storage area. The fuel cask does not move over the spent fuel racks. Discussion of the fuel cask physical dimensions and handling has been submitted in FSAR Amendment No. 33, sections 5.0 and 6.0, respectively.

Question No. 3

What are the dimensions and weights of the spent fuel casks that are or will be used at your facility.

Response

Dimensions and weights of the spent fuel cask were submitted in FSAR Amendment No. 33 and is described in paragraph 5.1.

Question No. 4

Identify any heavy load or cask drop analyses performed to date for your facility. Provide a copy of all such analyses not previously submitted to the NRC staff.

Response

A cask drop analyses has been previously submitted, FSAR Amendment No. 11, response to question No. 10.1.

Question No. 5

Identify any heavy loads that are carried over equipment required for the safe shutdown of a plant that is operating at the time the load is moved. Identify what equipment could be affected in the event of a heavy load handling accident (piping, cabling, pumps, etc.) and discuss the feasibility of such an accident affecting this equipment. Describe the basis for your conclusions.

Response

Heavy loads are not carried over equipment required for the safe shutdown of the plant.

Question No. 6

If heavy loads are required to be carried over the spent fuel storage pool or fuel transfer canal at your facility, discuss the feasibility of a handling accident which could result in water leakage severe enough to uncover the spent fuel. Describe the basis for your conclusions.

Response

The spent fuel cask drop analyses was submitted in FSAR Amendment No. 11 (Question No. 10.1). No other heavy loads are required to be carried over the spent fuel storage pool or fuel transfer canal at Cooper Nuclear Station.

Question No. 7

Describe any design features of your facility which affect the potential for a heavy load handling accident involving spent fuel, e.g., utilization of a single failure-proof crane.

Response

The design features which affect the potential for a heavy load handling accident involving spent fuel is discussed in FSAR Amendment No. 33, Sections 1.0, 2.0, 3.0 and 4.0.

Question No. 8

Provide copies of all procedures currently in effect at your facility for the movement of heavy loads over the reactor core during refueling, the spent fuel storage pool, or equipment required for the safe shutdown of a plant that is operating at the time the move occurs.

Response

Administrative procedures insure that heavy loads are not transported over the exposed reactor core during refueling. Procedures that govern the removal of heavy objects from directly above the core (i.e. shield plugs,

drywell head, etc.) before the core is uncovered, insure that these objects do not pass over the reactor cavity or fuel pool cavity. These procedures are available at Cooper Nuclear Station for review. The only heavy load to be carried over a portion of the spent fuel storage pool will be the fuel cask which is interlocked to include only that area of the spent fuel storage pool directly over the fuel cask storage area. The procedure for the preparation and shipment of spent fuel is discussed in Attachment "2". No heavy loads are carried over equipment required for safe shutdown of the plant while the plant is operating.

Question No. 9

Discuss the degree to which your facility complies with the eight (8) regulatory positions delineated in Regulatory Guide 1.13 (Revision 1, December, 1975) regarding Spent Fuel Storage Facility Design Basis.

a. The spent fuel storage facility (including its structures and equipment except as noted in paragraph f below) should be designed to Category I seismic requirements.

b. The facility should be designed (a) to keep tornadic winds and missiles generated by these winds from causing significant loss of water tight integrity of the fuel storage pool and (b) to keep missiles generated by tornadic winds from contacting fuel within the pool.

c. Interlocks should be provided to prevent cranes from passing over stored fuel (or near stored fuel in a manner such that if a crane failed, the load could tip over on stored fuel) when fuel handling is not in progress. During fuel handling operations, the interlock may be bypassed and administrative control used to prevent the crane from carrying loads that are not necessary for fuel handling over the stored fuel or other prohibited areas. The facility should be designed to minimize the need for bypassing such interlocks.

d. A controlled leakage building should enclose the fuel pool. The building should be equipped with an appropriate ventilation and filtration system to limit the potential release of radioactive iodine and other radioactive materials. The building need not be designed to withstand extremely high winds, but leakage should be suitably controlled during refueling operations. The design of the ventilation and filtration system should be based on the assumption that the cladding of all of the fuel rods in one fuel bundle might be breached. The inventory of radioactive materials available for leakage from the building should be based on the assumptions given in Regulatory Guide 1.25, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors" (Safety Guide 25).

e. The spent fuel storage facility should have at least one of the following provisions with respect to the handling of heavy loads, including the refueling cask:

   1. Cranes capable of carrying heavy loads should be prevented, preferably by design rather than by interlocks, from moving into the vicinity of the pool.

   2. Cranes should be designed to provide single-failure-proof handling of heavy loads, so that a single failure will not result in loss of capability of the crane-handling system to perform its safety function; or

   3. The fuel pool should be designed to withstand, without leakage that could uncover the fuel, the impact of the heaviest load to be carried by the crane from the maximum height to which it can be lifted. If this approach is used, design provisions should be made to prevent the crane, when carrying heavy loads, from moving in the vicinity of stored fuel.

f. Drains, permanently connected mechanical or hydraulic system, and other features that by maloperation or failure, could cause loss of coolant that would uncover fuel should not be installed or included in the design. Systems for maintaining water quality and quantity should be designed so that any maloperation or failure of such systems (including failures resulting from the Safety Shutdown Earthquake) will not cause fuel to be uncovered. These systems need not otherwise meet Category I seismic requirements.

g. Reliable and frequently tested monitoring equipment should be provided to alarm both locally and in a continuously manned location if the water level in the fuel storage pool falls below a predetermined level or if high local-radiation levels are experienced. The high-radiation-level instrumentation should also actuate the filtration system.

h. A seismic Category I makeup system should be provided to add coolant to the pool. Appropriate redundancy or a backup system for filling the pool from a reliable source, such as a lake, river, or onsite seismic Category I water-storage facility, should be provided. If a backup system is used, it need not be a permanently installed system. The capacity of the makeup systems should be such that water can be supplied at a rate determined by consideration of the leakage rate that would be expected as the result of damage to the fuel storage pool from the dropping of loads, from earthquakes, or from missiles originating in high winds.

Response

a. The design of the facility is described in the SAR, Section I-6.1.1.8, and Section X-5.5, page X-5-3.

b. The design of the fuel storage pool is such that tornadic winds and missiles generated by these winds should not cause significant loss of watertight integrity of the fuel storage pool. The wall panels and girts on the reactor building are designed to fail at 75 PSF. This pressure may act in either direction (in or out). Special shear bolts are used to insure this failure. The design pressure for structures in this region is 30 PSF. A discussion of wind and tornado loading on the spent fuel storage facility is contained in SAR Section XII-2.3.3.1 and Amendment 9 as a response to part C of question 12.17.

c. When the crane selector switch is on the "restricted" mode the crane can only be operated within the predetermined restricted boundary. A diagram of the path of restricted movement is included in FSAR Amendment 33. With the crane selector switch on "normal", the crane can be operated throughout the refueling floor.

d. The Reactor Building Ventilation system is described in the SAR for Cooper Nuclear Station, Sections X-10.3.3.3 and VII-12.5. The description of the fuel pool design is included in Section X-3.4 of the SAR. The fuel pool cooling and demineralizer system is described in Volume IV, Section X-5.0 of the SAR.

e. 1. The movement of cranes over the vicinity of the fuel pool is discussed in the response to question c, above.

2. A description of the dual load path hoisting system is included in the FSAR, Amendment No. 33, Sections 1, 2, 3, 4 and 5.

3. Pool design information was provided in FSAR Amendment No. 11 as a response to Question No. 10.1. Crane movement is discussed in question "c" above.

f. Systems for maintaining water quality and quantity are discussed in the SAR, Section X-5.0.

g. Monitoring equipment in the fuel storage pool is discussed in the SAR, Section X-3.0.

h. Descriptions of the fuel pool makeup system is included in the SAR Section X-5.5. Additional information on long term makeup water supplies was provided in FSAR Amendment No. 11 as a response to Question No. 10.4.

I. PURPOSE

To provide a detailed procedure to prepare and ship spent fuel off-site.

II. DISCUSSION

Spent irradiated fuel poses a radiation hazard and must be handled accordingly. Extreme distance or shielding is required to protect personnel from unnecessary radiation exposure. For this reason, spent fuel is handled at a specified minimum distance under water in the fuel storage pool.

Spent fuel will be shipped in a shielded container (cask) weighing up to 70 tons and holding up to 18 BWR fuel bundles. An empty spent fuel shipping cask will arrive at the site by truck/railroad car, located under the equipment access hatch, and hoisted to the refueling floor. The cask is then lowered into the spent fuel storage pool, loaded with spent fuel, and decontaminated. The loaded shipping container (cask) is removed from the Reactor Building in the reverse order that it entered. All movements are within the restricted path.

III. REFERENCE MATERIAL

A. Fuel Handling Procedure 3.1: Special Nuclear Materials Control.

B. Operating Instructions for IF 300 Irradiated Fuel Shipping Cask; General Electric Document GEI-92817A.

IV. PREREQUISITES

A. All personnel performing the fuel handling are knowledgeable and experienced in the usage of the equipment.

B. The reactor crane shall be inspected using Procedure 7.2.32.

C. Tag boards are available on the refueling floor and in the Control Room to display the current fuel location.

D. All personnel in contact with fuel operations shall wear a film badge and dosimeter inside their protective clothing.

E. Personnel assigned to fuel handling have been instructed in radiation and criticality control procedures.

F. A limited access area is established around the spent fuel storage pool. All loose and unnecessary material and equipment are removed from this area.

G. The Reactor Building crane shall be operated using Procedure 7.6.1.

H. All decontamination equipment and facilities are operational.

I. The refueling zone ventilating system is in service.

J. The RPV head holding pedestals are removed from the cask decontamination area.

V. LIMITATIONS

A. Technical Specifications.

1. Section 3.2.D - Radiation Monitoring and Isolations.

2. Section 3.7 - Containment System.

3. Section 3.10 - Spent Fuel Cask Handling.

4. Section 5.5 - Fuel Storage.

B. Administrative.

1. The following requirements must be met under Facility Operating License No. DPR-46:

a. Access to the fuel handling area on the refueling floor and to the overhead bridge crane, when fuel handling is in progress, will be permitted only to authorized personnel.

b. All transfers of fuel must be in accordance with Procedure 3.1, Special Nuclear Material Accountability.

2. Refer to Administrative Procedure 1.4.7: Key Control and Maintenance Procedure 7.6.1: Operation of Reactor Building Crane for use of the crane in the key locked restrict mode for fuel cask movements.

3. No more than one fuel bundle should be suspended above the fuel storage array and this at a height no greater than 24 inches to limit penetration displacement if the bundle was dropped.

4. Fuel handling in the fuel storage area should be limited to one fuel assembly or the weight equivalent per crane. An exception to this requirement is a properly designed fuel shipping container or overload test weight. The shipping container or overload test weight should at no time be suspended above the fuel storage array.

5. Surveillance Procedure 6.3.10.10 shall be completed prior to VII. A.6 of this procedure.

VI. PRECAUTIONS

A. Irradiated fuel rods contain fission gases under pressure. The cladding may also be weakened after exposure to the reactor environment. Therefore, all handling of irradiated fuel must be performed with the greatest of care.

B. Equipment used underwater in the spent fuel storage pool is subject to radioactive contamination in verying degrees. Established radiation monitoring and protective measures will be strictly observed to avoid personnel contamination during operation of the equipment.

C. Undue force or careless handling practices which might cause inadvertent radiation exposure or damage to fuel or equipment must be avoided.

D. Special care must be taken to prevent any material from falling into the spent fuel storage pool. Good housekeeping practices must be observed both for cleanliness and removal of all loose and unnecessary material. In addition, personnel on the refueling floor shall have no loose material in their pockets or in their possession. Radiation monitoring badges and pencils shall be taped in place as well as being mechanically fastened to the clothing.

E. When placing the cask in the spent fuel storage pool, do not suspend it over any fuel. Do not leave the cask suspended over the pool longer than necessary.

F. Whenever the fuel cask is being moved above the 931' level of Reactor Building, the "Restricted Mode" of crane operation shall be in service.

G. The fuel cask shall never be over 6" off the refueling floor except to set it on the Decontamination Pad.

H. Spent fuel casks weighing in excess of 140,000 pounds shall not be handled.

I. All personnel shall be aware of Procedure 5.3.5, "Refueling Floor High Radiation".

VII. PROCEDURE

Note: Because of the many different types of fuel shipping casks, shipment of channels, etc. a special procedure will be written to provide a detailed procedure for cask movement.

Caution: Ensure that the RPV head holding pedestals are removed from cask decontamination area.

A. Moving the Spent Fuel Shipping Cask Into the Fuel Pool.

1. Inspect the cask for damage and operability of all its component parts and wash off the road film from the cask and trailer/car.

2. Back the truck/rail car containing the horizontally mounted fuel shipment cask into the Reactor Building through the railroad air lock. Remove the cask hold-down bolts.

3. Using the Reactor Building crane and the lifting yoke provided, pivot the cask to the vertical position by picking up the weight with the crane.

4. Complete Surveillance Procedure 6.3.10.10.

CAUTION

ALL CASK HANDLING ABOVE THE 931' LEVEL OF THE REACTOR BUILDING WILL BE DONE IN THE "RESTRICTED MODE" WHICH WILL CONFINE MOVEMENT TO THE CASK CONTROLLED PATH AS SHOWN IN ATTACHMENT "A".

5. Place the Reactor Building crane in the "Restricted Mode" using the key operated selector switch prior to the time the cask reaches the 931' level.

Note: If during fuel cask movement an equipment failure prevents operation in the "Restricted Mode" movement of the fuel cask is permitted as necessary to get the cask to the closest acceptable stable location.

6. Set the cask down in the decontamination area on the refueling floor, unbolt and remove the cask lid and remove the cask plug. Check radiation and contamination levels inside cask and decontaminate as necessary.

CAUTION

WHEN PLACING THE CASK IN THE SPENT FUEL STORAGE POOL, IT SHALL BE SUSPENDED ONLY OVER THE SPENT FUEL CASK STORAGE LOCATION. IT SHALL NOT BE SUSPENDED OVER ANY FUEL. DO NOT LEAVE CASK SUSPENDED OVER THE POOL LONGER THAN NECESSARY.

CAUTION

THE SPENT FUEL CASK SHALL NOT BE RAISED ABOVE THE REFUELING FLOOR IN EXCESS OF 6" EXCEPT IT MAY BE RAISED TO A HEIGHT OF ∿ 3' FOR INSPECTION IN THE DECONTAMINATION AREA.

Note: All leakers must be placed in encapsulation cans before entering the cask.

7. Use the telescoping fuel grapple of the refueling platform to load the cask with those spent fuel bundles specified on a Special Nuclear Materials Transfer Form (See Procedure 3.1).

8. Using the lifting yoke and the Reactor Building crane, lower the cask plug into the cask cavity. Engage the lifting device.

B. Moving the Spent Fuel Shipping Cask Out of the Building.

1. Place the Reactor Building crane in the "Restricted Mode" using the key operated selector switch.

Note: 1. If during fuel cask movement an equipment failure prevents operation in the "Restricted Mode" movement of the fuel cask is permitted as necessary to get the cask to the closest acceptable stable location.

2. A Special Nuclear Material Transfer form must be executed in accordance with Procedure 3.1 when transferring a cask containing spent fuel.

2. Using the lifting yoke and the Reactor Building crane, raise the loaded cask from the fuel storage pool. Perform a radiation survey and wash the cask down with demineralized water while lifting.

3. Position the cask in the decontamination area.

4. Flush the cavity with demineralized water, sample for activity and perform a radiation survey. If there is any indication of a leaking fuel bundle, the cask must be returned to the pool and the associated fuel bundle removed. Known leakers must be shipped in the defective fuel storage containers. Decontaminate external surface of the cask and survey until within shipping limits.

Note: Detergents may also be used in the cask external decontamination process to reduce the radioactive contamination of the cask to within the legal limits required prior to forwarding to commercial carriers.

5. After the cask has reached a point of temperature equilibrium and the contamination of the externals is within shipping limits, bolt the cask lid in place.

6. Using the Reactor Building crane and the lifting yoke, lower the cask to the truck/railroad car, pivot it to the horizontal position and attach the cask hold-down bolts to secure it in place.

7. Perform a final radiatio survey.

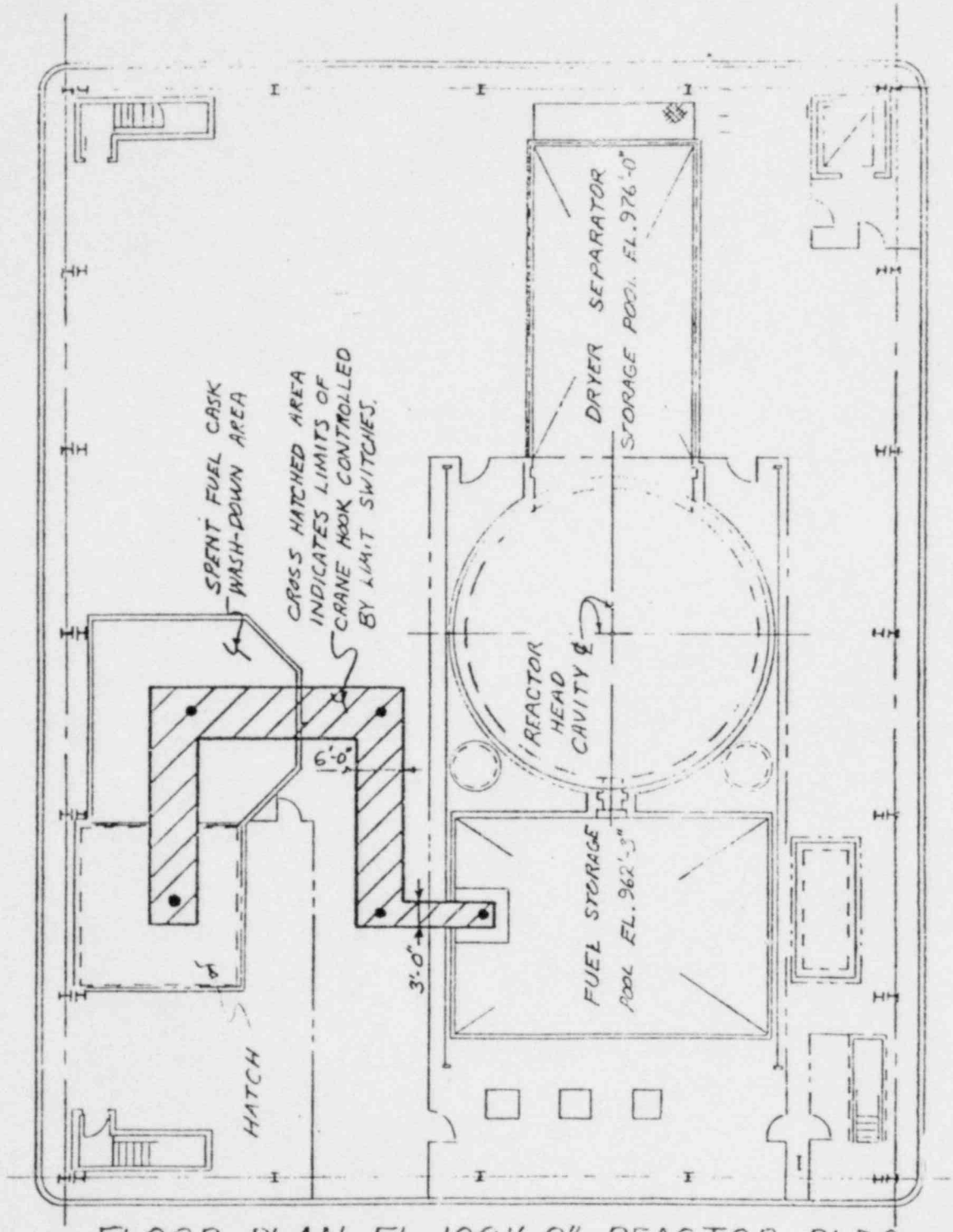
8. After appropriate shipping papers are prepared (FHP 3.1) required labels and placards are placed on cask and truck/railroad car, and all shipping licenses are fulfilled, remove the cask from the Reactor Building.

VIII. ATTACHMENTS

A. Horizontal Controlled Path of Spent Fuel Cask.

B. MBA Transfer Form (Figure 5 of Procedure 3.1).

HORIZONTAL CONTROLLED PATH OF SPENT FUEL CASK



FLOOR PLAN EL. 1001'-0" REACTOR BLDG.

HORIZONTAL CONTROLLED PATH OF SPENT FUEL CASK

SAR AMENDMENT 19

DWG. No. FIG. 1