ENVIRONMENTAL IMPACT APPRAISAL

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO.   TO DPR-45

DAIRYLAND POWER COOPERATIVE

LA CROSSE BOILING WATER REACTOR (LACBWR)

DOCKET NO. 50-409

DATE: July 13, 1979

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1.0 Description of Proposed Action

By letters dated April 20, June 7, July 11, August 7, September 25, October 4, and November 29, 1978, Dairyland Power Cooperative (DPC) (the licensee) proposed an increase in storage capacity of the fuel element storage well (FESW) at LACBWR from 134 to 440 storage cells. DPC provided additional information to support their proposal by letters dated October 26, and November 20, 1978, and January 4 and 31, February 14, and March 1, 1979.

2.0 Need for Increased Storage Capacity

LACBWR is a 50 MWe boiling water reactor located in Vernon County, Wisconsin. LACBWR received a Provisional Operating Authorization on October 31, 1969, which was converted to a Provisional Operating License on August 28, 1973. DPC submitted an application for a Full Term License on October 9, 1974. The fuel element storage well (FESW) contains fuel storage racks for 134 spent fuel assemblies. This storage capacity will accommodate a full LACBWR core of 72 fuel assemblies plus an additional 62 fuel assemblies.

During a normal refueling about one third of the fuel assemblies in the reactor core are replaced by new fuel. The period between refuelings depends on plant operating history and system wide outage schedules but generally can range between twelve and eighteen months.

During the 1979 LACBWR core refueling 28 spent fuel assemblies were removed and transferred to the Fuel Element Storage Well. To make room for these fuel assemblies it was necessary to transfer 8 of the oldest spent fuel assemblies from the FESW to the GE Morris Facility for temporary storage until the planned expansion of the FESW is completed. The FESW with the originally installed spent fuel racks is, as a result of the most recent movement of LACBWR spent fuel assemblies, filled to the current FESW capacity.

By adding an additional 306 storage locations, the licensee estimates that the proposed modification will accommodate spent fuel discharges until at least 1991 and will provide full core offload capability until at least 1988.

The proposed modification to the FESW will not alter the external physical geometry or require significant modifications to the FESW cooling or purification systems. The proposed modification does not affect the rate of spent fuel generation or the total quantity of spent fuel generated during the anticipated operating lifetime of the facility. The proposed modification will increase the number of spent fuel assemblies stored in the FESW and the length of time that some of the fuel assemblies will be stored in the pool.

3.0 Fuel Reprocessing History

Currently, spent fuel is not being reprocessed on a commercial basis in the United States. The Nuclear Fuel Services (NFS) plant at West Valley, New York, was shut down in 1972 for alterations and expansions; on September 22, 1976, NFS informed the Commission that they were withdrawing from the nuclear fuel reprocessing business. The Allied General Nuclear Services (AGNS) proposed plant in Barnwell, South Carolina, is not licensed to operate.

The General Electric Company's (GE) Midwest Fuel Recovery Plant (MFRP) in Morris, Illinois is in a decommissioned condition. Although no plants are licensed for reprocessing fuel, the storage pool at Morris, Illinois and the storage pool at West Valley, New York (on land owned by the State of New York and leased to NFS through 1980) are licensed to store spent fuel. The storage pool at West Valley is not full but NFS is presently not accepting any additional spent fuel for storage, even from those power generating facilities that had contractual arrangements with NFS. Construction of the AGNS receiving and storage station has been completed. AGNS has applied for - but has not been granted - a license to receive and store irradiated fuel assemblies in the storage pool at Barnwell prior to a decision on the licensing action relating to the separation facility.

4.0 Plant Description

The LaCrosse Boiling Water Reactor (LACBWR) is described in the Draft Environmental Statement (DES) published by the Commission in June 1976, and in the Safeguards Report. LACBWR is a forced circulation, direct-cycle, boiling water reactor. It produces approximately 50 megawatts net electrical output (MWne). Pertinent descriptions of principal features are summarized below to aid the reader in following the evaluations in subsequent sections of this appraisal.

4.1 Fuel Inventory

The LACBWR reactor core contains 72 fuel assemblies. The fuel is in the form of slightly enriched uranium dioxide ceramic pellets. The pellets are stacked to an active length of 83 inches within tubular cladding which is plugged and seal-welded at the ends to encapsulate the fuel. A 10x10 array of rods comprise each fuel assembly. Approximately one third of the assemblies are removed from the reactor and replaced with new fuel each operating cycle.

4.2 Plant Cooling Water Systems

The LACBWR condenser cooling water and service water systems use water supplied by the Mississippi River. Condenser cooling water is supplied by two circulating water pumps. The service water system furnishes cooling water to component cooling water system and other plant equipment. The service water system acts as the heat sink for all equipment important to plant safety. The component cooling water system supplies cooling water to the Fuel Element Storage Well (FESW) heat exchanger.

4.3 Radioactive Wastes

The plant contains waste treatment systems designed to collect and process the gaseous, liquid and solid waste that might contain radioactive material. The waste treatment systems are evaluated in the Draft Environmental Statement (DES) dated June 1976. There will be no change in the waste treatment systems described in Section 3.6 of the DES as a result of the proposed modification.

4.4 Purpose of Fuel Element Storage Well (FESW)

The FESW at LACBWR is designed to store spent fuel assemblies prior to shipment offsite. These assemblies may be transferred from the reactor core to the FESW during a core refueling, or to allow for inspection and/or modification of core internals. The latter may require the removal and storage of up to a full core. The assemblies upon removal from the core are initially intensely radioactive due to their fission product content and have a high residual heat output. They are stored in the FESW to allow for radioactive and thermal decay. The rate of decay is normally greatest following reactor shutdown just prior to refueling. After 150 days following reactor shutdown the decay heat rate is low enough to permit the assemblies to be withdrawn from the FESW and placed into a fuel cask for shipment offsite.

4.5 Fuel Element Storage Well Cooling and Purification System

The FESW cooling and cleanup system consists of a storage well, two 270 gpm circulating pumps, a shell and U-tube heat exchanger, a filter, ion exchanger and the required piping, valves and instrumentation. One pump draws the water from the storage well through a filter and discharges it through the tube side of a heat exchanger (cooler), from which it flows back through a portable ion exchanger to the storage well. Another identical pump serves as standby. Either pump can develop sufficient head to pump water from the storage well to the overhead storage tank. Water can be pumped from the well to the overhead storage tank or drained to the retention tanks as necessary

Because we expect only a small increase in radioactivity released to the pool water as a result of the proposed modification as discussed in Section 5.3, we conclude that the FESW purification system will keep concentrations of radioactivity in the pool water to levels which have existed prior to the modification.

5.0 Environmental Impacts of Proposed Action

5.1 Land Use

The LACBWR FESW is entirely contained within the existing reactor containment building. The proposed modification will not alter the external physical geometry of the FESW or the enclosing building. No additional commitment of land is required.

5.2 Water Use

There will be no significant change in plant water usage as a result of the proposed modification. As discussed in the accompanying Safety Evaluation, storing additional spent fuel in the FESW will only slightly increase the heat load on the FESW cooling system. The heat load will be transferred to the service water system via the component cooling water system. The modification does not require a change to the design flow rates for these systems. The maximum expected total heat load will occur after the discharge of a full core from the reactor to the FESW, and the FESW cooling system has adequate design capacity to maintain the FESW water temperature below 150°F under these conditions. Consequently, the rate of evaporation is not expected to be significantly altered and thus the need for makeup water will remain within the current design capability.

5.3 Radiological Considerations

5.3.1 Introduction

The potential offsite radiological environmental impacts associated with the expansion of the spent fuel storage capacity were evaluated and determined to be environmentally insignificant as addressed below.

The additional spent fuel which would be stored due to the expansion is the oldest fuel which has not been shipped from the plant. This fuel should have decayed about five years. During the storage of the spent fuel under water, both volatile and nonvolatile radioactive nuclides may be released to the water from the surface of the assemblies or from defects in the fuel cladding. Most of the material released from the surface of the assemblies consists of activated corrosion products such as Co-58, Co-60, Fe-59 and Mn-54 which are not volatile. The radionuclides that might be released to the water through defects in the cladding, such as Cs-134, Cs-137, Sr-89 and Sr-90, are also predominantly nonvolatile. The primary impact of such nonvolatile radioactive nuclides is their contribution to radiation levels to which workers in and near the FESW would be exposed. The volatile fission product nuclides of most concern that might be released through defects in the fuel cladding are the noble gases (xenon and krypton), tritium and the iodine isotopes.

Experience indicates that there is little radionuclide leakage from spent fuel stored in pools after the fuel has cooled for several months. The predominance of radionuclides in the spent fuel pool water appear to be radionuclides that were present in the reactor coolant system prior to refueling (which becomes mixed with water in the spent fuel pool during refueling operations) or crud dislodged from the surface of the spent fuel during transfer from the reactor core to the FESW. During and after refueling, the spent fuel pool cleanup system reduces the radioactivity concentrations considerably. It is theorized that most failed fuel contains small, pinhole-like perforations in the fuel cladding at the reactor operating condition of approximately 600°F. A few weeks after refueling, the spent fuel cools in the spent fuel pool so that fuel clad temperature is relatively cool, approximately 180°F. This substantial temperature reduction should reduce the rate of release of fission products from the fuel pellets and decrease the gas pressure in the gap between pellets and clad, thereby tending to retain the fission products within the gap.

In addition, most of the gaseous fission products have short half-lives and decay to insignificant levels within a few months. Based on the operational reports submitted by the licensees or discussions with the operators, there has not been any significant leakage of fission products from spent light water reactor fuel stored in the Morris Operation (MO) (formerly Midwest Fuel Recovery Plant) at Morris, Illinois, or at Nuclear Fuel Services' (NFS) storage pool at West Valley, New York. Spent fuel has been stored in these two pools which, while it was in a reactor, was determined to have significant leakage and was therefore removed from the core. After storage in the onsite spent fuel pool, this fuel was later shipped to either MO or NFS for extended storage. Although the fuel exhibited significant leakage at reactor operating conditions, there was no significant leakage from this fuel in the offsite storage facility.

LaCrosse BWR has had significant fuel failures including severe cladding failures in fuel pins in a number of assemblies. The experience discussed above would indicate that these failed fuel assemblies would not have significant leakage to the FESW water after the fuel has decayed during the first year. For fuel pins with severe cladding failures, all the radioactivity in the gap will have been released to the reactor coolant water. The diffusion of radioactivity from the fuel itself into the pool water at the low FESW fuel temperatures would not be significant.

5.3.2 Radioactive Material Released to Atmosphere

With respect to gaseous releases, the only significant noble gas isotope attributable to storing additional assemblies for a longer period of time would be Krypton-85. As discussed previously, experience has demonstrated that after spent fuel has decayed 4 to 6 months, there is no significant release of fission products from defected fuel. However, we have conservatively estimated that an additional 20 curies per year of Krypton-85 may be released from the FESW when the modified pool is completely filled. This increase would result in an additional total body dose of less than 0.001 mrem/year to an individual at the site boundary. This dose is insignificant when compared to the approximately 100 mrem/year that an individual receives from natural background radiation. The additional total body dose to the estimated population within a 50-mile radius of the plant is less than 0.001 man-rem/year. This is small compared to the fluctuations in the annual dose this population would receive from natural background radiation. This exposure represents an increase of less than 0.1% of the exposure from the plant evaluated in the DES. Thus, we conclude that the proposed modification will not have any significant impact on exposures offsite.

Assuming that the spent fuel will be stored onsite for several years, Iodine-131 releases from spent fuel assemblies to the FESW water will not be significantly increased because of the expansion of the fuel storage capacity since the Iodine-131 inventory in the fuel will decay to negligible levels between refuelings.

Storing additional spent fuel assemblies should not increase the bulk water temperature during normal refuelings above the 120°F used in the design analysis. Therefore, it is not expected that there will be any significant change in the annual release of tritium or iodine as a result of the proposed modification from that previously evaluated in the DES.

Most airborne releases from the plant result from leakage of reactor coolant which contains tritium and iodine in higher concentrations than the spent fuel pool. Therefore, even if there were a slightly higher evaporation rate from the spent fuel pool, the increase in tritium and iodine released from the plant as a result of the increase in stored spent fuel would be small compared to the amount normally released from the plant and that which was previously evaluated in the DES. The plant radiological effluent Technical Specifications, which are not being changed by this action, restrict the total releases of gaseous radioactivity from the plant including the FESW.

5.3.3 Solid Radioactive Wastes

The concentration of radionuclides in the pool is controlled by the filter and ion exchanger and by decay of short-lived isotopes. The activity is high during refueling operations while reactor coolant water is introduced into the pool and decreases as the pool water is processed through the filter and ion exchanger. The increase of radioactivity, if any, should be minor because the additional spent fuel to be stored is relatively cool, thermally, and radionuclides in the fuel will have decayed significantly.

While we believe that there should not be an increase in solid radwaste due to the modification, as a conservative estimate, we have assumed that the amount of solid radwaste may be increased by 12 cubic feet of resin a year from the demineralizer (two additional resin beds/year). The annual amount of solid waste shipped from La Crosse in 1974 was about 2300 cubic feet as stated in the DES. The annual average amount of solid waste shipped from a small BWR in 1973 to 1977 was about 2600 cubic feet per year. If the storage of additional spent fuel does increase the amount of solid waste from the FESW purification systems by about 12 cubic feet per year, the increase in total waste volume shipped would be less than 0.6% and would not have any significant environmental impact.

The present spent fuel racks to be removed from the FESW are contaminated and will be disposed of as low level waste. The licensee has estimated that about 800 cubic feet of solid radwaste will be removed from the FESW because of the proposed modification. Therefore, the total waste shipped

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from the plant should be increased by less than 1% per year when averaged over the lifetime of the plant. This will not have any significant environmental impact.

5.3.4 Radioactivity Released to Receiving Waters

There should not be a significant increase in the liquid release of radionuclides from the plant as a result of the proposed modification. The amount of radioactivity on the FESW filter-demineralizer might slightly increase due to the additional spent fuel in the pool, but this increase of radioactivity should not be released in liquid effluents from the plant.

The cartridge filter removes insoluble radioactive matter from the FESW water. This is periodically removed to the waste disposal area in a shielded cask and placed in a shipping container. The insoluble matter will be retained on the filter or remain in the FESW water.

The demineralizer resins are periodically flushed with water to the spent resin liner. The water used to transfer the spent resin is decanted from the tank and returned to the liquid radwaste system for processing. The soluble radioactivity will be retained on the resins. If any activity should be transferred from the spent resin to this flush water, it would be removed by the liquid radwaste system.

Leakage from the FESW is collected in the Reactor Building floor drain sumps. This water is transferred to the liquid radwaste system and is processed by the system before any water is discharged from the plant. At present, the average pool leakage is about 6 gallons per hour. This may rise to about 10 gallons per hour after the pool is modified and the water level is raised. Because this increased flow is a small fraction of the monthly average volume of liquids processed by the plant liquid radwaste treatment system, the system should process the additional leakage from the pool. We estimate that the increase in the liquid release of radionuclides from the plant would be approximately 1% of what the plant releases to the Mississippi River. There should not be a significant increase in the liquid release of radionuclides from the plant. The plant radiological effluent technical specifications, which are not being changed by this action, restrict the total releases of liquid radioactivity from the plant.

5.3.5 Occupational Radiation Exposures

We have reviewed the licensee's plans for the removal and disposal of the low density racks and the installation of the high density racks with respect to occupational radiation exposure. The occupational exposure for the entire operation is estimated by the licensee to be between 16 and 23 man-rem. We consider this to be a reasonable estimate. This operation is expected to be a small fraction of the total annual man-rem burden from occupational exposure.

We have estimated the increment in onsite occupational dose resulting from the proposed increase in stored fuel assemblies on the basis of information supplied by the licensee for dose rates in the spent fuel pool area from radionuclide concentrations in the FESW water. The spent fuel assemblies themselves in the double tier will contribute a small amount to dose rates in the pool area because of the depth of water shielding the fuel. The occupational radiation exposure resulting from the proposed action represents a negligible burden. Based on present and projected operations in the spent fuel pool area, we estimate that the proposed modification should add less than one percent to the total annual occupational radiation exposure burden at this facility. Thus, we conclude that storing additional fuel in a double tier in the FESW will not result in any significant increase in doses received by occupational workers.

5.3.6 Impacts of Other Pool Modifications

As discussed above, the additional environmental impacts in the vicinity of La Crosse BWR resulting from the proposed modification are very small fractions (less than 1%) of the impacts evaluated in the LaCrosse BWR DES. These additional impacts are too small to be considered anything but local in character.

Based on the above, we conclude that a spent fuel pool modification to increase fuel storage at any other facility should not significantly contribute to the environmental impact of the LaCrosse BWR and that the LaCrosse BWR FESW modification should not contribute significantly to the environmental impact of any other facility.

5.3.7 Evaluation of Radiological Impact

As discussed above, the proposed modification does not significantly change the radiological impact evaluated in the DES.

6.0 Environmental Impact of Postulated Accidents

Although the new high density racks will accommodate a larger inventory of spent fuel and the spent fuel will be stored in a double tier, we have determined that the installation and use of the racks will not change the calculated radiological consequences of a postulated fuel handling accident in the FESW area from those values reported in the DES for La Crosse BWR dated June 1976. Experience to date indicates that damage to one row of fuel pins assumed in the DES is still realistic and appropriate for the proposed modification.

Additionally, the NRC staff has under way a generic review of load handling operations in the vicinity of spent fuel pools to determine the likelihood of a heavy load impacting fuel in the pool and, if necessary, the radiological consequences of such an event. Because LaCrosse BWR will be required to prohibit loads, other than a spent fuel shipping cask and reactor vessel internals which are stored in the FESW during refueling, greater than the normal weight of a fuel assembly to be transported over spent fuel in the FESW, we have concluded that the likelihood of any other heavy load handling accident is sufficiently small that th proposed modification is acceptable and no additional restrictions o load handling operations in the vicinity of the FESW are necessary while our review is urder way.

7.0 Alternatives

In regard to this licensing action, the staff has considered the following alternatives: (1) reprocessing of spent fuel; (2) storage at an independent commercial facility; (3) storage at another nuclear facility; and (4) shutdown of the facility.

7.1 Reprocessing of Spent Fuel

As discussed earlier, none of the three commercial reprocessing facilities in the U.S. are currently operating. The General Electric Company's Midwest Fuel Recovery Plant (MFRP) at Morris, Illinois is in a decommissioned condition. On September 22, 1976, Nuclear Fuel Services, Inc. (NFS) informed the Nuclear Regulatory Commission that they were "withdrawing from the nuclear fuel reprocessing business." The Allied General Nuclear Services (AGNS) reprocessing plant received a construction permit on December 18, 1970. In October 1973, AGNS applied for an operating license for the separation facility; construction of the separation facility is essentially complete. On July 3, 1974, AGNS applied for a materials license to receive and store up to 400 metric tons uranium (MTU) in spent fuel in the onsite storage pool, on which construction has been completed. Hearings on the materials license application have not been completed.

In 1976, Exxon Nuclear Company, Inc. submitted an application for a proposed Nuclear Fuel Recovery and Recycling Center (NFRRC) to be located at Oak Ridge, Tennessee. The plant would include a storage pool that could store up to 7,000 MTU in spent fuel.

On April 7, 1977, the President issued a statement outlining his policy on continued development of nuclear energy in the U.S. The President stated that: "We will defer indefinitely the commercial reprocessing and recycling of the plutonium produced in the U.S. nuclear power programs. From our own experience, we have concluded that a viable and economic nuclear power program can be sustained without such reprocessing and recycling."

The Nuclear Regulatory Commission issued an order dated December 30, 1977 terminating proceedings to license reprocessing facilities. (42 FR 65334)

The licensee had intended to reprocess the spent fuel to recover and recycle the uranium and plutonium in the fuel. Due to a change in national policy and circumstances beyond DPC's control, reprocessing of the spent fuel is not an available option at this time. Even if national policy were changed tomorrow to allow reprocessing of spent fuel, the time required to process the current national inventory of spent fuel could be ten years.

7.2 Independent Spent Fuel Storage Facility

An alternative to expansion of onsite spent fuel pool storage is the construction of new "independent spent fuel storage installations" (ISFSI). Such installations could provide storage space in excess of 1,000 metric tons of uranium (MTU) of spent fuel. This is far greater than the capacities of onsite storage pools. Fuel storage pools at GE Morris and NFS are functioning as ISFSIs although this was not the original design intent. Likewise, if the AGNS receiving and storage station at its Barnwell, South Carolina reprocessing plant were licensed to accept spent fuel, it would be functioning as an ISFSI. The AGNS position, however has generally been that it will not commercially operate an ISFSI. The license for the GE facility at Morris, Illinois was amended on December 3, 1975 to increase the storage capacity to about 750 MTU*; as of August 30, 1978, approximately 310 MTU were stored in the pool in the form of 1,196 assemblies. The staff has discussed the status of storage space at Morris Operations (MO) with GE personnel. We have been informed that GE is primarily operating the MO facility to store either fuel owned by GE (which had been leased to utilities) or fuel which GE had previously contracted to reprocess.** We understand that the present GE policy is not to accept spent fuel for storage except for that fuel for which GE has a previous commitment. (In this regard GE has accepted the temporary storage of eight LACBWR fuel assemblies.) The NFS facility has capacity for about 260 MTU, with approximately 170 MTU presently stored in the pool. The storage pool at West Valley, New York is on land owned by the State of New York and leased to NFS through 1980. Although the storage pool at West Valley is not full, since NFS withdrew from the fuel reprocessing business, correspondence we have received indicates that NFS is not at present accepting additional spent fuel for storage even from those reactor facilities with which they had contracts. The status of the storage pool at AGNS was discussed above.

With respect to construction of new ISFSIs, Regulatory Guide 3.24, "Guidance on the License Application, Siting, Design, and Plant Protection for an Independent Spent Fuel Storage Installation," issued in December 1974, recognizes the possible need for ISFSIs and provides recommended criteria and requirements for water-cooled ISFSIs. Pertinent sections of 10 CFR Parts 19, 20, 30, 40, 51, 70, 71 and 73 would also apply. On October 6, 1978, the Commission proposed a new regulation to provide for the issuance of licenses to store spent fuel in independent spent fuel storage installations. The proposed 10 CFR Part 72 "Licensing Requirements for the Storage of Spent Fuel in an Independent Spent Fuel Installation (ISFSI)" specifies procedures and requirements for the issuance of such licenses along with requirements for the siting, design, operation and recordkeeping activities of the facilities.

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*An application for an 1100 MTU capacity addition is pending, but proceedings have been suspended indefinitely.

**GE letter to NRC dated May 27, 1977.

The staff has estimated that at least five years would be required for completion of an independent fuel storage facility. This estimate assumes one year for preliminary design; one year for preparation of the license application, Environmental Report, and licensing review in parallel with one year for detail design; two and one-half years for construction and receipt of an operating license; and one-half year for plant and equipment testing and startup.

Industry proposals for independent spent fuel storage facilities are scarce to date. In late 1974, E. R. Johnson Associates, Inc. and Merrill, Lynch, Pierce, Fenner and Smith, Inc. issued a series of joint proposals to a number of electric utility companies having nuclear plants in operation or contemplated for operation, offering to provide independent storage services for spent nuclear fuel. A paper on this proposed project was presented at the American Nuclear Society meeting in November 1975 (ANS Transactions, 1975 Winter Meeting, 1975). In 1974, E. R. Johnson Associates estimated their construction cost at approximately $20 million.

Several licensees have evaluated construction of a separate independent spent fuel storage facility and have provided cost estimates. Connecticut Yankee, for example, estimated that to build an independent facility with a storage capacity of 1,000 MTU (BWR and/or PWR assemblies) would cost approximately $54 million and take about 5 years to put into operation. Commonwealth Edison estimated the construction cost to build a fuel storage facility at about $10,000 per fuel assembly. To this would be added costs for maintenance, operation, safeguards, security, interest on investment, overhead, transportation and other costs.

On December 2, 1976, Stone and Webster Corporation submitted a topical report requesting approval for a standard design for an independent spent fuel storage facility. The facility is designed to store approximately 1433 tons of spent fuel, or the amount produced by 30 years of operation at a 1300 megawatt plant. No specific locations were proposed, although the design is based on location near a nuclear power facility. We estimated present day cost for such a fuel storage installation to be about $26 million. This does not include client costs associated with the nuclear power facility site preparation. On July 12, 1978 the staff concluded that the proposed approach and conceptual design were acceptable.

On a short-term basis (i.e., prior to 1983) an independent spent fuel storage installation does not appear to be an acceptable alternative based on cost or availability in time to meet the licensee's needs. It is also unlikely that the total environmental impacts of constructing an independent facility and shipment of spent fuel would be less than the minor impacts associated with the proposed modification.

In the long-term, the U.S. Department of Energy (USDOE) is modifying its program for nuclear waste management to include design and evaluation of a retrievable storage facility to provide Government storage at central locations for unreprocessed spent fuel rods. The pilot plant is expected to be completed by late 1985 or 1986. It is estimated that the long-term storage facility will start accepting commercial spent fuel in 1995. The design is based on storing the spent fuel in a retrievable condition for a minimum of 25 years. The criteria for acceptance is that the spent fuel must have decayed a minimum of ten years so it can be stored in dry condition without need for forced air circulation. As an interim alternative to the long term retrievable storage facility, on October 18, 1977, USDOE announced a new "spent nuclear fuel policy." USDOE will determine industry interest in providing interim fuel storage services on a contract basis. If adequate private storage services cannot be provided, the Government will provide interim fuel storage facilities. It was announced by USDOE at a public meeting held on October 26, 1977, that this interim storage is expected to be available in the 1981-1982 time frame. USDOE through their Savannah River Operations Office is preparing a conceptual design for a possible spent fuel storage pool of about 5000 MTU capacity. DOE has requested, but has not received, Congressional authorization for design and construction of their interim spent fuel storage facility. Based on our discussions with USDOE personnel, it appears that the earliest such a pool could be licensed to accept spent fuel would be about 1983. The interim facility(s) would be designed for storage of the spent fuel under water. USDOE stated that it was their intent to not accept any spent fuel that had not decayed a minimum of five (5) years.

As indicated in the President's energy policy statement of April 29, 1977, the preferred solution to the spent fuel storage program is to have the nuclear power plants store their spent fuel on-site until the Government long term storage facility is operable, which is now estimated to be about 1995. For those nuclear power plants that cannot store the spent fuel on-site until the permanent long-term storage facility is available, USDOE intends to provide limited interim storage facilities.

This interim storage is not expected to be available until 1983. A National Waste Repository would not be available until approximately 1995. If the LACBWR FESW is not modified as proposed, the LACBWR Plant would have to shut down in 1980 since the FESW would be unable to store additional spent fuel discharged from the core during refueling. The date that interim storage would be available is not known at this time with sufficient precision to provide for planning. Since these facilities might not be available when needed, the LACBWR plant could be forced to shut down. Therefore, this is not an alternative. The impact of plant shutdown as compared with the negligible environmental consequences of the proposed modification is discussed below.

7.3 Storage at Another Reactor Site

LACBWR is the only nuclear power station owned by DPC. Therefore, DPC does not have an option of storage of LACBWR fuel at another DPC station. The alternative of storage at another nuclear power station not owned and operated by the licensee is also not realistic. According to a survey conducted and documented by the former Energy Research and Development

Agency, up to 46 percent of the operating nuclear power plants will lose the ability to refuel during the period 1975-1984 without additional spent fuel storage pool expansions or access to offsite storage facilities. Thus, the licensee cannot rely on any other power facility to provide additional storage capability except on a temporary basis. If space were available in another reactor facility, the cost would probably be comparable to the cost of storage at a commercial storage facility and would only forestall, for a limited time, shutdown of LACBWR.

In the absence of a general policy regarding interfacility transfer and storage of spent fuel, such action is being decided on a case-by-case basi . In view of this, storage at another reactor site would not afford the timely relief needed here. Therefore, storage at another reactor site is not a realistic alternative to the proposed action.

7.4 Shutdown of Facility

If LACBWR were forced to shutdown for lack of space to store spent fuel, there would be the loss of the economic benefit from the facility (generation of electric energy) and a cost associated with purchase of replacement energy and maintaining the facility in a standby condition far in excess of the cost of the proposed modification.

The licensee estimates that the loss of revenues from the idle plant would be about $28,800/day. This is consistent with comparable data for other operating reactors.

7.5 Summary of Alternatives

In summary, the alternatives (1) to (3) described above are presently not available to the licensee or could not be made available in time to meet the licensee's need. Assuming the nonavailability of alternatives (1) to (3), DPC would be forced to shut down LACBWR if the proposed additional spent fuel storage capacity is not available. Even if available, alternatives (2) and (3) do not provide the operating flexibility of the proposed action and are likely to be more expensive than the proposed modification.

Alternative (4), plant shutdown, would be much more expensive than the proposed action because of the need to provide replacement power. In addition to the economic advantages of the proposed action, we have determined that the expansion of the storage capacity of the FESW for LACBWR would have a negligible environmental impact.

8.0 Evaluation of Proposed Action

8.1 Unavoidable Adverse Environmental Impacts

8.1.1 Physical Impacts

As discussed above, expansion of the storage capacity of the Fuel Element Storage Well (FESW) would not result in any significant unavoidable adverse environmental impacts on the land, water, air or biota of the area.

8.1.2 Radiological Impacts

As discussed in Section 5.3, expansion of the storage capacity of the FESW will not create any significant additional radiological effects. The additional total body dose that might be received by an individual or the estimated population within a 50-mile radius is less than 0.001 mrem/yr and 0.001 man-rem/yr, respectively. These exposures are small compared to the fluctuations in the annual dose this population receives from background radiation. The population exposure represents an increase of less than 0.1% of the exposures from the plant evaluated in the DES. The occupational radiation exposure of workers during removal of the present storage racks and installation of the new racks is estimated by the licensee to be between 15 and 23 man-rem. This is a small fraction of the total man-rem burden from occupational exposure at the plant. Operation of the plant with additional spent fuel in the FESW is not expected to increase the occupational radiation exposure by more than one percent of the present total annual occupational exposure at this facility.

8.2 Relationships Between Local Short-Term Use of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

Expansion of the storage capacity of the FESW will not change the evaluation of long-term use of the land as described in the DES for LACBWR. In the short-term, the proposed modification would permit the expected benefits (i.e., production of electrical energy) to continue.

8.3 Irreversible and Irretrievable Commitments of Resources

8.3.1 Water, Land and Air Resources

The proposed action will not result in any significant change in the commitments of water, land and air resources as identified in the DES for LACBWR. No additional allocation of land would be made; the land area now used for the FESW would be used more efficiently by adopting the proposed action.

8.3.2 Material Resources

It is not likely that taking the licensing action here proposed would constitute a commitment of resources that would tend to significantly foreclose the alternatives available with respect to any other individual licensing action designed to ameliorate a possible shortage of spent fuel storage capacity. The time frame under consideration is two years, the staff's estimate of the time necessary to complete the generic environmental statement on handling and storage of spent fuel from light water reactors. The action proposed will not have any significant effect on whether similar actions are or should be taken at other nuclear reactors since it will not affect either the need for or availability of storage facilities at other nuclear reactors. Nor will the added capacity here significantly affect the need for the total additional storage space presently planned at reprocessing facilities for which licensing actions are pending. In order to carry out the proposed modifications, the licensee will require racks of stainless steel and B_4C. These materials are readily available in abundant supply. In the context of this criterion, the staff concludes that the amount of material (steel, boron, carbon) required for the racks for LACBWR is insignificant and does not represent an irreversible commitment of natural resources.

The longer term storage of spent fuel assemblies withdraws the unburned uranium from the fuel cycle for a longer period of time. Its usefulness as a resource in the future, however, is not changed.

The provision of longer onsite storage does not result in any cumulative effects due to plant operation since the throughput of materials does not change. Thus the same quantity of radioactive material will have been produced when averaged over the life of the plant. This licensing action would not constitute a commitment of resources that would affect the alternatives available to other nuclear power plants or other actions that might be taken by the industry in the future to alleviate fuel storage problems. No other resources need be allocated because the other design characteristics of the FESW remain unchanged.

8.4 Commission Policy Statement Regarding Spent Fuel Storage

On September 16, 1975, the Commission announced (40 FR 42801) its intent to prepare a generic environmental impact statement on handling and storage of spent fuel from light water reactors. In this notice, it also announced its conclusion that it would not be in the public interest to defer all licensing actions intended to ameliorate a possible shortage of spent fuel storage capacity pending completion of the generic environmental impact statement.

The Commission directed that in the consideration of any such proposed licensing action, the following five specific factors should be applied, balanced, and weighed in the context of the required environmental statement or appraisal. This has been done as summarized below.

a. Is it likely that the licensing action here proposed would have a utility that is independent of the utility of other licensing actions designed to ameliorate a possible shortage of spent fuel capacity?

The reactor core for LACBWR contains 72 fuel assemblies. In its submittal of April 20, 1978, DPC presented their estimated schedule for refueling. The facility is scheduled to be refueled annually, with about 24 fuel assemblies generally scheduled to be replaced.

LACBWR received its provisional operating license in August 1973 and completed its fifth operating cycle in March 1979. With the present spent fuel storage racks, LACBWR has room to store the spent fuel assemblies that were removed in 1979 but not those scheduled to be replaced in 1980. If expansion of the storage capacity of this FESW is not approved, or if an alternative storage facility for the spent fuel is not located, LACBWR may have to shut down for an indefinite period in 1980. As discussed under alternatives (Section 7.0), an alternate storage facility is not now available. As a long term solution to the spent fuel storage problem, the Federal government is planning to provide a retrievable repository for spent fuel in the 1990's.

The proposed licensing action (i.e., installing new racks of a design that permits storing more assemblies) would allow LACBWR to continue to operate until the 1990's, which is around the time the planned Federal repository is expected to be in operation. The proposed modification will also provide the licensee with additional core offload flexibility which is desirable even if adequate offsite storage facilities hereafter become available to the licensee.

We have concluded that a need for additional spent fuel storage capacity at LACBWR has utility which is independent of the utility of other licensing actions designed to ameliorate a possible shortage of spent fuel capacity.

b. Is it likely that the taking of the action here proposed prior to the preparation of the generic statement would constitute a commitment of resources that would tend to significantly foreclose the alternatives available with respect to any other licensing actions designed to ameliorate a possible shortage of fuel storage capacity?

With respect to this proposed licensing action, we have considered commitment of both material and nonmaterial resources. The material resources considered are those to be used in the expansion of the storage capacity of the FESW.

The proposed increased storage capacity of the LACBWR FESW is considered to be a nonmaterial resource. We have determined that the proposed expansion in the storage capacity of the FESW is only a measure to allow for continued operation and to provide operational flexibility at the facility, and will not affect similar licensing actions at other nuclear power plants. Similarly, taking this action would not commit the NRC to repeat this action or a related action.

We conclude that the expansion of the FESW at LACBWR, prior to the preparation of the generic statement, does not constitute a commitment of either material or nonmaterial resources that would tend to significantly foreclose the alternatives available with respect to any other individual licensing actions designed to ameliorate a possible short of spent fuel storage capacity.

c. Can the environmental impacts associated with the licensing action here proposed be adequately addressed within the context of the present application without overlooking any cumulative environmental impacts?

Potential nonradiological and radiological impacts resulting from the fuel rack modification and subsequent operation of the expanded FESW at this facility were considered by the staff.

No environmental impacts outside the spent fuel storage building are expected during removal of the existing racks and installation of the new racks. The impacts within this building are expected to be limited to those normally associated with metal working activities and to the controlled, low level occupational radiation exposure to the personnel involved.

The potential nonradiological environmental impact attributable to the additional heat load in the FESW was determined to be negligible compared to the existing thermal effluents from the facility.

We have considered the potential radiological environmental impacts associated with the expansion of the FESW storage capacity and have concluded that they would not result in radioactive effluent releases that significantly affect the quality of the human environment during either normal operation of the expanded FESW or under postulated fuel handling accident conditions.

d. Have the technical issues which have arisen during the review of this application been resolved within that context?

This Environmental Impact Appraisal and the accompanying Safety Evaluation respond to the questions concerning health, safety and environmental concerns. All technical issues have been resolved within the context of our review.

No significant environmental impacts outside the reactor containment building are expected during removal of the existing racks and installation of the new racks. The impacts within this building are expected to be limited to those normally associated with metal working activities and to the controlled, low level occupational radiation exposure to the personnel involved.

The potential nonradiological environmental impact attributable to the additional heat load in the FESW was determined to be negligible compared to the existing thermal effluents from the facility.

e. Would a deferral or severe restriction on this licensing action result in substantial harm to the public interest?

We have evaluated the alternatives to the proposed action, including storage of the additional spent fuel offsite and ceasing power generation from the plant when the existing FESW is full. We have determined that there are significant economic advantages associated with the proposed action and that expansion of the storage capacity of the FESW will have a negligible environmental impact. Accordingly, deferral or severe restriction of the action here proposed would result in substantial harm to the public interest.

9.0 Benefit-Cost Balance

This section summarizes and compares the cost and the benefits resulting from the proposed modification to those that would be derived from the selection and implementation of each alternative. Table 1 presents a tabular comparison of these costs and benefits. The benefit that is derived from two of these alternatives is the continued operation of LACBWR and production of electrical energy. Reprocessing of spent fuel is not an option in the foreseeable future and has no associated cost or benefit. The alternative of storage at another nuclear plant is not possible at this time nor in the foreseeable future except on a short-term emergency basis. The final alternative, plant shutdown, has a high identifiable cost and no associated benefit.

From examination of the table, it can be seen that the most cost-effective alternative is the proposed FESW modification. As evaluated in the preceding sections, the environmental impacts associated with the proposed modification would not be significantly changed from those analyzed in the Draft Environmental Statement for LACBWR published by the Commission in June 1976.

10.0 Basis and Conclusion for Not Preparing an Environmental Impact Statement

We have reviewed this proposed facility modification relative to the requirements set forth in 10 CFR Part 51 and the Council of Environmental Quality's Guidelines, 40 CFR 1500.6. We have determined, based on this assessment, that the proposed license amendment will not significantly affect the quality of the human environment. Therefore, the Commission has determined that an environmental impact statement need not be prepared and that, pursuant to 10 CFR 51.5(c), issuance of a negative declaration to this effect is appropriate.

TABLE 1

SUMMARY OF COST-BENEFITS

Alternative	Cost	Benefit
Reprocessing of Spent Fuel	-	None - this alternative is not available either now or in the foreseeable future.
Increase storage capacity of LACBWR FESW	$2,270/assembly	Continued operation and production of electrical energy.
Storage at other nuclear plants	Comparable to storage at LACBWR	Continued operation and production of electricity. However, this alternative is not likely to be available.
Storage at Independent Facility	-	This alternative is not available.
Storage at Reprocessing Facility	-	This alternative is not available.
Reactor Shutdown	$28,800/Day	None - No production of electrical energy.