



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

October 26, 1988

Docket No. 50-267

MEMORANDUM FOR: Jose A. Calvo, Director
Project Directorate - IV
Division of Reactor Projects - III,
IV, V and Special Projects

FROM: Kenneth L. Heitner, Project Manager
Project Directorate - IV
Division of Reactor Project - III,
IV, V and Special Projects

SUBJECT: SUMMARY OF MEETING WITH PUBLIC SERVICE COMPANY OF COLORADO (PSC)
TO DISCUSS POTENTIAL DECOMMISSIONING OF FORT ST. VRAIN (FSV) -
OCTOBER 13 AND 14, 1988 (TAC NO. 69515)

This meeting was held at the request of PSC to discuss the potential decommissioning of FSV. The attendees at this meeting are listed in the Enclosure. Major issues discussed at the meeting include:

- Alternatives for Continued Plant Operation,
- Defueling,
- Decommissioning,
- Storage of Spent Fuel, and
- Repowering (Conversion).

The State of Colorado was represented and participated in the meeting.

Alternatives for Continued Plant Operation

PSC is studying several alternatives for continued plant operation. Some possibility exists to have additional fuel fabricated for FSV and continue with nuclear operation. However, more likely scenarios involve ceasing nuclear operation either at the end of the current Cycle (4), or the next Cycle (5). The possibility also exists of extending each cycle by a coastdown period. These scenarios would require additional staff review.

The staff observed that regardless of the scenario selected, PSC's current obligations towards safe operation of FSV were to be maintained. PSC's commitments to long term improvements also remain valid and potentially enforceable until PSC formally applied to modify the FSV license for "possession only" and committed to cease nuclear production operations. At that time, further efforts to improve plant (reactor) operational safety could be reviewed and potentially relaxed. However, requirements needed for future activities, such as defueling and decommissioning would have to be retained.

Defueling

Provisions for eventual defueling of FSV were not specifically considered in the original design reviews. Because of the unique structure of the reactor core, defueling simply cannot be an extension of the normal refueling process.

Specifically, dummy fuel blocks must be placed in the reactor core to retain the core's structural integrity as defueling proceeds. The dummy fuel blocks could be either a graphite or refractory material. Most likely, the blocks would be boronated, to absorb neutrons. (After the reactor is defueled, the dummy fuel blocks themselves will be removed as part of the decommissioning process) The defueling process for FSV would extend over a two to three year period. This is because of the plant's limited storage capacity to hold freshly removed fuel. As each segment of fuel is removed, it must be readied for eventual shipment or on-site storage (to be discussed). Plant operations during the defueling phase are of a more limited nature than during normal operation. Potentially, a reduced set of Technical Specifications could be proposed and approved to cover defueling phase. Reanalysis of core physics, thermal hydraulics, and structural adequacy during defueling would require staff review prior to beginning the defueling operation.

The staff observed the FSV defueling operation will be considerably greater in duration and potential cost than for a light water reactor (LWR). The scope of the decommissioning rule does not adequately address this process for FSV. Although there were no specific requirements in the rules for Commission review and approval of the costs and funding of the FSV defueling, PSC should consider presenting a summary of this information to the staff. The staff concurred with PSC in the need to review the technical aspects for the defueling noted above. The staff noted to the extent that new methods or codes would be required, PSC should plan on appropriate lead times for staff review of these methods and codes.

Decommissioning

Decommissioning of the FSV reactor site following defueling was discussed in detail. However, PSC characterized the information presented as preliminary, since the supporting data and analyses were still being developed. The principal decommissioning activities would be concerned with the internals of the Prestressed Concrete Reactor Vessel (PCRV). Within the PCRV, two sources will contribute most of the residual activity. The first is "plated out" fission products from reactor operation. These are typically deposited in colder areas of the reactor. The principal plate out source is cesium-137 (about 22 curies). (About 3 to 4 curies of strontium-90 is also present.) This material is expected to be present in the steam generators and in the insulation material within the PCRV. These sources could be physically removed from the PCRV by removal of the steam generators and PCRV liner insulation material.

The second major source of radioactivity are materials with the PCRV activated by neutrons from reactor operation. PSC noted that the boronated steel blocks just radially inward from the reactor core barrel would be the most highly activated material. However, other activated materials can also be present. PSC is still evaluating these sources to project future activity levels in the PCRV.

Initially, PSC plans to remove major internals from the lower PCRV, such as the helium circulators and steam generator modules. Consideration is also being given to removal of upper PCRV structures, but current technology may not support remote work in this high radiation area (estimated at 1000 R/hr). Potentially, the upper PCRV internals would not be dismantled in the near term, but would be the motivation for entering the SAFSTOR mode. SAFSTOR would allow decay of the critical activation sources in the PCRV upper structure in particular cobalt-60. SAFSTOR for a period of 50 years would sufficiently reduce the potential radiation hazard to enable dismantling to proceed. At that point, dismantling would complete the decommissioning process and leave all radiation levels acceptable for uncontrolled access.

PSC's intention is to fully describe this process in appropriate submittals to the staff under the decommissioning rule, in order to obtain staff approval.

The staff made the following comments on PSC's presentation:

1. Removal of some of the PCRV liner and concrete could be required to meet acceptable residual radiation levels at the end of the SAFSTOR period. The decommissioning plan should discuss that removal process.
2. Careful attention should be given to health physics planning, since worker exposures could be much higher than in PSC's previous FSV experience.
3. Adequate surveys would be required before and during the decommissioning process to validate the projected residual radioactivity and the radiation exposure models being used.
4. Additional guidance on reactor decommissioning is expected to be published as proposed Regulatory Guides in the Spring of 1989.

The staff also noted that while the management responsibility for this review would be in the Office of Nuclear Reactor Regulation, technical staff support would primarily come from the Office of Nuclear Material Safety and Safeguards.

Storage of Spent Fuel

PSC discussed the disposition of the FSV spent fuel. The Department of Energy is under contract with PSC to receive fuel segments 4 through 8, which are currently in the reactor. PSC's current responsibility is only for segment 9 in the reactor and segment 10 in storage (unirradiated). Although some possibility exist for others taking the responsibility for segments 9 and 10, PSC is planning for its long term storage.

Long term storage would be in an Independent Spent Fuel Storage Installation (ISFSI). The ISFSI would be located at the FSV site, but its exact location has not been determined. The ISFSI would utilize dry cask storage of the spent fuel as has been approved for the Surrey site. Approval would be needed for both the utilization of a specific cask with the FSV fuel, as well as for storing the cask use at the FSV site.

The staff provided PSC with a copy of the Surrey ISFSI License, Technical Specifications and Safety Evaluation Reports. The staff also noted that certain Regulatory Guides concerning ISFSI's have or are being issued.

Repowering (Conversion)

PSC stated that one option being evaluated was converting FSV to fossil energy. This would involve erecting a boiler and other necessary structures needed for a fossil energy station. The preliminary arrangement of this station is included in the Enclosure. The major structure would be the boiler, built adjacent to the current turbine building. PSC is considering the following questions for potential staff review:

- To what extent could the plant be modified under 10 CFR 50.59? (i.e. specific examples)
- Could work construction proceed in the turbine building even if systems required for reactor safety were still in the building?
- Could the existing AC power system, service water system and instrument air system, be used to support construction work?
- At what level does the plant's nuclear QA program have to be maintained after the plant's final shutdown?

PSC also wished to explore changes to the FSV security plan to allow the new facilities to be built without requiring extensive security requirements.

The staff noted that many issues of this type were addressed in other situations under current regulations. For example, at least three nuclear sites had adjacent fossil energy plants (Crystal River, Turkey Point and Waterford). Operating plants have had construction take place on an adjacent site (i.e. Millestone, St. Lucie). Specific issues unique to the FSV situation should be brought to the staff's attention. (The FSV Project Manager will internally review these issues and determine any unique situations that should be brought to the licensee's attention)

State Participation

The State of Colorado was represented at this meeting by its designated representative (Mr. A. J. Hazle, Director, Radiation Control Division, Colorado Department of Health). The staff noted that the State's role in the licensing process under 10 CFR 50.91 made it important to keep the state informed about all steps in the decommissioning process. The state representative noted that the State was concerned about the eventual release of the site for unrestricted use, and the radiation level criteria used to approve that release. The State was also opposed to on-site burial of radioactive materials removed from the reactor facility. The state representative also noted that public concerns about STAFSTOR and the ISFSI could be anticipated.

The state representative expressed some concern about a potential transfer of FSV to state byproduct materials license after the fuel had been removed from the site. The NRC staff responded that the new decommissioning rule of June 27,

1988 prohibited such transfer. 10 CFR 50.82 (f) now states:

- "(f) The Commission will terminate the license if it determines that -
- (1) The decommissioning has been performed in accordance with the approved decommissioning plan the order authorizing decommissioning; and
 - (2) The terminal radiation survey and associated documentation demonstrates that the facility and site are suitable for release for unrestricted use."

Future Actions

The staff and PSC discussed the need for future meetings. Specific meetings would be required to further discuss each aspect of potential decommissioning, as noted above. PSC has outlined specific additional meetings in the Enclosure. The staff noted that special meetings may be needed on issues which cover each area, such as Safeguards, Security, and Quality Assurance.

The staff noted that from a safety viewpoint, PSC should make its final decisions as soon as possible. The staff position was that PSC must retain a full commitment to operational safety until a final decision was made for defueling and decommissioning. The staff observed that resources required to maintain and improve operational safety cannot be reduced until that decision is made and appropriate approvals obtained from the NRC.

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Enclosure:
As stated

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/s/

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