ARKANSAS POWER & LIGHT COMPANY
FIRST NATIONAL BUILDING/P.O. BOX 551/LITTLE ROCK, ARKANSAS 72203/(501) 371-4422

April 2, 1982

WILLIAM CAVANAUGH, III
Senior Vice President
Energy Supply

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Director of Nuclear Reactor Regulation
ATTN: Mr. J. F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Reactor Vessel Surveillance-
Appendix H Exemption Request
(File: 1511.1)

Gentlemen:

Your letter dated April 1, 1977, granted an exemption to 10 CFR 50 Appendix H for ANO-1 to allow irradiation of surveillance specimens at Davis-Besse Unit No. 1 for five years. AP&L has been following a proposed revision to Appendix H that would allow AP&L to perform this irradiation outside the ANO-1 vessel without seeking an exemption to Appendix H. However, since this revision is still pending we must request an extension to the exemption given on April 1, 1977. We request that this extension be granted until the proposed Appendix H revision becomes official at which time the exemption will no longer be needed.

Presently, ANO-1 is shut down for a maintenance outage and must receive the extension for exemption to Appendix H before we can restart the unit. Based on our present schedule we plan to restart ANO-1 on April 27, 1982. We request your expeditious review of this matter to avoid delay in the restart efforts. Attached is a report which summarizes the results of the ANO-1 reactor vessel surveillance program over the past five years and provides the basis for the exemption request.

A001 S.1. w/check $4,000

Pursuant to the requirement of 10 CFR 170.22, we have determined this request to involve a Class III fee for a single safety issue amendment to our license. Accordingly, a check in the amount of $4,000.00 is remitted.

Very truly yours,

William Cavanaugh III

WC:LDY:sl

STATE OF ARKANSAS)

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COUNTY OF PULASKI)

I, William Cavanaugh III, being duly sworn, subscribe to and say that I am Senior Vice President, Energy Supply for Arkansas Power & Light Company; that I have full authority to execute this oath; that I have read the document numbered 1CAN048204 and know the contents thereof; and that to the best of my knowledge, information and belief the statements in it are true.

William Cavanaugh III

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for the County and State above named, this 2 day of April, 1982.

Sharon Kaye Hendrix

Notary Public

My Commission Expires:

9-19-89

BASIS FOR EXTENSION OF EXEMPTION FROM PROVISIONS OF 10 CFR 50 APPENDIX H

INTRODUCTION

In early 1977, Arkansas Power & Light Company (AP&L) requested by Reference 1 an exemption from the requirements of 10 CFR 50 Appendix H. This exemption was granted by Reference 2 and allowed continued operation of the Arkansas Nuclear One-Unit 1 (ANO-1) while irradiating reactor vessel surveillance capsules at Toledo Edison Company's Davis Besse Unit 1.

This exemption was granted for a period of five years with a provision for extending the exemption based on successful operating experience. This report is a summary of the experience AP&L has had with the Integrated Reactor Vessel Surveillance Program (IRVSP) and the future plans for the program. An adequate justification for the extension of the exemption from the requirements of Appendix H to 10 CFR 50 is provided.

DISCUSSION

Operating Experience

Surveillance Specimen Holder Tubes

The key factor leading to AP&L participation in the IRVSP and Reactor Vessel Material Owners Group was the loss of integrity of the Surveillance Specimen Holder Tubes (SSHT's) and their subsequent removal from ANO-1. It was concluded that, although the installation of re-designed SSHT's was feasible on an operating plant, the benefits did not justify the costs associated with the development of remote tooling, extended plant downtime, and significant radiation exposure to personnel. The Owners of the affected operating plants entered into agreements with Utilities that were scheduled to bring new plants on line in the near future, to continue the Reactor Vessel Surveillance capsule irradiation at these new "host" plants. The ANO-1 reactor vessel materials surveillance capsules were installed in SSHT's at Davis Besse 1. The SSHT's at Davis Besse 1, including the supports and bolts that attach them to the Thermal Shield, have been examined via remote video inspection during refueling outages. No loss of structural integrity has

been observed. In addition, there have been no signals provided by the loose parts monitoring system which would indicate the loss of integrity of the SSHT's or their mounting at DB-1. There are no plans to modify the SSHT's or the Core Support Assembly on any operating B&W plant which would change the geometric similarity of the reactors or preclude the continued irradiation of surveillance capsules in the host plants. Thus, adequate surveillance information will continue to be obtained for ANO-1.

Surveillance Capsules Evaluated

B&W has evaluated 12 surveillance capsules that have been removed from operating B&W plants, they are:

Plant Name	Capsule I.D.	Report Number/Date
Oconee 1	OCI-F	BAW-1421, August 1975
Oconee 1	OCI-E	BAW-1436, September 1977
Oconee 2	OCII-C	BAW-1437, May 1977
Oconee 2	OCII-A	BAW-1699, November 1981
Oconee 3	OCIII-B	BAW-1697, October 1981
Oconee 3	OCIII-A	BAW-1438, July 1977
Three Mile Island 1	TMI-1E	BAW-1439, January 1977
Arkansas Nuclear One-1	ANI-E	BAW-1440, April 1977
Arkansas Nuclear One-1	ANI-B	BAW-1698, November 1981
Crystal River 3	CR3-B	BAW-1679, June 1981
Rancho Seco	RSI-B	BAW-1702, January 1982
Davis Besse	TEI-F	BAW-1701, January 1982

The surveillance capsules other than those owned by AP&L are significant because of participation in the B&W IRVSP by many utilities. The information shared among Utilities with reactors constructed of similar materials, supplemented with future capsule evaluations testing of special research capsules, and data obtained from NRC sponsored test reactor programs, will provide a data base which permits a continuing evaluation of the behavior of these materials in a reactor vessel environment. Based on the surveillance capsule data obtained from all the B&W-177 FA plants to date, it has been demonstrated that the prediction techniques used in the establishment of vessel operation limitations (i.e., Reg. Guide 1.99, Rev. 1) are conservative.

The Crystal River, Rancho Seco and Davis Besse capsules contain weld metal compact fracture specimens that will be tested using a single specimen J-Integral technique in early 1982.

Reactor Vessel Fluence Evaluation

A concern which developed as a result of the removal of the SSHT's was the inability to monitor the fluence received by the reactor vessel wall. However, due to the geometric similarity of plants, the fluence accumulated by the reactor vessels in plants without SSHT's can be

calculated based on their power histories and dosimetry measurements from plants with SSHT's. Continued refinement of these analytical techniques is being accomplished through B&W participation in the NRC sponsored "LWR Pressure Vessel Irradiation-Surveillance Dosimetry Program". A high degree of analytical accuracy by B&W has been demonstrated in the NRC program to date, and continued participation is expected to improve the fluence evaluation capability.

Capsule Fluence vs. Reactor Vessel Fluence

Because of the relatively large lead factors [fast flux (E > 1 MEV) at capsule centerline divided by the fast flux at 1/4 thickness of reactor vessel] associated with the location of the SSHT's at the Host Reactors, the similarity of plant capacity factors, and the similarity of fuel management at both Davis Besse 1 and ANO-1; the neutron fluence received by the Arkansas surveillance capsules being irradiated in Davis Besse 1 leads the neutron fluence experienced by the Arkansas vessel.

Calculations show that the Arkansas reactor vessel has achieved an accumulated neutron fluence at the 1/4t location (as of December 31, 1981) calculated at:

Plant	n/cm^2 (E > 1 MEV)	Equivalent EFPY
ANO-1	1.2×10^{18}	4.5

The Arkansas surveillance capsule most recently removed from Davis Besse 1 achieved a neutron fluence from irradiation at both Arkansas and Davis Besse 1 of:

Capsule	n/cm^2 (E > 1 MEV)	Equivalent EFPY
ANI-BA	4.3×10^{18}	17

The capacity factor of Davis Besse 1 since November 11, 1977, its commercial operation date, through December 31, 1981 is 0.40 and for comparison, the capacity factor of ANO-1 is 0.63.

With lead factors in the range of 7 to 10, the surveillance capsules are expected to continue to lead the respective reactor vessel's accumulated peak fluence.

Additionally, specimens made of related weld metals were donated to NRC sponsored research programs and have been irradiated in test reactors to fluence levels beyond that expected to be achieved by the Arkansas reactor vessel at the end of service live. Data from these test reactor programs are becoming available and will be evaluated for applicability to the Arkansas reactor vessel.

Future Plans

Of particular interest to ANO-1 is that, in addition to plant specific capsules scheduled for withdrawal over the next several years, two research capsules which are a part of the IRVMSP are to be withdrawn from

operating reactors in 1983. These capsules contain Charpy V-notch and compact fracture specimens made from weld metals which have a direct relationship to weld metal in ANO-1 reactor vessel as follows:

Capsule	Reactor No.	Estimated Capsule Fluence	Equivalent EFPY
CR3-LI	CR3	6.6×10^{18}	31
DB-LI	DB-1	5.4×10^{18}	25

The testing of these research capsules, which are supplemental to the plant specific capsules, will yield valuable power reactor irradiation information on materials similar to those actually found in the reactor vessel.

CONCLUSION

The objective and technical description of the IRVSP has not changed from that described in the Safety Evaluation by the Office of Nuclear Reactor Regulation supporting Amendment No. 22 Facility license DPR-51. The IRVSP continues to provide material data that leads the reactor vessel and has demonstrated that the material behavior prediction techniques are conservative. No operational or fuel management modifications that will adversely affect the IRVSP are expected.

Based on the successful experience of the IRVSP to date, it is requested that AP&L be granted a continued extension of their exemption from the provisions of Appendix H to 10 CFR 50, by continuing the irradiation of the remaining Arkansas surveillance specimens at Toledo Edison Company Davis Besse 1.

Reference 1 - Letter dated August 17, 1976, to Mr. Dennis L. Ziemann from Mr. J. D. Phillips (AP&L letter no. 1CANØ87619).

Reference 2 - Letter dated April 1, 1977, to Mr. J. D. Phillips from Mr. Victor Stello, Jr.