Babcock & Wilcox

Research and Development Division

P.O. Box 1260, Lynchburg, Va. 24505

Telephone: (804) 384-5111

January 29, 1979

Mr. Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

License R-47, docket 50-99

Subject: Additional Information for License Renewal

Dear Mr. Reid:

Responses to requests for additional information contained in your letter dated August 21, 1978 are attached. Much of the information is incorporated by reference and is enclosed separately.

If more is needed please don't hesitate to call or write me.

Sincerely,

BABCOCK & WILCOX
Lynchburg Research Center

A. F. Olsen
License Administrator

AFO:smh

Attachment

subscribed and sworn to before me
this 29th day of January, 1979.
City of Lynchburg, Virginia

Colleen Holt
Notary Public

My commission expires July 27, 1980

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Attachment

10 CFR 50.33 (c) Description of Business

The Babcock and Wilcox Company is a major industrial company which manufactures and markets specially engineered industrial products and materials which help perform essential tasks for utilities, industries, institutions and governments throughout the world.

More than half of the company's business is in the design, manufacture and erection of energy systems and components. The balance is in specialty steel tubing, refractories, advanced compcsites, automated machinery, valves and process controls.

The production of steam supply systems has traditionally been a major part of B&W's business. Today the company is one of the leaders in the design and production of both nuclear and fossil power generating equipment for utilities, industry, ships, schools and hospitals.

10 CFR 50.33 (d)(3)(i)

The Babcock and Wilcox Company is governed by the laws of the State of Delaware. The company's principal offices are located at:

J. Ray McDermott & Company, Inc.
1010 Common Street
New Orleans, Louisiana 70112

10 CFR 50.33 (d)(3)(ii)

Board of Directors, J. Ray McDermott and Co., Inc.

Name	Address	Citizenship
*C. L. Graves	1010 Common Street New Orleans, Louisiana 70112	USA
*J. E. Cunningham	1010 Common Street New Orleans, Louisiana 70112	USA
*George G. Zipf	"	"
*R. K. Richie	"	"

Name	Address	Citizenship
*H. W. Bailey	1010 Common Street New Orleans, Louisiana 70112	USA
V. J. LeBlanc	"	"
*W. E. Earles	"	"
H. R. Reeves	"	"
G. C. Lee	"	"
L. B. Smith	"	"
I. R. Foster, Jr.	"	"
J. L. Bates	"	"
E. J. Dressel	"	"
J. D. Dupy	"	"
K. J. Gilly	"	"
R. R. Strickert, Jr.	"	"
C. E. Young	"	"
J. A. Lyontt	"	"
L. V. Sierra	"	"

*also serve the Company as directors.

10 CFR 50.33 (d)(3)(iii)

The Babcock and Wilcox Company is a wholly owned subsidiary of J. Ray McDermott and Co., Inc. Neither corporation is owned, controlled or dominated by an alien or foreign corporation or government.

10 CFR 50.33 (e)

The following licenses issued by the U.S. Atomic Energy Commission and the U.S. Nuclear Regulatory Commission cover the research and development activities conducted at the Lynchburg Research Center:

License R-47, docket 50-99
License CX-10, docket 50-13
License SNM-778, docket 70-824

10 CFR 50.33 (f)

1. The most recent financial reports of J. Ray McDermott and Co., Inc. are listed below and enclosed with this submittal:

   - Annual Report for the Fiscal Year Ended March 31, 1978. J. Ray McDermott and Co., Inc.
   - Fact Book '78 for the Fiscal Year Ended March 31, 1978. J. Ray McDermott and Co., Inc.
   - Form 10-K, Annual Report Pursuant to Section 13 or 15 (d) of the Securities Exchange Act of 1934, for the fiscal year ended March 31, 1978. J. Ray McDermott and Co., Inc.

   The sources of funds to be utilized to cover the costs of operation of the Lynchburg Pool Reactor facility are provided by the operating divisions of the Babcock and Wilcox Company and contract research projects.

2. The estimated annual costs to operate the LPR for the period 1979-1998 are:

1979 - $25,000	1989 - $54,000
1980 - 27,000	1990 - 58,300
1981 - 29,200	1991 - 63,000
1982 - 31,500	1992 - 68,000
1983 - 34,000	1993 - 73,400
1984 - 36,700	1994 - 79,300
1985 - 39,700	1995 - 85,600
1986 - 42,800	1996 - 92,500
1987 - 46,300	1997 - 99,900
1988 - 50,000	1998 - 107,900

Total (20 years) $1,144,100

These costs were calculated using 1978 costs as a base and adding 8% per year for inflation.

As presently projected, the funds necessary to operate the facility, listed above, for the requested period of the license will be included in future budgets.

3.

	Item	Labor Man-weeks	Cost *	Waste Disposal **	Total
1.	Remove, package, ship and reprocess 25 fuel elements.	3	$ 1,500	$40,000	$41,500
2.	Dispose of radioactive sources.	1	500	1,000	1,500
3.	Dump reactor water.	1	500	---	500
4.	Remove, package, ship and bury experiments.	2	1,000	13,500	14,500
5.	Remove, package, ship and bury grid plates.	2	1,000	Included in Item #4	1,000
6.	Decontaminate and ship to burial as necessary piping, pumps, valves, heat exchanger and purification system.	6	3,000	Included in Item #4	3,000
7.	Remove, package, ship and bury beam ports.	2	1,000	Included in Item #4	1,000
8.	Remove, package, ship and bury autoclave.	2	1,000	Included in Item #4	1,000
9.	Clean pool; decontaminate and paint as necessary.	4	2,000	Included in Item #4	2,000
	Sub Total	23	$11,500	$54,500	$66,000
	Plus 20% HP Coverage	5	2,500	---	$ 2,500
				Grand Total	$68,500

* Labor cost figured using fiscal year 1979 rates ($12.50/man-hour)

** Waste disposal cost figured using 1978 waste disposal prices

Note: The value of recovered fuel (4066 gr, 93% U-235) is not included. This results in a return of $115,500 based on 1978 data from DOE's Savannah River Plant.

The type of permanent shutdown contemplated is the decommissioning of the Lynchburg Pool Reactor to the point that the space it now occupies could be released for unrestricted use.

Funds necessary to shutdown and decommission the reactor facility will be provided by the operating divisions of the Babcock and Wilcox Co. and contract research projects.

4. The annual cost to maintain the reactor in a safe shutdown condition is estimated to be $5000 in 1979 and adding 8% for each year thereafter. This cost covers 10 man-weeks used to perform water chemistry checks, completion of the Secured Check List and miscellaneous maintenance requirements. The funds necessary to cover this cost will be provided by the operating divisions of the Babcock and Wilcox Co. and contract research projects.

10 CFR 50.30 (f)

1. Measurements of the primary and secondary coolant pressures at the heat exchanger are given in the table below. These measurements show that in the static condition, the primary system pressure is higher by about 2 psi. With the primary pump on and the secondary pump off, the primary system pressure is higher by about 13 psi. With the secondary pump on, the secondary system pressure is higher by 21 to 63 psi.

Condition	Primary System	Secondary System
Static	6.7	4.8
Pump on	17.5	27.8 (spray valve open)
		69.3 (spray valve closed)

2. Liquid Effluents - Waste liquids from the Lynchburg Pool Reactor are collected in the Building A liquid waste retention basin. This basin, when full, is mixed, sampled, analyzed, and released to the liquid waste treatment system at the Naval Nuclear Fuels Division (NNFD) of the Babcock and Wilcox Co. (License SNM-42). Approximately 10 microcuries of Beta-Gamma activity are relieved annually to the NNFD waste treatment system.

   Gaseous Effluents - The LPR has no defined gaseous effluent release stream. Releases escape through walls and around doors. These effluents are too small to measure but are calculated based on the number of megawatts produced. In the last several years this activity has been less than 1 millicurie per year. The major constituent is Argon-41 and the remainder is short-lived noble gases.

   Solid Effluents - Solid wastes are collected in 55-gallon drums and stored for shipment to a licensed burial facility for disposal. The volume of solid disposed of during a typical year is 20 cubic feet. The activity of this waste is approximately 100 millicuries of long-lived activation products.

3. Samples are disposed of as solid waste and are included in #2 "Solid Effluents" above.

4. Argon-41 is the principle constituent of gaseous activity releases comprising about 75% of the total. Krypton-85 contributes 0.01% and the remainder is made up of short-lived noble gases. The maximum concentration of these releases is 3×10^{-8} µCi/ml. As stated previously, gaseous activity is not a defined stream but rather a leakage through walls and around doors. Due to the short half-lives of Argon-41 and noble gases, the average concentration of releases during a year is $< 1 \times 10^{-11}$ µCi/ml.

10 CFR 50.34 (b)

1. The most recent update of the Safety Hazards Evaluation Report is referenced below and is enclosed.

   - Safety Hazards Evaluation Report Update for License No. R-47. BAW-74, Supplement 12, November, 1978, Babcock and Wilcox Co.

2. There are no changes planned for the Lynchburg Pool Reactor during the renewal period.

10 CFR 50.34 (b)(6)

v. The Lynchburg Research Center, including the reactor facilities, are covered by a single emergency plan that was developed in accordance with Regulatory Guide 3.42. This plan entitled, Lynchburg Research Center, Emergency Plan, is enclosed and is excerpted from our application for renewal of license SNM-778, docket 70-824.

vi. The technical specifications for the Lynchburg Pool Reactor have been revised in accordance with guidance forwarded in the letter from Robert W. Reid to A. F. Olsen, dated August 21, 1978. This revision is referenced below and enclosed.

   - Appendix A to Facility License No. R-47, Technical Specifications for the Lynchburg Pool Reactor, docket 50-99, Babcock and Wilcox Company, December, 1978.

10 CFR 50.34 (c)

In accordance with the letter from Robert W. Reid to A. F. Olsen, dated October 6, 1978 the security plan for the Lynchburg Pool Reactor and the CX-10 facility will be revised to conform with anticipated forthcoming guidance and will be submitted to the

U.S. Nuclear Regulatory Commission on or before May 31, 1979. If the anticipated guidance is not issued, a consolidation of the present security plan and changes made in accordance with 10 CFR 50.54 (p) will be forwarded by May 31, 1979.