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MIDDLE SOUTH UTILITIES SYSTEM

March 1, 1985

ROTH S. LEDDICK
Senior Vice President
Nuclear Operations

W3P85-0552
3-A25.01.02
A4.10

Mr. Myron O. Knudson, P.E.
Director, Water Management Division
Environmental Protection Agency
Region VI
First International Building
1201 Elm Street
Dallas, Texas 75270

SUBJECT: Waterford Steam Electric Station
Unit Number 3
NPDES Permit No. LA 0007374

Dear Mr. Knudson:

Louisiana Power & Light Company (LP&L) hereby requests that the above permit be modified to (1) authorize increased flow at outfalls 001, 01A, 01B and 01C, (2) require monitoring of boron discharged through outfall 01A, (3) eliminate the current limit on discharges of boron at outfall 01B, and (4) create a new outfall 01D for steam generator blowdown. The affected pages of the permit with the requested changes and a proposed permit page for outfall 01D are attached.

The requested modifications are the result of substantial alterations in the design and planned operation of the permitted facility occurring after Permit LA 0007374 was issued and of new information concerning estimated discharges and optimal plant configuration. This information was not previously available and has become known only as the plant phases into an operational mode and encounters situations approximating actual operating conditions. Each modification is fully consistent with published effluent limitations and water quality criteria and is authorized by Clean Water Act Sections 301(b), (c) and (g), 304(b); and 40 CFR 125.3(c)(2), 122.62(a).

The requested changes will meet an urgent need to reduce unnecessary solid waste production, will avoid operational hardships, and will conserve energy. In addition, since the modified limits will cause no adverse effects, the costs of attempting to comply with current limitations would contribute to price inflation and economic inefficiency without producing benefits of any kind. We feel therefore that the modifications we request are warranted and reasonable and respectfully urge you to give prompt and favorable consideration to this request.

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Additional information is provided in the accompanying "Discussion of Requested Modifications." Should you require further information to evaluate these modifications, please contact Chadi D. Groome of our Nuclear Licensing Office at (504) 595-2846. We will provide you any information or assistance that you require, and would welcome the opportunity to meet with you at your earliest convenience to discuss this matter.

Yours very truly,

R. S. Leddick

RSL/CDG/smb

Enclosures

cc: S. Becker, Chief
Industrial Permit Section-EPA Region VI
J. Dale Givens, LA DEQ
R. D. Martin, Region IV, NRC
G. W. Knighton, NRR
L. M. Bykoski, NRR
C. W. Billups, NRR

NS40785SEG

DISCUSSION OF REQUESTED MODIFICATIONS

The information presented below is submitted in support of Louisiana Power & Light Company's (LP&L's) request under 40 CFR 124.5 (July 1, 1983) for modification of NPDES Permit LA 0007374 which authorizes discharges to the Mississippi River and the 40 Arpent Canal from Unit 3 of LP&L's Waterford Steam Electric Station (Waterford 3) at Killona, Louisiana. Waterford 3 is a nuclear-fueled steam electric power plant which is scheduled to commence operation in 1985.

Description of Outfalls

The Circulating Water System (CWS) pumps Mississippi River water through the Waterford 3 main condenser to provide cooling and returns the water to the river at Outfall 001 on a once-through basis.

Wastewater from the Waterford 3 Waste Management System (WMS) is discharged at Outfall 01A into the plant's CWS which discharges into the Mississippi River. The WMS concentrates and removes radioactive pollutants from various plant waste streams.

The Boron Management System (BMS) discharges into the CWS at Outfall 01B. The BMS is designed to concentrate and recover boron for re-use in the plant.

The plant operates a primary water treatment system to filter river water for various plant uses. The filters are flushed with raw river water to remove solids trapped in the filter beds. This filter flush water is discharged to the CWS at Outfall 01C.

Outfall 01D is a new outfall for the direct discharge of steam generator blowdown to the Waterford 3 CWS. This blowdown now discharges to the river through the Waterford 1 and 2 circulating water system (after flowing through the combined waste treatment system).

Summary of Modifications

Effluent Outfall	Characteristic Parameter	Effluent Limit Existing	New
001	Flow (daily max)	1445	1518 MGD
01A	Flow (daily avg)	0.0093	0.0288 MGD
01A	Boron	none	sample*
01B	Flow (daily avg)	0.0144	0.0288 MGD
01B	Boron (avg & max)	10 mg/l	sample*
01C	Flow (daily max)	0.960	1.3 MGD
01D	Flow (daily max)	none	0.908 MGD
01D	Flow (daily avg)	none	0.435 MGD
01D	TSS (daily max)	none	100 mg/l
01D	TSS (daily avg)	none	30 mg/l
01D	pH	none	6.0 to 9.0 SU

* One grab sample per batch, to be reported per existing permit.

Outfall 001

LP&L requests an increase from 1445 million gallons per day (MGD) to 1518 MGD in the flow limit applicable to Outfall 001. The existing value for CWS flow was derived for worst case pumping conditions, which is also the worst case for environmental analysis, and remains the expected flow under those conditions. However, for certain other, more optimum pumping conditions, CWS hydraulics indicate that the expected flow could reach a maximum of 1518 MGD. The existing limit (1445 MGD) has been used for environmental impact analysis and remains appropriate for that purpose because it is the flow that is expected during periods of high ambient river temperatures, but the stated permit maximum should coincide with the maximum hydraulic capability.

Outfall 01A

LP&L requests an increase from 0.0093 million gallons per day (MGD) to 0.0288 MGD in the flow limit applicable to Outfall 01A and proposes a new sampling requirement for boron discharged at this outfall.

Flow. We have already experienced difficulty managing release of water from the WMS and the BMS during preoperational tests and preparations for fuel loading. Extraordinary means and stop gap measures were employed to insure that permit conditions were not exceeded. These measures, which could include interruption of plant operation, will be unavailable or extremely costly once the plant becomes operational. Based on this experience, we anticipate that a daily average flow limit of 0.0288 MGD will be necessary at outfalls 01A and 01B to accommodate efficient operation of the plant. We do not anticipate that total yearly releases of water from the WMS and BMS will increase.

Boron. When the permit application was prepared, boron was expected to be present in discharges from the BMS, but not in discharges from the WMS at Outfall 01A. However, boron will enter the WMS from the Containment Building sumps, the Auxiliary Building floor drains, and laboratory and sampling drains. Although boron concentrations in this stream may be reduced by steps taken to control radioactive releases (filtration, demineralization), removal of boron was not a design consideration for this system. Boron removal occurs only incidentally to the removal of radioactivity, and only for a short period while the demineralizer resins are fresh. As a result, boron may be present in the discharge in concentrations as high as 2,300 ppm under certain conditions.

While boron levels could be reduced by continuous operation of the WMS's concentrators, such a practice is not necessary to protect the environment, and would entail added costs which we estimate at about $2.5 million per year. In addition, continuous operation of WMS's concentrators would require large amounts of energy and would result in the production of a large volume of solid waste. This material would be required to be disposed of on land at a site authorized to receive low-level radioactive waste (radwaste). The capacity of radwaste disposal sites is currently in short supply and may soon be limited to the most critical needs.

We submit that such costs and energy use and the creation of unnecessary demand for radwaste disposal site capacity are not justified unless expected discharges of boron would produce adverse effects in the receiving water. It is clear that no such adverse effects would occur.[1]

In the Waterford 3 Final Environmental Statement, the Nuclear Regulatory Commission staff calculated that the currently permitted BMS discharge of 10 ppm boron at Outfall 01B would result in a boron concentration of 0.00002 ppm at the point of discharge to the river after dilution in the CWS. Under "worst case" assumptions of a simultaneous discharge of 2,000 ppm boron at 20 GPM from both 01A and 01B and a minimum CWS flow of 620,000 GPM, the concentration of boron at the point of discharge to the Mississippi River would be only 0.13 ppm. This combination of "worst case" events is, of course, extremely unlikely and could not be sustained for long. A conservative scenario of a minimum CWS flow and a combined 01A and 01B discharge of 20 GPM containing 2,000 ppm boron results in a point-of-discharge concentration of less than 0.07 ppm.

1/ In determining effluent limitations for nonconventional pollutants, such as boron, EPA is explicitly authorized by Section 304(b) of the Clean Water Act to consider, among other factors, "non-water quality environmental impact (including energy requirements) . . .[and] the cost of achieving . . . effluent reduction." See Clean Water Act Sections 304(b)(2)(B); 40 CFR 125.3(c)2. The information presented herein also satisfies the requirements for a variance under Section 301(g) of the Act, since it shows that the discharge will not violate water quality standards or other standards or impose additional requirements on other sources and will assure protection of public water supplies, wildlife, recreational uses, human health and the environment. EPA may therefore apply the factors listed in Section 304(b)(1)(B), which include, in addition to the factors mentioned above, "the total cost of application of technology in relation to the effluent reduction benefits to be achieved."

The boron limit in the permit for Connecticut Yankee's Haddam Neck Station (NPDES CT003123) was increased to 2250 mg/l on August 13, 1984 to allow the plant to reduce radwaste production, conserve energy and reduce cost. In March 1984, a quarterly monitoring requirement was imposed in the renewal permit for Duke Power Company's Oconee Plant in lieu of an effluent limit of 2000 mg/l. The Oconee action was based on the absence of harm to the receiving water.

A literature search reveals that EPA's "Red Book" (Quality Criteria for Water, EPA-440/9-76-003) contains the most definitive information on the effects of boron releases on the aquatic environment. This document cites a study which found that the minimum lethal dose for minnows exposed to boric acid for six hours was 18,000-19,000 ppm. Other studies, also reported in the Red Book, have found naturally occurring levels in rivers and lakes as high as 5 ppm. Boron concentrations in sea water are between 4 and 5 ppm. The Red Book's most restrictive water quality criterion proposed for boron is the value of 0.75 ppm for irrigation water, which the authors state would provide long-term protection for certain sensitive crops.[2] However, Reisenauer et al. (1973) considered boron concentrations in soil of between 1 and 5 ppm as necessary for normal growth and classified soils containing less than 1 ppm as boron deficient.

The "worst case" maximum concentration value for the combined 01A and 01B discharge prior to mixing with the river water, as calculated above, is insignificant in relation to naturally occurring concentrations and is a fraction of EPA's most conservative water quality criterion for boron. In addition, because massive dilution will immediately occur through mixing with the river water, the concentration of boron in the river near the plant will increase by less than 1 ppb, an amount which cannot be detected by presently accepted analytical techniques. See, e.g., 49 FR 38002 (September 26, 1984). Finally, since Waterford 3 is only 130 miles from the mouth of the Mississippi River, boron released from the plant will shortly enter the Gulf of Mexico, where naturally occurring boron concentrations are more than 30 times higher than the worst case point-of-discharge value calculated for the theoretical maximum combined 01A and 01B discharge.

Thus, there is no evidence that the proposed discharges of boron from Waterford 3 would have any adverse effects, even under worst case assumptions. LP&L therefore requests that no effluent limit be placed on boron discharged at Outfall 01A. We propose a requirement to sample this discharge for boron once each time a tank is released and to report the results of this monitoring to EPA with other monitoring results.

2/ In fact, the Mississippi River below Waterford 3 is not a significant source of water for agricultural purposes. The irrigation water quality criterion is selected for comparison because it is the most restrictive.

An AEC monograph entitled "Toxicity of Power Plant Chemicals to Aquatic Life," WASH-1249, UC-11 (AEC June 1973) also finds that "relatively high concentrations [of boron] are required to produce toxic effects on aquatic life" and that "concentrations up to 30 mg/l in drinking water are said to be not harmful." ID., p. E.1.

Outfall 01B

For reasons already given in the preceding discussion, LP&L requests an increase from 0.0144 MGD to 0.0288 MGD in the flow limit for Outfall 01B. In addition, LP&L is seeking to replace the present boron limit of 10 mg/l (daily average and daily maximum) with a sampling and reporting requirement identical to the requirement proposed for Outfall 01A.

Original estimates by the vendor were that the BMS evaporators were so efficient at concentrating boron for recycle that the condensate would contain no more than 10 ppm boron. This value was presented in the permit application as the expected discharge concentration at Outfall 01B and was inserted into the permit as an effluent limitation. Since that time, industry experience with this equipment has indicated that, at best, boron carryover into the condensate from the Waterford 3 evaporators can be expected to be 25-100 ppm. Industry experience has also indicated that the evaporators and associated equipment often experience mechanical difficulty and are extremely expensive to operate on a continuous basis. When evaporators are not operated, the 01B discharge at certain times may approach levels as high as 2,300 ppm.

To comply with the existing permit limit of 10 ppm, in addition to continuous operation of the BMS evaporators, additional deborating demineralizers would be required to treat the evaporator distillates. We estimate that the cost of this attempt could be $1.1 million per year excluding the cost of operating the evaporators. As the earlier discussion indicates, there is no evidence that these expenditures, the attendant consumption of energy, and the production of large volumes of solid waste would produce any benefits whatever. On the contrary, all available evidence indicates that, even under "worst case" assumptions involving simultaneous releases from both the BMS and the WMS, the discharge would be approximately 17 percent of the most restrictive EPA water quality criterion for boron before any mixing with the river water.

In addition, as in the case of the WMS, operation of the BMS's evaporators and demineralizers will result in the production of large volumes of solid waste which must be disposed of at authorized radwaste sites which are critically limited and may soon be closed[3]. For these reasons, LP&L is requesting that the permit's present limit of 10 mg/l boron at Outfall 01B be replaced by a sampling and reporting requirement as proposed for Outfall 01A.

3/ See Footnote 1.

Outfall 01C

LP&L requests an increase in the maximum daily flow for Outfall 01C from 0.96 MGD to 1.3 MGD. This modification is necessary because we have learned that more frequent flushing of filters will be necessary during periods of high river turbidity, when the flush cycle will approach continuous operation, and during periods of high water usage by the plant. We still expect to be able to comply with the daily average flow limitation of 0.72 MGD, even with the higher maximum flow, and are therefore not seeking a change in the daily average.

Outfall 01D

LP&L requests that a new outfall be authorized for the discharge of steam generator blowdown (SGBD) directly to the Waterford 3 CWS. The existing pathway for the discharge of Waterford 3 SGBD is through the combined Waterford 1 and 2 - Waterford 3 waste treatment facility to the Waterford 1 and 2 CWS and thence to the Mississippi River. We wish to maintain this pathway, but provide for the option to discharge directly to the Waterford 3 CWS when it is operationally advantageous to do so.

Under normal conditions, SGBD will usually be recovered and returned to the condensate system. However, there will be times when it will be preferable to discharge rather than recycle the blowdown, and under certain conditions, it would also be preferable to discharge to the Waterford 3 CWS rather than to route this discharge across the plant site and through the waste treatment facility.

The characteristics of SGBD have become better identified since the original decision to direct SGBD to the waste treatment ponds. It has been demonstrated that SGBD typically exhibits suspended solids levels less than 1 ppm, and there is no plausible scenario for oil and grease contamination. On November 19, 1982 (47 FR 52304) boiler (steam generator) blowdown was incorporated into the definition of low volume waste (40 CFR 423.11(b)) and is no longer subject to individual effluent limitations. There is no justification, environmental or economic, for combining SGBD with other waste streams for treatment, when the treatment provides no foreseeable improvement in effluent quality. Much time and energy is expended to keep the condensate system operating within the narrow range allowed in the NRC Technical Specifications for Waterford 3 (Appendix A to the Operating License), and SGBD is the primary tool for achieving the desired condensate quality. SGBD characteristics are, therefore, studied industry wide, and known in-plant on a daily, if not more frequent basis. We therefore feel we have a reasonable representation of what we can expect in our SGBD, and that when discharged, it will fully comply with effluent limits, and indeed will be of better quality than is usually released from low volume treatment trains.

A-2 **EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

During the period beginning July 1, 1984 and lasting through the expiration of this permit the permittee is authorized to discharge from outfall(s) serial number(s) 001, Unit 3 once through cooling water and previously monitored waste streams.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day)		Discharge Limitations Other Units (Specify)		Monitoring Requirements Measurement Frequency	Monitoring Requirements Sample Type
	Daily Avg	Daily Max	Daily Avg	Daily Max		
Flow—m^3/Day (MGD)	N/A	N/A	(*)	~~(1445)~~ 1518	Continuous[1]	Record
Temperature	N/A	N/A	*[2]	43.3°C(110°F)[3]	Continuous	Record
Heat[4]	N/A	N/A	N/A	8.5×10^9 BTU/Hour[5]	Continuous	Record
Total Residual Chlorine[6]	N/A	228.2(502)	N/A	0.5 mg/l	One/Week[7]	Grab

[1]See Part III, Paragraph C.
[2]See Part III, Paragraph D.
[3]Instantaneous maximum.
[4]See Part III, Paragraph J.
[5]See Part III, Paragraph E.
[6]See Part III, Paragraphs F & G.
[7]Monitoring shall be representative of periods of chlorination.

*Report

The pH shall not be less than N/A standard units nor greater than N/A standard units and shall be monitored N/A

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):
Prior to discharge to the Mississippi River.

A-3 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date and lasting through the expiration of this permit, the permittee is authorized to discharge from outfall(s) serial number(s) 01A (Control point), waste management system and laundry wastes.
Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day)		Discharge Limitations Other Units (Specify)		Monitoring Requirements	
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency	Sample Type
Flow—m^3/Day (MGD)	N/A	N/A	(~~.0093~~ .0288)	(*)	Daily	Totalized
Surfactants	N/A	N/A	30 mg/l	30 mg/l	1/batch	Grab
Oil & Grease	N/A	N/A	15 mg/l	20 mg/l	1/batch	Grab
Total Suspended Solids	N/A	N/A	30 mg/l	100 mg/l	1/batch	Grab
Boron	N/A	N/A	(*)	(*)	1/batch	GRAB

*Report

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/batch by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):
Prior to mixing with the circulating cooling water.

A-4 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date and lasting through the expiration of this permit the permittee is authorized to discharge from outfall(s) serial number(s) 01B (Control point), boron management system.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day)		Discharge Limitations Other Units (Specify)		Monitoring Requirements	
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency	Sample Type
Flow—m^3/Day (MGD)	N/A	N/A	(~~.0144~~ .0288)	(*)	Daily	Totalized
Boron	N/A	N/A	(*) ~~10 mg/l~~	(*) ~~10 mg/l~~	1/batch	Grab
Oil & Grease	N/A	N/A	15 mg/l	20 mg/l	1/batch	Grab
Total Suspended Solids	N/A	N/A	30 mg/l	100 mg/l	1/batch	Grab

*Report

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/batch by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):
Prior to mixing with the circulating cooling water.

A-5 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date and lasting through the expiration of this permit, the permittee is authorized to discharge from outfall(s) serial number(s) 01C (Control point), filter flush water fr primary water treatment plant.
Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day)		Discharge Limitations Other Units (Specify)		Monitoring Requirements Measurement Frequency	Monitoring Requirements Sample Type
	Daily Avg	Daily Max	Daily Avg	Daily Max		
Flow ~~m^3~~/Day (MGD)	N/A	N/A	(0.720)	(~~0.960~~ 1.3)	Daily	Totalized
Total Suspended Solids	*	*	N/A	N/A	1/week	Grab
Total Organic Carbon	*	*	N/A	N/A	1/week	Grab
Alkalinity, Phenolphthalein Method	*	*	N/A	N/A	1/week	Grab
Clarifying Agents Used	*	N/A	N/A	N/A	1/month	Record

*Report
See Part III, Paragraph K.

The pH shall not be less than * standard units nor greater than * standard units and shall be monitored 1/week by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):
Prior to mixing with the circulating cooling water.

Permit No. LA0007377

PROPOSED EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - OUTFALL 01D, STEAM GENERATOR BLOWDOWN

Effluent Characteristic	Discharge Limitations				Monitoring Requirements	
	kg/day (lbs/day)		Other Units (Specify)			
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency	Sample Type
Flow-m^3/day (MGD)	N/A	N/A	(0.435)	(0.908)	Daily	Totalized
Total Suspended Solids	N/A	N/A	30 mg/1	100 mg/1	1/week	Grab

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once/week by grab sample.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):
Prior to mixing with the circulating cooling water.