

April 6, 1990

Docket No. 50-395

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Mr. O. S. Bradham
Vice President, Nuclear Operations
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
P. O. Box 88
Jenkinsville, South Carolina 29065

Dear Mr. Bradham:

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1, REGARDING
USE OF BIOCIDES TREATMENT ON SERVICE WATER SYSTEM (TAC NO. 73300)

Enclosed for your information is a copy of an Environmental Assessment. The assessment relates to the use of a biocide at the Virgil C. Summer Nuclear Station, Unit No. 1 for the purpose of implementing a full-scale treatment program for the service water system. The approval for use of the biocide is granted in response to your May 19, 1989 submittal.

The Environmental Assessment has been forwarded to the Office of the Federal Register for publication.

Sincerely,

Original Signed By:

John J. Hayes, Jr., Project Manager
Project Directorate II-1
Division of Reactor Projects I/II

Enclosure:
Environmental Assessment

cc w/enclosure:
See next page

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Mr. O. S. Bradham
South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station

cc:

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UNITED STATES NUCLEAR REGULATORY COMMISSION
SOUTH CAROLINA ELECTRIC & GAS COMPANY
SOUTH CAROLINA PUBLIC SERVICE AUTHORITY
VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1
DOCKET NO. 50-395

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT

Identification of Proposed Action:

In May 1981, the Nuclear Regulatory Commission issued the "Final Environmental Statement Related to the Operation of the Virgil C. Summer Nuclear Station Unit No. 1," NUREG-0719 (FES). In the FES, it was stated that biocides would not be utilized to control fouling in the condenser. There was no indication either in the licensee's Environmental Report or their Final Safety Analysis Report that a biocide would be utilized for the service water system.

Appendix B to the Facility License NPF-12 to V. C. Summer Nuclear Station, Unit No. 1 (Summer or Summer Station) contains the Environmental Protection Plan. This plan allows the licensee to make changes in facility operation affecting the environment provided that such changes do not involve an unreviewed environmental question. A proposed change involves an unreviewed environmental question if it concerns: (1) a matter that may result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement (FES), as modified by the staff's testimony to the Atomic Safety and Licensing Board (ASLB),

supplements to the FES, environmental impact appraisals, or in any decisions of the ASLB; (2) a significant change in effluents or power level (in accordance with 10 CFR Part 51.5(b)(2)); or (3) a matter not previously reviewed and evaluated in the documents specified in (1) of this paragraph, which may have significant adverse environmental impact. In addition, License Condition 2.F requires the licensee to provide written notification to the NRC and to receive written approval from the NRC before proceeding in activities that may result in a significant adverse environmental impact that was not evaluated or that is significantly greater than that evaluated in the FES.

In a May 19, 1989 letter, the licensee proposed implementation of a full scale treatment program for the service water system using a biocide. The purpose of the biocide was to control microbiologically induced corrosion (MIC) and biological fouling from Asiatic Clams. Such fouling led to restricted flow in the service water to the reactor building cooling units during a May 12, 1988 reactor trip.

Accordingly, the licensee has reviewed the use of the biocide, performed an environmental evaluation of its use, and determined that use of the biocide is an unreviewed environmental question. Therefore, they have submitted a written evaluation to the staff and requested permission to use the biocide. They have also requested and have received approval from the South Carolina Department of Health and Environmental Control (SCDHEC) for the utilization of the biocide.

THE NEED FOR THE PROPOSED ACTION

The granting of this request would allow the licensee to treat the service water system with the Betz Clam-trol (CT-1) biocide. The service water system is a safety-related system which is utilized to provide cooling for the emergency diesel generators, component cooling heat exchangers, and heating ventilating and air conditioning mechanical water chiller condensers. The service water system also cools the reactor building cooling units under: (1) post-accident or high containment pressure conditions, loss of non-class 1E power; and (2) loss of industrial cooling water or during testing. The service water system is also a backup source for the emergency feedwater and component cooling water systems. Four problems contribute to service water system degradation. They are Asiatic clam fouling, MIC, soft-water corrosion, and silt deposition and fouling. The degradation of service water flow to safety related systems could magnify the consequences of a transient or an accident. The licensee is proposing the use of the biocide to prevent degradation caused by MIC and Asiatic clams. Another form of treatment must be utilized to limit the degradation caused by soft-water corrosion and by silt deposition and fouling.

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

3.1 Radiological Impacts

There are no radiological impacts as a result of the use of the biocide.

3.2 Non-radiological Impacts

The Betz CT-1 biocide is a blend of organic biocides that contains no heavy metals or EPA priority pollutants. The biocide will be injected at the trash racks located at the entrance to the intake tunnel of the service water intake structure and other points as necessary. The biocide is designed to control Asiatic Clams and is anticipated to help control MIC. Treatment would be daily at an application rate of 5 to 15 ppm for 1 to 4 hours and would be scheduled so that the potential for discharge of the biocide to the Monticello Reservoir through the service water intake/circulating water intake cross-connect pipe would be limited.

The data provided by the supplier (Betz) of the biocide indicated that CT-1 is fairly toxic to non-target organisms. The 96 hour LC_{50} for bluegill sunfish is 4.3 mg/l and the 48 hour LC_{50} for *Daphnia magna* is 0.41 mg/l. Betz claims that the biocide is rapidly deactivated by adsorption on suspended particles in the water. Such a deactivation property is utilized to reduce the chance of biological effects caused by the active ingredients in CT-1. However, this same mode of deactivation may also affect CT-1's effectiveness in controlling clams.

The addition of CT-1 to the service water system could result in biological effects being noted in the service water pond, in Monticello Reservoir at both the circulating water intake and discharge, and within

the circulating water system itself. The licensee controls the service water pond, and it is not considered public water. The effects on organisms in this pond are of little consequence unless these effects cause problems in Monticello Reservoir. The licensee indicated that deactivation by suspended material should preclude any significant effects in the service water pond. There is a 36" pipe connecting the service water intake structure with the circulating water intake structure which allows the exchange of water between the Monticello Reservoir and the service water pond. Water flows from the service water pond to Monticello Reservoir only when the level of the Monticello Reservoir is dropping. This occurs when the Fairfield Pumped Storage Facility (FPSF) is generating, i.e., releasing water from the Monticello Reservoir to the Broad River. Thus, this is the only time that the biocide could be discharged from the service water pond to Monticello Reservoir.

The location of the discharge point into Monticello Reservoir from the service water pond depends upon the operating status of the circulating water pumps. If the pumps are operating, water from the interconnecting pipe is entrained in the flow through the circulating water system and discharged through the circulating water discharge canal. If the circulating water pumps are not operating, then discharge would occur through the circulating water intake.

In a report prepared for the licensee, it was indicated that since deactivation of the biocide reduces the potential impact of the biocide,

the biocide should be restricted to favorable lake level conditions, i.e., FPSF pumping back or idle. This would prevent the release of active components of the biocide to the Monticello Reservoir. Thus, it was recommended in the report that application of the biocide during idle periods be delayed until the lake level and service water pond level stabilize.

The licensee indicated in their submittal that they would be applying the biocide one to four hours per day into the normal service water flow rate of 24,000 gpm. To minimize the convection of the biocide to the circulating water intake via the 36" cross-connect pipe, application will only be made at night when the FPSF is either pumping up from the Broad River or when the FPSF is sitting idle. The net effect is that flow in the cross-connect pipe will be either toward the SW intake or stagnant during application.

The licensee's submittal stated that significant impacts could occur if the biocide was not deactivated. Impacts could include increased mortality of fish and not easily quantifiable increases in entrainment losses to zooplankton and ichthyoplankton that are transported through the condensers. The report prepared for the licensee recommended that a sampling and analysis program be implemented to monitor the level of biocide in the service water pond.

The report also indicated that the level of CT-1 in water that can cause mortality in zooplankton (48 hour LC_{50} for *Daphnia magna* of 0.41 mg/l) has not been measurable with the analytical methods available. However, a new detection methodology proposed by Betz may allow detection.

Nevertheless, a situation could occur where water might be considered free of biocide, but still contain enough active ingredients to affect the zooplankton. However, expected dilutions and deactivation by adsorption should reduce possible effects.

The licensee evaluated the possible effect of introducing the active and inert components (ethylene glycol and isopropanol) of the biocide into the drinking water system at the Summer Station via the raw water supply which is located at the circulating water intake structure. The restriction of biocide use to periods of favorable lake level conditions should prevent the introduction of the active components of the biocide into the raw water supply. Inert ingredients, if not degradable, could concentrate in the service water system. Ethylene glycol was viewed as a potential problem. However, the licensee indicated that ethylene glycol degrades in the environment and would not concentrate in the service water system. Other inert ingredient concentrations should not increase to the point which would affect drinking water quality.

Section 2 of the Summer Environmental Protection Plan states that the NRC will rely on the SCDHEC to handle matters involving water quality and aquatic biota. On December 22, 1988, the licensee made a request to SCDHEC for modification of their NPDES Permit to approve the use of CT-1. On October 31, 1989, SCDHEC approved the use of the biocide with the following stipulations:

1. The end-of-pipe concentration discharge of CT-1 to the circulating water intake shall not exceed 0.41 ppm.
2. Sampling of the discharge to show compliance with Item 1 shall be once per week for the first month of application. The sampling result shall be submitted within thirty days of the last sampling date. Additional sampling may be required based on these results.
3. Application of the biocide may be made only during times that the FPSF is either pumping up from the Broad River or sitting idle.

The Commission has evaluated the impact of the proposed action. The limitations on the use of the biocide should minimize the discharge of the biocide to the Monticello Reservoir thereby minimizing the impact upon the biota. The concentration limit for the discharge from the end-of-pipe to the circulating water discharge should ensure that the *Daphnia magna* is unaffected. The Commission has also determined that sufficient environmental monitoring will occur to determine whether the biocide will impact upon the Monticello Reservoir.

ALTERNATIVES TO THE PROPOSED ACTION

Two alternatives exist in lieu of the proposed actions. They are to remain in the status quo i.e., do nothing or to continuously treat with chlorination. Although chlorination has been shown to be effective in controlling Asiatic clams, it has been shown to increase corrosion at the Summer plant due to soft-water attack. Continued operation under the existing

conditions to prevail would make the service water system potentially susceptible to degraded conditions as a result of reduced flow.

ALTERNATIVE USE OF RESOURCES

This action does not involve the use of resources not previously considered in connection with the Summer FES.

AGENCIES AND PERSONS CONSULTED

The NRC staff has reviewed the licensee's request for the use of the biocide. The staff discussed the licensee's proposed action with the SCDHEC.

FINDING OF NO SIGNIFICANT IMPACT

The Commission has determined not to prepare an environmental impact statement for the proposed action.

Based upon the foregoing environmental assessment, the staff concludes that the propose action will not have a significant effect on the quality of the human environment.

For further information with respect to this action, see the application previously listed, which is available for public inspection at the Commission's Public Document Room, 2120 L Street, N. W., Washington, D.C. 20555 and at the Fairfield County Library, Garden and Washington Streets, Winnsboro, South Carolina 29180.

Dated at Rockville, Maryland this 6th day of April , 1990.

FOR THE NUCLEAR REGULATORY COMMISSION

Original Signed By:

Elinor G. Adensam, Director
Project Directorate II-1
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

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