

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

Applicants.

April 9, 1982

PETITION TO INTERVENE AND REQUEST FOR HEARINGS

Fairfield United Action herewith submits the contentions and the bases therefore which it would seek to have litigated in this proceeding, reserving its right to amend and make additions thereto.

Contention B1

The license should not issue because rapid tube wear caused by flow-induced vibrations in the preheater region of the Westinghouse Model D3 steam generators employed at Summer presents a highly credible likelihood of tube weakening, leakage, or rupture which, in combination with other sequences of events which can reasonably be expected to occur within the lifetime of the facility, would result in the release of significant amounts of radiation to the atmosphere and endanger the health and safety of the public.

The Summer facility employs three Model D3 Westinghouse steam generators. Nuclear generation facilities located at Ringhals, Sweden, and at Almaraz, Spain, which likewise employ Westinghouse Model D3 steam generators have experienced accelerated tube wear in the early months of operation. (Memorandum, S. Chesnut, Project Manager, Licensing Branch 1, DL, to B.J. Youngblood, Chief, Licensing Branch 1, DL, "Summary of Meeting on Westinghouse Model D Steam Generators," March 12, 1982.) At one of those non-domestic facilities a primary to secondary leak attributable to this phenomenon occurred after 113 effective full power days of operation. (T.C. Nichols to H.R. Denton, February 19, 1982.)

Initial data from instrumented Model D steam generators indicates that the accelerated wear is attributable to turbulence in the preheater region caused by the feed inlet impingement plate and the flow limiter and that the onset of increased turbulence is related to high feed flow rates. For Model D3 generators such as at Summer, the increased turbulence is experienced at feed flow rates of approximately 50%. (Chesnut to Youngblood, March 12, 1982.)

Tube ruptures under normal operating conditions "can present a significant challenge to plant operators and safety systems." (NRC, "Steam Generator Status Report," February 1982, p. 2.) The design basis tube failure is a double-ended rupture of a single tube. (FSAR, 5.2-16.) However, this postulated accident fails to encompass the not unlikely event of multiple tube failures, a matter which has "not yet been rigorously studied." ("Status Report," p. 2.) The in-service inspection program which has been relied upon to assure tube integrity (Ibid., p. 3) is inadequate to Summer where the Model D steam generators have shown such rapid tube degradation that tube inspection at refueling outages is too seldom. "Rapid degradation between inspections of a large number of tubes could create the potential for multiple tube failures in the event of a plant transient or failure of a single tube and the accompanying jet impingement and tube whip could cause failure of additional tubes." (Ibid., p. 2.)

Potentially complicating circumstances, such as the stuck open PORV at the Robert A. Ginna plant on January 25, 1982, create the potential for significant hazards to the safety of the public. A seriously leaking or ruptured tube(s) permits irradiated water from the primary cooling system to enter the secondary side. The Power Operated Relief Valve (PORV) on the pressurizer fails open - as happened at Ginna and at Three Mile Island. Operation of the emergency pumps keeps the pressure on the primary side so high that the safety valve on the steam generator lifts. Radioactive steam is free to escape to the environment. After the incidents at Ginna, Davis Besse and Three Mile Island, the reliability of PORV's cannot be considered high. The Summer PORV valves have been generically tested by EPRI. However, in reporting the demonstrated "functionability" of its PORVs, Applicants

note that there are "anomalies in safety valve performance" still being addressed by the Westinghouse Owners Group. Among those "anomalies" are: inconsistencies in valve opening and delays in valve opening. (T.C. Nichols to Harold R. Denton, "PWR Safety and Relief Valve Test Program: Plant Specific Submittal Letter," April 1, 1982, pp. 2-3.)

Rupture in multiple steam generators can create a situation in which, "unless the plant can be rapidly depressurized and brought into Residual Heat Removal, there is potential to continuously lose emergency core cooling water outside of containment." ("Status Report," p. 2.)

Moreover, during postulated accident sequences, such as a Main Steam Line Break or a Loss of Coolant Accident, steam generator tubes are subjected to increased and sudden stresses from increased pressure differentials, possible pressure waves, and vibrational loadings. With multiple degraded steam generator tubes, these loads increase the potential for tube failure which could make the accident situation worse.

In a LOCA, for example, a sudden drop in pressure on the primary side cause ruptures in the steam generator tubes. Because the pressure is lower on the primary side, steam from the secondary side enters the primary cooling system. "S.G. tube failures would create a secondary to primary leak path which aggravates the steam binding effect and could lead to ineffective reflooding of the core." (*Ibid.*, p. 3., emphasis added.) With inadequate cooling of the core, a core melt could follow.

The NRC's "Status Report" suggests that such events are of low probability, but points out that "more realistic events . . . pose a less severe challenge to S.G. tube integrity . . .," but "tube rupture(s) leading to or following such events could have serious consequences." (*Id.*, emphasis added.)

The Summer station presents a special case in that Model D3 steam generators have been demonstrated to degrade and leak within 113 full power

days of operation. Remedial actions which rely upon frequent tube inspection are inadequate where the frequency would have to be so high. The risks associated with an accident related to steam generator tube failure in a Model D3 design system is much higher than at facilities where tube degradation is not an almost immediate consequence of operation. A number of scenarios have been presented which present a highly credible threat to the safety of the public from significant releases of radiation to the environment.

Neither the Applicants nor the Staff have adequately addressed the problem of accelerated tube wear due to flow induced vibration as it relates to Summer. The Applicants' FSAR discussion of flow induced vibrations (FSAR, 5.5-17 et seq.) notes that consideration has been given to the problem, but can offer little hope that it has been dealt with. What confidence is expressed relies upon "successful operational experience with several steam generator designs." (Ibid., 5.5-20.) That reliance is obviously misplaced for Model D3 generators.

The most recent Staff analysis in this proceeding (SER, Supp. 3, January 1982) focuses on possible remedies for problems in Westinghouse Model 51 steam generators, especially cracking at the U-bends. "There has been virtually no operating experience to date with Model Model D steam generators." (Ibid., p. 5-6.) That analysis is now obsolete. On the "Overall Steam Generator Problem," William J. Dircks, EDO, NRC notes that "current efforts (NRC and regulated industry) are probably not nearly enough . . . ." (Dircks to Robert Minogue, ONRR, February 17, 1982, p. 1.)

For Summer, no assurance can be given "that these tubes (will) maintain adequate integrity . . . during normal operating and postulated accident conditions" (SER, Supp. 3, p. 5-6).

Contention B2

The favorable cost-benefit analysis struck at the Construction Permit stage is fatally compromised by the failure of the NRC Staff to calculate costs and benefits based on operation at half power and to include in the balance costs of repairs and/or replacement of the steam generators as well as the very high worker exposure rates which will result from frequent repairs and/or replacement.

The primary benefit found by the Staff in the FES in the operation of Summer includes 4.73 billion kWh of annual electrical energy production, increased system reliability, savings in production costs, and increased fuel diversity. (FES, p. 9-1.)

This analysis assumes that Summer will operate at an annual capacity factor of 60%. Mark Whitaker, Applicant SC&G's General Manager of Nuclear Engineering and Licensing, has been quoted in newspaper articles as saying that "I can't even give you a year" . . . when the plant will be able to run at full power. (Columbia Record, March 10, 1982, p. 1-A.) "It looks like a long time before we can go beyond 50 percent," he is quoted elsewhere. (The State, March 11, 1982, p. 1-C.) At the most optimistic, running Summer at 50% power - with no down time for maintenance or repairs - would reduce annual energy production to 3.9 billion kWh. A more realistic 35% capacity factor (50% power x 70% availability) which allows for down time would result in 2.7 billion kWh annual electrical production. That is only 57% of the projected benefit.

The experience of McGuire and other Westinghouse design steam generators is that their operation results in increased unreliability to the system because of their tendency to leak. Duke Power Company's McGuire Unit 1, which has Model D2 steam generators very similar to Summer's D3s, has only operated 30% of the time since going commercial in December of 1981.

South Carolina, for example, has four commercial reactors currently licensed to operate. However, during at least two periods in this calendar year, there has not been a single nuclear power reactor operating in this "nuclear state". The Robinson 2 facility of Carolina Power & Light and all three of Duke Power Company's Oconee plants have been down. All save one of the Oconee reactors has been down because of steam generator problems.

Savings in production costs resulting from the use of nuclear fuel plainly do not obtain when lower usage rates decrease that fuel's share of the generation burden. Increased maintenance costs in the millions of dollars have not been factored in. ("Status Report," p. 1.)

Thus, instead of a 900 MW facility, the benefits have to be premised on an unreliable 450 MW generation facility. The Applicants indicate that they have no idea when it might be safe to operate at full power. Under those circumstances, credit should only be given for the knowable available power of 450 MW.

Building a generating plant so fundamentally flawed in design that it can safely be run - by Applicants' estimates - at only 50% power calls for a recasting of the entire cost-benefit analysis. As the Commission noted in Public Service Co. of New Hampshire (Seabrook Station), 5 NRC 503 (1977):

Indeed, our conclusion substantially depends on the integrity of the NEPA process which leads up to the point of hearing. Where that integrity is absent - where time and money have been misspent - it may be proper to restrike a NEPA analysis on the basis of a set of facts no longer existing, i.e. as though those expenditures had not been made . . .

Id., 5 NRC at 533.



In further support of this Petition, Fairfield United Action would respectfully show:

1. That the Atomic Safety and Licensing Appeals Board found that "No one disputes that, as the Licensing Board determined, FUA has satisfactorily demonstrated the requisite standing to intervene." (South Carolina Electric & Gas Co., et al. (Virgil C. Summer Nuclear Station, Unit 1), ALAB-642, 13 NRC 881, 884 (1981); ibid, LBP-81-11, 13 NRC 420, 422 (1981).)

2. That Petitioner's members have only recently been informed of accelerated tube wear and leaks in steam generators tubing caused by flow-induced vibrations at other nuclear power stations employing Westinghouse Model D steam generators.

3. In late January of 1982, following the close of the record in the evidentiary hearings in this proceeding, Petitioner was served by Staff with a copy of Board Notification BN-82-02, "Board Notification - Preheater Type Steam Generator," dated January 20, 1982. That Board notification informed this Board of tube degradation in two foreign reactors applications of Westinghouse Model D steam generators.

That notification further informed the Board of testing and surveillance of similar Model D Westinghouse steam generators at Duke Power Company's McGuire 1 facility, where "No wear type indications were observed."

In a letter dated February 19, 1982, Thomas C. Nichols of the Applicant South Carolina Electric & Gas Co. informed Mr. Harold R. Denton of the NRC that the Applicants' plans for addressing potential steam generator tube degradation involved proceeding with "normal low power testing". After power had been escalated to 50%, Applicants would "continue operation at 50% for



approximately two months or at a power level above 50% that has been evaluated, based upon information available at the time, to preclude significant tube damage." Eddy current tests in one steam generator and consideration of other matters would lead to establishment of an operating power level.

On March 10 and March 11, 1982, newspaper articles in the Columbia, South Carolina, based Columbia Record and The State reported that the Summer station would be unable to operate at full power for an indefinite period because of the potential for tube ruptures. One story cited SCE&G officials as postulating 50% power as a safe level for operation. (See Attachments 1 and 2.)

On April 5, 1982, Petitioner's members became aware of a memorandum in this and other dockets, dated March 12, 1982, summarizing a February 19, 1982, meeting on Westinghouse Model D steam generators. Although heretofore Petitioners had been on the service list in this proceeding, the Staff has apparently ceased serving documents on Petitioner and Petitioner's members became aware of this document only by chance.

This memorandum from S. Chesnut to B.J. Youngblood, both of the NRC's Licensing Branch No. 1, DL, reported that "Initial data from the instrumented steam generators showed that the onset of the increased turbulence occurred at high feed flow rates (approximately 50% for Models D2 and D3, 70% for D4, D5)." It further reported on the cause of the accelerated tube wear as set forth in Contention 1B, above.

Having been informed by newspaper accounts on March 10 that operation of the V.C. Summer Station at over 50% could create vibrations leading to tube degradation and rupture and having had this confirmed in official documents in this docket only on April 5, 1982, Petitioner has moved expeditiously to file this Petition.

Although the evidentiary hearings in this proceeding had ostensibly been closed on January 20, 1982, the Board Notification which first raised this issue in this docket was only dated on that day. Even had Petitioner moved to file a Petition at that date, only 80 days ago, no Petition to intervene and to offer a new contention could have been filed based upon this new information prior to the close of the hearing.

The specific design defect in the Westinghouse Model D steam generator has only recently been made apparent through operation of foreign and domestic reactors. The evidence on January 20, 1982, suggested that the McGuire 1 Model D steam generators were showing no indications of accelerated wear. No explanation of the mechanism causing the accelerated tube wear in the foreign reactors was available to Petitioner from either the NRC or the Applicants until April 5, 1982, other than newspaper accounts on March 10 and 11, 1982.

Petitioner believes that it has timely filed this Petition and that it has exercised all due diligence in this matter and that good cause exists for its failure to file this Petition until this time.

4. That Petitioner's interest in protecting its members from harm to their health and safety can only be protected through full participation as a party to this proceeding to litigate the issues set forth herein. No existing parties will represent Petitioner's interest including the State of South Carolina whose participation has been limited, the Commission Staff which cannot represent the individual interests of Petitioner's members, and the existing Intervenor whose ability to protect Petitioner's interests has been thoroughly analyzed by this Board before , Summer, LBP-81-11, supra, 13 NRC at 427.

There is no other forum available to Petitioner in which to seek to protect its members from harm to their health and safety. This Board is the body charged with that responsibility.

5. That Petitioner believes that the issues presented herein are properly placed into contest before this Licensing Board for adjudication. If the Board were to fail to address these issues and to take evidence on them, the existing record might well permit the use of equipment which is unsafe. Indeed, Applicants apparently admit that operation of the plant at greater than 50% capacity would be unsafe. Under this Board's obligation not to issue a license absent reasonable assurance that the facility can be operated without endangering the health and safety of the public, this significant safety-related issue should be fully explored in an adversarial proceeding to determine whether there is a technical basis for safe operation of the Summer facility. To fail to fully explore these contentions could create a situation fraught with danger to the public. Petitioner believes that only by its participation will the Licensing Board have a complete and sound record produced as the result of a full adversarial proceeding.

6. That, although admission of the contentions sought to be litigated will expand the issues now before the Licensing Board, Petitioner believes that the matters are of such gravity that this Petition should be granted notwithstanding any potential delay. Petitioner would note that Applicants' have again notified the NRC of a delay in fuel load readiness. The Applicants have proven so unable to estimate that fuel load readiness date that the Board should not credit any estimates which they make. One year ago, in opposition to this Petitioner's Petition to Intervene, Applicants' estimated an August 1981 date. (Applicants' Answer To Untimely Petition to Intervene, April 3, 1981, Attachment C-1.)


The full and thorough litigation of these issues by the Petitioner will not delay the proceedings any more than if fully litigated by other participants.

7. That Petitioner believes that a weighing of the five factor test as set forth at 10 CFR 2.714(a) weighs in favor of admitting Petitioner, especially where good cause for the late filing has been shown. Nuclear Fuel Services, Inc. (West Valley Reprocessing Plant), CLI-75-4, 1 NRC 273 (1975).

8. That based upon the foregoing, Fairfield United Action asserts a significant ability to contribute for the Licensing Board's consideration on substantial issues of law and fact which will not otherwise be properly raised or presented absent its participation in this proceeding.

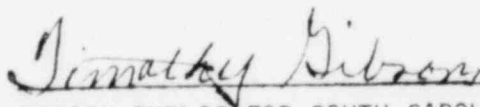
WHEREFORE, having shown good cause and having set forth the contentions sought to be litigated and the bases therefore and having set forth its interest which will be affected in this proceeding and the Affidavits of eight of its members in its Petition to Intervene and Request for Hearings, and Supplement, which Petition and Affidavits are incorporated herein, Fairfield United Action respectfully requests leave to intervene in these proceedings, the conduct of hearings and the denial of this application

for an operating license unless so conditioned as to prevent injury to Petitioner's health, safety and economic interests, or, failing the grant to this Petitioner of leave to intervene, that the Board exercise its sua sponte authority to examine these serious health and safety questions as provided at 10 CFR 2.260(a).

  
John C. Ruoff, Ph.D.  
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AFFIRMED and subscribed

before me this 9<sup>th</sup> day of April 1982.

  
NOTARY PUBLIC FOR SOUTH CAROLINA (L.S.)

My Commission Expires: July 29, 1990

# N-Plant Can't Run Full-Steam

By HOWARD SCHNEIDER  
Staff Writer

Technical problems with the V.C. Summer nuclear plant's steam generators will force the facility to run indefinitely at reduced capacity once it begins operation, according to officials at the South Carolina Electric and Gas Co.

Although there will probably be no delay in the plant's licensing or planned start-up in October, SCE&G officials said the generator difficulty might force the 900-megawatt Jenkinsville facility, which is already four years behind schedule and \$750 million over budget, to run at only 50 percent capacity.

"It looks like a long time before we can go beyond 50 percent," said Mark Whitaker, SCE&G's general manager for nuclear engineering and licensing.

THE PLANT will run at low capacity until the problem, which was discovered in the fall, can be corrected or until further research proves that the generators can safely handle higher operating levels, Whitaker said.

He said engineers at Westinghouse, the company which makes the defective generators, are looking for a way to fix the problem now, but it is uncertain when a solution will be found.

Whitaker said it is also unclear whether SCE&G or Westinghouse will pay for repairs to the Summer plant's three steam generators, which are 67 feet long, weigh several tons, and are estimated to cost up to several million dollars apiece.

However, "Westinghouse sold us a plant that was warranted to work," he said. If it doesn't, then SCE&G will expect the electronics giant to make any needed repairs.

Whitaker said the problem poses no immediate radiation or public safety hazard, but will cost SCE&G "a lot" in lost revenue because of decreased energy production. There are no accurate estimates of how much income will be lost, he said.

SCE&G will not have to purchase energy from an outside source to make up for the Summer plant's difficulties, Whitaker said, because the nuclear facility is designed to supplement and not replace existing energy supplies.

SCE&G owns two-thirds of the Summer plant's power generating capacity, and Santee Cooper owns the rest, he said.

THE PROBLEM with V.C. Summer's steam generators is the same difficulty that led to the shutdown last week of Duke Power Company's McGuire facility, and also to the shutdown in October of a Swedish nuclear power station.

Each of these plants, along with 29 others in the world, are equipped with the Westinghouse's "D" line of steam generators, according to Michael D. Quinton, director of mechanical engineering in SCE&G's nuclear engineering department.

The generators are filled with about 5,000 metal tubes which carry hot water from the nuclear reactor pool and transfer heat to the water in the secondary loop to produce steam to drive electrically generating turbines, Quinton said.

It was discovered first in the Swedish plant and later in the McGuire facility that at high levels of operation some of the tubes, whose walls are 3/64 inches thick, begin rubbing against the metal plates holding them in place. The friction can cause them to rupture and leak the radioactive water from the reactor, Quinton explained.

ACCORDING TO U.S. regulations, any leaks that exceed 1 gallon per minute require the entire plant to be shut down until the rupture is repaired, an expensive and time-consuming operation, Quinton said.

(See DEFECTS, 4-C, Col. 1)

## Defects Limit Nuclear Plant

(Continued From 1-C)

However, he also said that since the radioactive water flowing out of the ruptured tube would still be contained inside the power plant's steam generating system, the leaks pose no immediate threat to the public.

The rubbing action, Quinton said, is caused by an aberrant water flow which only occurs at high levels of operation and which make some of the tubes begin to vibrate.

At lower levels of operation, the water flow returns to normal and the vibration stops, he said.

The Swedish incident which first brought the generator problem to the attention of the nuclear industry. After only 89 weeks of operation, Sweden's Ringhals reactor suffered a tube rupture and had to be shut down, Quinton said.

Westinghouse engineers isolated the problem then, and SCE&G officials were notified of the defect in the D model steam generators in January, he said.

Although research is still being done, Quinton said Westinghouse estimates that the generators can be operated at 50 percent capacity without any unusual wear to the tubes.

However, he emphasized that the 50 percent figure might be modified as more research is done.

DUKE POWER CO., which shut down the McGuire plant after only three months of operation and found that the generator tubes were in fact wearing thin, Friday will ask the Nuclear Regulatory Commission for permission to operate at 75 percent capacity once the damaged tubes are repaired, Quinton said.

The request will probably be made with the understanding that after a certain period of time the plant will be closed again and the generators inspected, he added.

If no tube damage is found, Quinton said it would be safe to assume that the vibration only occurs in the 75 to 100 percent capacity range.

However, both Whitaker and Quinton emphasized that the NRC has not yet issued an opinion on the generator problem. And until the NRC rules on the subject, predictions about where plants with the defective generators will be allowed to operate are only speculative.

Whitaker said he expects the Summer plant to be licensed by the NRC sometime in late April or early May. At that time, he said the federal agency will specify the capacity at which the plant can operate.

Once the license is obtained, it will take several months, probably until October, before the plant actually begins producing electricity, Whitaker said.

Quinton said he is attending a meeting Friday in Pittsburgh where representatives from the NRC, Westinghouse, and nuclear plant owners will discuss possible solutions to the generator difficulty.



# Design defect

By CLIF LeBLANC  
Record Staff Writer

The discovery that some metal tubes in a Westinghouse steam generator identical to the one at the V. C. Summer nuclear plant have worn half way through in five months of operation is going to indefinitely postpone full-power use of the Jenkinsville plant.

Officials of South Carolina Electric & Gas Co., the major owners of the \$1.1 billion, 900-megawatt plant, say they do not know when the design defect will be fixed or when the plant will be able to reach 100 percent power capacity.

"I CAN'T even give you a year," Mark Whitaker, SCE&G's general manager of nuclear engineering and licensing, said when asked how soon company experts think the plant will be able to run at full power.

However, officials said the problem will not delay start-up of the Summer facility, which is scheduled for September or October.

The repairs will be paid for by Westinghouse because the problem is the result of a design defect and the generators are under warranty.

Although SCE&G will not be faced with paying for repairs, it does not know how much money the delay in bringing the plant to full power will cost the company.

The plant already is four years late

NRC says leaking steam tubes  
loom as safety problem for  
nuclear plants. Page 9-C.

and \$750 million over its original budget.

"OUR MANAGEMENT is very interested in the problem," Michael Quinton, of the plant's mechanical and nuclear engineering division, said in characterizing the company's reaction to the latest setback for the beleaguered Summer facility.

The wear on the 3/4-inch metal tubes is the same problem that has forced Duke Power Co. to shutdown its McGuire atomic plant after only three months of operation to inspect for wear problems.

Duke is seeking government permission to restart the plant.

The design defect also closed down a plant in Sweden where the problem was discovered in October 1981 after only five months of full-power operation. A plant in Spain with the same model of Westinghouse steam generator also closed but now is operating at about half power.

The affected tubes, which carry superhot, radioactive water, are wearing heavily from the outside because of vibrations set off by the force of cooling water rushing around them, according to engineers.

THE MOTION from the water

## Worn tubes in steam generator to indefinitely delay full-power use of beleaguered V.C. Summer plant

causes the tiny tubes to rub against the metal support plate that holds them in place. The friction is wearing them out much faster than expected.

The tubes in question are not in the nuclear reactor itself. They are in the generators that are located a few feet from the reactor but inside the reactor building. The generators are connected to the reactor through the system of tubes.

The design defect has sent Westinghouse specialists scrambling to find a solution. And the U. S. Nuclear Regulatory Commission is watching for corrective action by plant owners.

SCE&G's Quinton said Westinghouse believes it has made the design change needed to solve the problem, but tests are not complete.

Even then, he said, SCE&G still must decide if the proposed solution is the best for the Summer plant.

"THE PROBLEM is not completely defined," Quinton said. "The one thing we don't want to do is to go in and implement a fix that's not really a fix."

All the affected plants have the model "D" Westinghouse steam generators (specifically models D-2 and D-3), which have been in use anywhere in the world only about 1 1/2 years, according to Westinghouse spokesman John Burk.

The Summer plant has model D-3. But Quinton said the problem is likely to plague "D" models 2 through 5.

The McGuire plant near Charlotte

## Vibration causes tube wear problem

The wear problem in the Westinghouse steam generator tubes is complex, but a South Carolina Electric & Gas Co. engineer explains it this way.

The V. C. Summer plant is driven by a pressurized water nuclear reactor.

The reactor has two cooling systems called primary and secondary, which are structurally separate.

The primary system contains radioactive water heated to 625 degrees but it is kept under enough pressure to prevent it from boiling.

This superheated water is circulated around the reactor and pumped to a steam generator where the primary system of tubes makes

contact with cooler, non-radioactive water in the secondary system.

The difference in temperatures creates steam which then is used to drive the turbine that produces electricity.

But the force of the water in the secondary system — 965 pounds per square inch which flows at about 15 feet per second — causes a vibration when it circulates around the primary system tubes.

Since these 3/4-inch metal tubes are held in place by metal support plates, the vibration forces the tubes to rub against the support plate, causing heavy wear of the tubes.

The engineer said the pattern of tube wear is different from the way tubes at other plants have worn.

was the only operating plant in the country which has the generators in question.

However, 29 plants around the country that are under construction plan to use the "D" model and 15 have the D-2 and D-3, according to an industry listing.

The Swedish plant had been operating at more than 50 percent power only five months when the tubes ruptured and leaked 2.6 gallons of radioactive water per minute into the plant's secondary water system which is not radi-

oactive, a recently published NRC report on steam generator tube problems shows.

TYPICALLY, in the United States, leaks of that kind require plant shutdown if the leak reaches 1 gallon per minute, an NRC spokesman said.

The size of leakages that require shutdown vary depending on the steam generator design, spokesman Joe Gilliland explained.

(See SUMMER PLANT, 8-A)



## Summer plant

(Continued from 1-A)

The NRC report says that about 100 tubes in the Swedish plant were affected and about 45 "have wall reductions of greater than 50 percent."

Each of the three Westinghouse generators at the Summer plant has 4,674 tubes, the manufacturer said.

In an optimistic note, he said the design problem is not going to affect the plant's timetable through Jan. 1, 1983.

The utility still predicts the plant will be licensed and be operating commercially in September or October 1982.

Loading the nuclear reactor with fuel, testing it at low power, and operating the plant at a safe level of power are expected to continue on schedule, Quinton said.

"WE WILL have completed testing and be at 50 percent power by Jan. 1," Quinton said.

Burk, the Westinghouse spokesman, said the tube problem seems to crop up only when plants are operated at more than 50 percent power.

Even though company officials maintain the problem will not delay

start-up, company stockholders may get a different impression when they read the 1981 annual report.

"The company has not completed its assessment of the effect of this development on the NRC's granting of an operating license or the company's current schedule for commercial operation," the annual report, just off the presses, says.

"However, it is likely to result in delay in the granting of the license, fuel loading and the commencement of commercial operations or in the imposition of conditions to such license."

Company spokesman C. H. "Buddy" Clark explained the discrepancy as utility officials painting the "worst picture" for stockholders.

"Generally, annual reports are more pessimistic rather than optimistic," Clark said of the report which outlines the company's economic outlook.

BUT CLARK added quickly, "That's still not to say that there couldn't be (further delays as projected in the annual report).

Utility officials say they do not know how close to full power they can run the plant as long as the defect

exists, but Quinton added, "We're not going to do anything to jeopardize those units."

They concede, however, the company anticipated full-power operation when the September timetable was announced last year.

Even at half-power, however, the Summer plant would still be half as big as SCE&G's largest conventional plant, the company said.

Despite the annual report, Clark and other SCE&G officials say the tube problem will not become an issue in the licensing of the plant.

"So far," the spokesman said, "we have no indication from the NRC that the license will be withheld because of this."

Whitaker, the utility's manager of nuclear engineering and licensing, agreed.

The Atomic Safety and Licensing Board is now deliberating whether it should OK a license for the plant and a decision is expected in a month to six weeks.

WHITAKER SAID the board learned of the problem in the Swedish plant in January during the closing hours of the hearings.

"The board chose not to raise that issue. So you can say a decision not to act is a decision not to make an issue out of it," Whitaker said.

Concerns about wear on tubes in nuclear power plants, particularly older ones, are drawing growing attention in the atomic industry and in government circles.

The NRC considers tube wear "an unresolved safety issue," but the report said that "continued operation and licensing do not constitute an undue risk to the health and safety of the public."

Just last week in testimony before a congressional subcommittee, Nunzio J. Palladino, chairman of the NRC, said, "There's no question that the problem looms as more serious than we might have thought a few years ago."

Harold Denton, former NRC chairman and now director of the agency's nuclear reactor regulation division, testified that the nation should expect more leaks like the one at the Ginna plant near Rochester, N. Y. in late January.

"We haven't yet learned all the causes (of tube leaks)," Denton told the House energy and power subcommittee.

Generally, tube wear has been caused in two ways.

- Corrosion from within the tubes caused by the interaction of chemicals in the cooling water, tube system design and the kind of materials used, according to the NRC report published in February.

- Mechanical wear such as the example involving the Westinghouse steam generators.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

SOUTH CAROLINA ELECTRIC AND GAS  
COMPANY, et al.

(Virgil C. Summer Nuclear Station,  
Unit 1)

Docket No. 50 - 395

CERTIFICATE OF SERVICE

PERSONALLY appeared before me, John C. Ruoff, who does affirm that he did on this 9th day of April 1982 serve copies of the attached "Petition to Intervene and Request for Hearings" by first class mail, postage prepaid, upon the following persons:

Herbert Grossman, Esq.  
Chairman, Atomic Safety and Licensing  
Board  
U.S. Nuclear Regulatory Commission  
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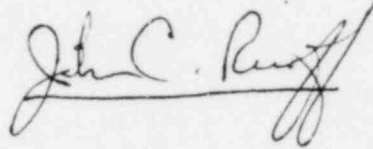
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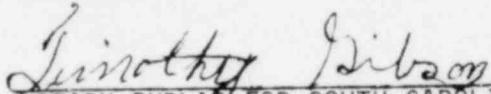
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AFFIRMED to before me this

9<sup>th</sup> day of April 1982.

  
NOTARY PUBLIC FOR SOUTH CAROLINA (L.S.)

My Commission Expires: July 29, 1990