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9/13/84

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

JUN 13 1980

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OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

In Reply Refer To:
RII:JMP
50-325/80-12
50-324/80-11

Carolina Power and Light Company
ATTN: J. A. Jones
Senior Executive Vice President and
Chief Operating Officer
411 Fayetteville Street
Raleigh, NC 27602

Gentlemen:

This refers to the inspection conducted by members of the USNRC Region II staff on March 10-14 and March 29 - April 3, 1980, of activities authorized by NRC Operating License Nos. DPR-71 and DPR-62 for the Brunswick facility.

Areas examined during these inspections and our findings are discussed in the enclosed inspection report. Enforcement action resulting from this inspection was addressed to you in correspondence from our Headquarters dated June 11, 1980.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you (or your contractor) believe to be proprietary, it is necessary that you make a written application within 20 days to this office to withhold such information from public disclosure. Any such application must include a full statement of the reasons on the basis of which it is claimed that the information is proprietary, and should be prepared so that proprietary information identified in the application is contained in a separate part of the document. If we do not hear from you in this regard within the specified period, the report will be placed in the Public Document Room.

Should you have any questions concerning this letter, we will be glad to discuss them with you.

Sincerely,

for James P. O'Reilly
Director

Enclosure:
Inspection Report Nos. 50-325/80-12
and 50-324/80-11

cc: (See Page 2)

NUCLEAR REGULATORY COMMISSION
Docket No. 50-400 Official Exh. No. JI 32
In the matter of Shearon Harris #1
Staff IDENTIFIED ✓
Applicant RECEIVED ✓
Intervenor ✓ REJECTED
Cont'g Off'r
DATE 9-13-84
Witness
WRB

cc w/encl:
A. C. Tollison, Jr.
Plant Manager
Box 458
Southport, NC 28461

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-325/80-12 and 50-324/80-11

Licensee: Carolina Power and Light Company
411 Fayetteville Street
Raleigh, NC 27602

Facility Name: Brunswick

Docket Nos. 50-325 and 50-324

License Nos. DPR-71 and DPR-62

Inspection at Brunswick site, near Southport, North Carolina

Approved by: J. P. Stohr, Chief, FFMS Branch — 6/13/80 Date Signed

SUMMARY

Inspection on March 10-14, 1980 and March 29 - April 3, 1980

Areas Inspected

This routine, unannounced inspection involved 81 inspector-hours on site in the areas of health physics coverage for outage activities, qualifications of health physics personnel and control of radioactive material and 60 inspector-hours on site in the areas of environmental monitoring and investigations concerning the unrestricted area and restricted area radioactive material release from the auxiliary boiler system.

Results

Of the areas inspected, six items of noncompliance were found; Infraction - failure to post a high radiation area - Details I; Violation - failure to keep workers informed of radiation levels - Details I; Infraction - failure to label containers of radioactive material - Details II; Violation - a change was made in the facility as described in the Final Safety Analysis Report without prior Commission approval - Details II; Violation - failure to take required surveys as required by an Emergency Implementing Procedure - Details II; and Infraction - failure to make a written report required by Technical Specifications - Details II.

DETAILS I

Inspectors: John M. Puckett for 6/12/80
L. L. Jackson Date Signed

J. R. Wray 6/12/80
Date Signed

Reviewed by: A F Gibson 6/13/80
A. F. Gibson, Section Chief, FFMS Branch Date Signed

1. Persons Contacted

Licensee Employees

*A. C. Tollison, Jr., Plant General Manager
*J. A. Padgett, Director - Nuclear Safety and Quality Assurance
*R. M. Poulk, NRC Coordinator
*G. H. Warriner, Project Specialist - Environmental
*L. F. Tripp, Environmental and Radiation Control Supervisor
*W. M. Tucker, Manager, Technical and Administrative
*B. H. Webster, Manager, Environmental and Radiation Control

Other licensee employees contacted included four construction craftsmen and four technicians.

Other Organizations

B. Peacock, Supervisor, Contract Health Physics Technicians

NRC Resident Inspector

*J. E. Ouzts

2. Exit Interview

The inspection scope and findings were summarized on March 14, 1980 with those persons indicated in Paragraph 1 above. The items of noncompliance were discussed with the Plant General Manager. The inspector informed those present that the problems pointed out during this inspection indicated basic deficiencies in the health physics program. The Plant General Manager informed the inspector that positive steps would be taken immediately to improve the health physics program in those areas where problems were identified.

3. Licensee Action on Previous Inspection Findings

(Closed) Infraction (50-325/80-03-02 and 50-324/80-03-02) Failure to survey. The inspector surveyed many pieces of equipment and uncontained materials both inside and outside of the plant buildings and found no examples of

loss of control over radioactive materials due to failure to survey. The corrective actions appeared satisfactory to prevent recurrence.

(Closed) Infraction (50-325/80-03-01 and 50-324/80-03-01) Failure to label containers of radioactive materials. The inspector surveyed many containers of radioactive material and found that the corrective actions to ensure that materials are labeled in accordance with 10 CFR 20.203(f) were not adequate. This resulted in a repeat item of noncompliance (50-325/80-12-02 and 50-324/80-11-02). The old item is closed and the new item will be tracked until a satisfactory resolution is reached.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Caution Signs, Labels and Control

a. 10 CFR 20.203(c), high radiation areas, requires that each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words CAUTION (OR DANGER) HIGH RADIATION AREA. The inspectors toured many areas of the plant. For those areas visited it was found that the radiation area and high radiation area signs were generally adequate except for the areas beneath the scram discharge headers. The accumulation of radioactive material in these pipes has caused hotspots of several R/hr on contact with the piping and created some high radiation areas in the vicinity of the piping. The southern most scram discharge header on Unit 2 was causing a high radiation area (dose rates of 120 to 130 mr/hr) to exist approximately six feet above the floor on the southeast end of the header. The inspector observed several people standing in and around the unposted high radiation area. Failure to post this area as a high radiation area constitutes noncompliance with 10 CFR 20.203(c) (50-325/80-12-04 and 50-324/80-11-04). Licensee representatives were advised to be aware of overhead sources of radiation during their surveys and to post overhead radiation areas and high radiation areas as well as those on the normal working levels. Posting overhead areas should preclude workers from erecting ladders or scaffolding in such areas, without adequate health physics coverage.

b. 10 CFR 20.203(f). Containers, requires that each container of licensed material shall bear a durable clearly visible, label identifying the radioactive contents. This label will bear the radiation caution symbol and the words "CAUTION (OR DANGER) RADIOACTIVE MATERIAL. This label is not required for containers which do not contain licensed material in excess of the quantities listed in Appendix C to 10 CFR 20. The inspectors observed many containers, i.e., bags, drums and at least one resin liner, which were not labeled at all or were labeled but not in accordance with 10 CFR 20.203(f). While all of the containers observed would surely not contain more than 10 CFR 20 Appendix C quantities and not require a label, radiation measurements on several containers indicated that the radioactive contents would be in

excess of limits in Appendix C to 10 CFR 20. The inspectors considered the dose rates, container shielding, container volume and self shielding of the contents in making estimates of the radioactivity. One of the containers of particular concern was a disposable demineralizer located immediately southeast of the auxiliary boilers. This container, because of its large size was estimated to contain several times Appendix C quantities of radioactive material. This container, although not labeled properly, did not constitute a significant personnel hazard, however, the container is made of unpainted carbon steel which is subject to corrosion and subsequent leakage. In its present location, any leakage would be directly to the yard. The inspector was informed that this container has not been shipped off as radwaste because of the difficulty in verifying that the free water in the container does not exceed burial ground limits. The inspector suggested that this problem be attended to promptly to preclude having to solve the disposal problem compounded by a leakage problem. The failure to label certain containers of radioactive material in accordance with 10 CFR 20.203(f) is noncompliance (50-325/80-12-05 and 50-324/80-11-05). This is a repeat item of noncompliance (See paragraph 6.a.(1) of report nos. 50-325/80-03 and 50-324/80-03).

6. Use of Radiation Work Permits

a. Technical Specification 6.12, high radiation areas, requires that entrance to a high radiation area be controlled by requiring issuance of a Radiation Work Permit (RWP). The Inspector reviewed several RWP's and noted that some were so broadly written as to be of doubtful benefit. The inspector also made an entry into the Unit 2 drywell to observe work in progress and to evaluate the effectiveness of the RWP system. The inspector observed four workers inside the drywell who had just completed removal of a metal beam from the area adjacent to a recirculation pump. Three of these workers were sitting in an 80-90 mr/hr radiation field while planning their next activity. They stated that they had not been briefed on the radiation levels in the work area and they were not aware that they were sitting near a radiation hotspot sign. Upon being informed of the radiation levels, the workers moved to an area of lower radiation levels to finish their work planning. The Health Physics Technician at the control point stated that he had not briefed the workers because their foreman had been briefed a few days earlier, prior to the start of the work. The inspector informed a Radiation Control and Test (RC&T) Foreman that the manner in which the RWP program was being implemented was inadequate in that workers were not being kept informed of the radiation hazards in the work area. A review of RC&T procedure 0230, Issue and Use of Radiation Work Permits revealed that the procedure was not being followed. Failure to follow procedures is in itself a noncompliance however, the inspector informed plant management that this would be a noncompliance against the more basic requirement of 10 CFR 19.12, Instructions to Workers, which states that all individuals working in or frequenting any portion of a restricted area shall be kept informed of the storage,

transfer, or use of radioactive materials or of radiation in such portions of the restricted area, etc. (50-325/80-12-07 and 50-324/80-11-07). The failure to follow procedures was discussed with management representatives but is not cited separately since the corrective action to ensure compliance with 10 CFR 19.12 should correct the procedure adherence problem also.

b. One remaining problem area which can be related to the lack of specificity on RWP's was observed by the inspector during the Unit 2 drywell entry on March 13, 1980. The workers observed in the drywell had neither a continuously integrating dosimeter with preset alarm, a radiation monitoring device which continuously indicates the dose rate nor the monitoring services of an individual qualified in radiation protection procedures equipped with a radiation dose rate monitoring device. Since the entire drywell is treated as a high radiation area, workers entering the drywell must have at least one of the monitoring devices mentioned above or be accompanied by a person qualified in radiation protection procedures who is equipped with a dose rate monitoring device. Failure to do this is noncompliance with Technical Specification 6.12.1.

7. Personnel Qualifications

a. RC&T Technicians in responsible positions are required by Technical Specifications to meet certain education and experience criteria delineated in ANSI STD 18.1-1971 in order to be considered qualified. An inspector reviewed the resumes of both CP&L Technicians and the contract technicians who were considered to be working in responsible positions in the area of radiation protection and found no items of noncompliance. It was noted however that some of the contractor personnel identified as "Senior Technicians" did not appear to meet the criteria as stated in ANSI 18.1-1971. The contractor was using certain experience and education not specifically allowed by ANSI 18.1-1971 but which was in some cases not specifically disallowed. These individuals had not yet been used in a position of responsibility and thus there was no noncompliance.

b. This information is not intended to imply that the licensee or his contractor intended to intentionally use unqualified personnel in positions of responsibility but to point out that a strict interpretation of ANSI 18.1-1971 is the best course of action when evaluating a person's experience and education to determine his qualifications. There are several questions related to the area of personnel qualification (example: can that portion of a person's formal education which exceeds the education requirements in the ANSI standard be applied toward experience) which will not be addressed here. It is hoped that a revision to ANSI 18.1-1971, which is in draft, will clarify this question. This is an industry wide problem and will not be tracked as an open item related to this report. The licensee agreed that those personnel in question would not be assigned to

responsible positions until they do meet the requirements of ANSI 18.1-1971. The inspectors and licensee representatives discussed the meaning of "responsible position" and the inspectors were satisfied with the licensee's course of action at this time.

8. Followup on a Worker Complaint

a. The NRC Region II office was notified of a complaint from a former employee of the CP&L Brunswick Plant. The former employee alleged that following two different incidents involving possible ingestion and/or inhalation of radioactive material he was not provided with the level of uptake as determined from whole body counts and upon termination, was denied a copy of his dosimetry files. The first incident involved the ingestion of a contaminated liquid and the second incident involved work in an airborne radioactivity area without the protection of a respirator.

b. The inspector reviewed the circumstances of the first incident which occurred on 10/19/79 with an Operating Shift Supervisor who was also involved in the incident. His description of the incident indicated that the complainant had been sprayed in the face with water from the reactor coolant system. The incident is thought to have occurred because the system was not vented prior to removing the flange which allowed the water to leak out. The inspector was told that there was currently no way to vent this particular portion of the reactor coolant cleanup system and to allow it to completely drain. Better work planning will alleviate this problem in the future. A review of the complainant's whole body count which was conducted on 10/23/79 indicated that he had ingested or inhaled 3.1% of the Maximum Permissible Body Burden (MPBB). The inspector also reviewed the Personnel Skin Contamination Record maintained by the RC&T Group at the plant. This record showed that the skin contamination level was less than 200 dpm/100 cm^2 after multiple showers. The whole body count and the Personnel Skin Contamination Record indicate that the exposure from this incident did not exceed regulatory limits and that the radiological hazards were very small.

c. The second incident occurred on February 7, 1980 when the Complainant, while working in the Reactor Building utilizing a respirator was given permission to remove the respirator. Subsequent to removing the respirator, RC&T personnel discovered that a mistake had been made on the air sample results and the individual should not have been permitted to remove his respirator. RC&T personnel performed an evaluation of the airborne concentrations versus the stay times of the individual and determined that he received only 0.377 MPC-hrs. A whole body count performed on February 8, 1980 indicated 3.6% of the MPBB. Dosimetry records for the period July 1979 through February 1980 did not indicate any overexposure from direct radiation. Based on the information reviewed by the inspector it was concluded that no regulatory limits were exceeded and no unusual health risks resulted from the two incidents.

d. As to the refusal of the licensee to provide dosimetry records, it appears that the complainant asked for his personnel records instead of his dosimetry records. The complainant's dosimetry records were available but RC&T personnel were not aware of any requests for these records. Plant management representatives stated that personnel files are not immediately available to individuals because of the necessity to purge reference letters, etc., which were obtained under a promise of confidentiality. Licensees normally keep dosimetry records separate from personnel records and the inspector was informed by a licensee representative that it is plant policy that anyone may request personal dosimetry information directly from the RC&T Group. This information is provided promptly unless the information requested is not available. Whole body counts and TLD evaluations are examples of activities usually performed offsite and for which information might not always be immediately available at the site.

e. The inspector concluded that no overexposures occurred and that dosimetry information was not knowingly withheld. Since the complainant has terminated his employment with the licensee, he must be provided, within 90 days, a report on his exposures to radiation and radioactive material in accordance with 10 CFR 20.408. The inspector had no more questions on this subject.

9. Plant Tour

a. The inspector noted many locations where housekeeping needed to be substantially improved. The lower level of the Radwaste Building had general dose rates of 40-60 mr/hr near the floor due to contamination on the floor (resins and water). It was pointed out to licensee management that these conditions not only contributed to unnecessary exposure to personnel but also to the generation of excessive radwaste and unnecessary demands on RC&T Group resources.

b. The inspectors also expressed a concern over the control of radioactive material outside the primary plant building. A potential for spills to the yard or yard drainage system exists at the Chem-Nuclear Mobile Solidification Unit, the Auxiliary boiler, the water treatment plant, and possibly from a mobile laundry brought in to support the Unit 2 Outage. The most serious potential for leakage to the yard drain system appears to be from the Mobile Solidification Unit. A hose (or pipe) failure or overflow of a radwaste container could allow radioactive waste to flow across the concrete pad to the yard drainage system. The radwaste operations in question are performed in the open and rain could further aggravate leakage problems by flushing contamination into a yard drain before it could be cleaned up. These concerns are similar to those identified in Inspection Report No. 50-325/80-03, paragraph 6.b.

c. The inspectors noted that large scale laundry operations were being conducted onsite in support of the outage. Spot checks of clean laundry revealed residual contamination on the Anti-C clothing but the levels measured were not excessively high. There are no specific regulatory limits concerning contamination on Anti-C's.

DETAILS II

Inspector: John Michael Puckett 6/12/80
J. M. Puckett Date Signed

Reviewed by: A F Gibson 6/13/80
A. F. Gibson, Section Chief, FFMS Branch Date Signed

1. Persons Contacted

Licensee Employees

*A. C. Tollison, Jr., General Manager
*A. M. McCauley, Corporate Nuclear Safety
*W. M. Tucker, Manager, Technical and Administrative
*J. M. Brown, Manager, Operations
*J. A. Padgett, Director, Nuclear Safety and Quality Assurance
*D. N. Allen, Quality Assurance Supervisor
*L. Tripp, E&RC Supervisor
*W. L. Triplett, Administrative Supervisor
*J. A. Kaham, RAdiation Control
*C. E. Rose, Operations Quality Assurance
*W. J. Dorman, Operations Quality Assurance
*D. H. Edwards, Radiological Environmental
*R. M. Poulk, NRC Coordinator
*J. L. Kiser, Radiation Control Engineer

Other licensee employees contacted included five technicians and one operator.

NRC Resident Inspector:

*J. E. Ouzts

NRC Inspectors:

*J. M. Puckett, RII, IE
*G. Gibson, RII, IE

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on April 3, 1980, with those indicated in paragraph 1 above. Particular emphasis was placed in the discussion on the need to identify safety-related items and to appropriately evaluate their significance. Another area of importance stressed in this summary was the need for prompt and effective survey and evaluation of unusual circumstances and occurrences so their significance can be recognized and appropriate remedial action can be promptly taken. During this

meeting, Mr. Tollison, the Plant Manager, made a commitment to the inspector in that: the auxiliary boiler system and the temporary portable boiler presently on site would not have condensate returned as feed until suitable measures such as monitoring and sampling were established to ensure hazardous levels of contamination would not accumulate in the boilers.

An enforcement conference was later held with licensee management. See paragraph 4 for details.

3. Auxiliary Boiler Tube Leak and Environmental Release of Radioactive Material

a. History of Operation of the Auxiliary Boiler System in a Contaminated Status.

In April 1976, IE Inspection Report 76-21 discussed periodic sampling of systems not normally contaminated. A monthly sample of the auxiliary boiler had revealed low-level contamination in the system which had entered via a leak in the 20 gpm waste concentrator. In June 1976, both auxiliary boilers were decontaminated and a flange on the waste evaporator was repaired. As of October 1976, the sampling program revealed no further contamination of the auxiliary boilers. The inspector determined that licensee corrective action was appropriate and had no further questions.

In May 1977, a mechanical jumper (temporary hose) was installed from drain valve V1057 on the 50 gpm waste concentrator steam supply to the waste concentrate tank to supply steam heating to the tank in lieu of corroded electrical heaters. A safety analysis of this change to a system described in the FSAR was not performed by the Plant Nuclear Safety Committee (PNSC) at this time.

On April 24, 1978, after approximately 11 months of operation with the mechanical jumper in place, the auxiliary boilers were shut down for repair. At this time a siphon action due to steam condensation in the auxiliary steam piping took place, drawing concentrated radioactive waste water into the steam piping.

On April 25, 1978, when the auxiliary boilers were restarted, the radioactive material circulated back to the auxiliary boiler and contaminated the feed piping, mud tank, and associated components. Leakage past the seat of regulator bypass valve AS-V107 on the 50 gpm evaporator pressurized the line downstream of the regulator causing relief valve AS-RV-V113 to lift. Part of the contents of the steam line were blown to the atmosphere at the radwaste loading dock. This was a liquid release because the water in the lines had not yet heated and become steam. An estimated 0.65 milliCuries was released to the restricted area. No significant release to the unrestricted area was detected. The licensee submitted LER 1-78-051 to IE via the proper channels.

In May 1978, an IE inspection (Report 78-12) was conducted in response to the LER. It noted that a contractor employee working at the radwaste loading dock was contaminated as a result of the release and his whole body count indicated a Maximum Permissible Body Burden of 2.0 percent. The inspection resulted in an item of noncompliance with 10 CFR 50.59(b) in that the licensee made a change in June 1977, from electrical to steam heating of the radwaste concentrated waste tank without a written safety evaluation being prepared. As corrective action for this item of noncompliance the licensee revised Radwaste Operating Procedure 6, Temporary Heating of the concentrated waste tank, and performed a safety analysis limited to this operation. Efforts were made to decontamina the auxiliary boiler system, and development of a temporary line and hose procedure to include any connections to safety-related or potentially contaminated system was initiated.

On July 28, 1978, Procedure OG-8, Guidelines for Preparation of Mechanical Jumper and Abnormal System Operation Procedure, was approved for use by the PNSC. Its stated purpose is to provide guidelines and instructions for the use of mechanical jumpers and for abnormal system operations not covered by other procedures. However, the guidelines and instructions provided applied only to the use of mechanical jumpers.

Continued operation of the 20 to 50 gpm waste concentrators, and subsequent leakage from them into the return condensate and feed to the auxiliary boilers of radioactive material caused increased concern within the plant chemistry department because of the additional expense due to handling of contaminated waste water. Management recognized that the boilers were contaminated and took several steps to reduce the level of contamination. These steps included use of portable demineralizers, shutdown and hydrolazing, and increased blowdown to radwaste. Nonetheless, the auxiliary boiler system was operated in a contaminated status for about 20 months.

A licensee employee stated that this operation caused problems not anticipated in the system design. Steam heating had to be secured to the service building for two winters to avoid the spread of contamination. The liquid nitrogen vaporizer (CAC system) on the Augmented Offgas Building roof and its surrounding area became contaminated due to condensate leaks. Leakage back through the condensate return lines in the water plant heating system caused contamination to appear in the water treatment plant, and finally, the Auxiliary Boiler Building had to be posted as both a Contaminated Area due to leakage from the system and as a Radiation Area due to the dose rates (40 milliRem/hour) from radioactive material buildup in the boiler mud tank.

The licensee's history of the operation of the auxiliary boiler system showed that in May 1979 the 50 gpm waste concentrator developed many leaks and was declared unserviceable and removed from service. The level of contamination in the auxiliary boilers had again increased, necessitating greater caution with blowdown and additional decontamination efforts. This left the 20 gpm waste concentrator in service

and when radioactivity was discovered in its return lines, it too was removed from service. By November 1979, the stainless steel tube bundle in the 50 gpm waste concentrator had been replaced with one fashioned of inconel and it was returned to service utilizing steam from the contaminated boilers.

b. Events Leading to the Auxiliary Boiler Tube Rupture and Radioactive Material Release to the Environment

On December 26, 1979, a letter was sent from the Chemistry Department at Brunswick Plant to Corporate Headquarters requesting assistance regarding the contaminated auxiliary boilers. This letter made several suggestions, offered some alternative solutions, and concluded with the following comments regarding the economics of this mode of operation:

> "d. If we can get a system such as this working, it should save the company money in the long run because (a) blowdown will reduce the suspended solids in the boiler. Suspended solids cause more carryover in the steam. This may reduce the particulate activity in the steam down to a usable level, (b) the water will not have to be chemically treated prior to discharging it, (c) we will not have the worry of whether the organics will carry over in radwaste and eventually get back to the vessels, (d) any extra water sent to radwaste puts a strain on radwaste because it has to be processed, (e) hopefully after a month or two the activity will be low enough to allow continuous blowdown to the canal, (f) the apparatus could be set up permanently so that when a boiler is shut down and restarted, we could perform the batch blowdown to the holding tank until it is determined that we can shift to a continuous blowdown, (g) it should greatly extend the useful life of the boiler and its associated equipment."

On January 24, 1980, an NRC inspector toured the restricted area at the Brunswick Plant and recorded his findings in Report 50-325/80-03 as follows:

> "The inspector noted a relatively large area around the auxiliary boilers which was roped off and controlled as a contaminated area. It was determined that both auxiliary boilers were contaminated. The easternmost unit was shut down but the other unit was operating. The operating unit is sufficiently contaminated that it is causing a radiation area to exist in the vicinity of the boiler and some of the piping. The inspector measured a dose rate of approximately 40 mR/hr at the north end of the mud drum of the operating unit. Because of contamination in the boiler, the mud drum is not being blown down in a manner consistent with good chemistry control. This increases the likelihood of having a boiler tube leak. If the boiler develops a leak, the contaminated water may leak directly to the ground and enter the ground water or be washed into the storm drain system. Two storm drains are located inside the contaminated area. They carry yard drainage to a pump lift station which pumps the water to a large holding

pond (approximately 60 acres). This pond is sampled for radioactivity on a weekly basis and flow from the pond, as measured by a vee-notch weir, is recorded. Another aspect to this problem is that if the safety valves lift, low-level contamination could be scattered over a wide area around the auxiliary boilers. These concerns were expressed to the plant manager. The inspector will followup on this problem (IFI 50-325/80-03) during subsequent inspections."

On February 14, 1980, a memo was sent from the Chemistry Department at the Brunswick Plant to the Plant E&RC Supervisor. It stated:

"The attached data is an accumulation of the latest isotopic samples taken on the auxiliary boiler system. Page 1 shows isotopes found in samples taken on 24 January 1980 of the steam, feedwater, #1 mud drum and #2 mud drum both before and after filtering the sample.

Pages 2, 3, and 4 shows data from samples taken on 13 February 1980 of the condensate returning to the auxiliary boiler system before and after the 20 gpm concentrator was placed in service. This data strongly points to the possibility of a leak to the condensate returning to the auxiliary boiler system. This is shown by the fact that most isotopes present showed a significant increase after the 20 gpm concentrator was placed in service, and by the fact that I-131 was found in the second sample. The 50 gpm concentrator was in service during both samples."

The following is a tabulation of the data on page 1 of the memo:

Isotope Detected	Steam Concentration (μCi/ml Condensed)	Feed (μCi/ml)	MUD Tank (μCi/ml)
Ar^{41}	1.72×10^{-6}	3.39×10^{-5}	ND
Xe^{131}	2.76×10^{-5}	ND	ND
Xe^{133}	2.83×10^{-5}	ND	ND
Cr^{51}	1.95×10^{-4}	1.21×10^{-4}	1.83×10^{-3}
Mn^{54}	4.09×10^{-5}	3.74×10^{-5}	2.52×10^{-4}
Co^{58}	8.40×10^{-6}	5.47×10^{-6}	2.58×10^{-5}
Co^{60}	ND	4.23×10^{-4}	3.08×10^{-4}
I^{131}	3.63×10^{-4}	2.58×10^{-5}	1.17×10^{-3}
Tc^{99m}	1.74×10^{-6}	ND	ND
Cs^{134}	8.19×10^{-4}	5.01×10^{-5}	4.22×10^{-3}
Cs^{136}	3.64×10^{-5}	ND	ND
Cs^{137}	9.91×10^{-4}	6.90×10^{-5}	5.14×10^{-3}
Sb^{122}	9.34×10^{-5}	5.65×10^{-6}	ND
Ba^{139}	2.43×10^{-6}	ND	ND

ND = not detected

The auxiliary boiler system is not described in the Final Safety Analysis Report (FSAR) as a radioactively contaminated system and no provision is made in the design of this type of boiler to monitor

possible radioactive release nor was containment of radioactive material contemplated in the system component's design. It must be recognized that a distinction exists between the auxiliary steam system and the auxiliary boiler system. The former can be provided with nuclear steam from the Boiling Water Reactor (BWR) and has provisions for the return of condensed steam to the main condenser or the radioactive waste system. Other condensate cross-connections are provided to avoid return of radioactively contaminated condensate to the auxiliary boiler system.

As required by 10 CFR 50.59, the licensee may make changes in the facility as described in the Safety Analysis Report without prior Commission approval, unless the proposed change involves an unreviewed safety question. A proposed change shall be deemed to involve an unreviewed safety question if a possibility for an accident or malfunction of a different type than any evaluated previously in the Safety Analysis Report may be created. The Final Safety Analysis Report does not address operation of the auxiliary boilers as a contaminated system.

The auxiliary boiler system was operated from April 26, 1978, to February 22, 1980, with condensate return water and auxiliary boiler mud tank water contaminated up to approximately 1.3×10^{-2} µCi/ml. On February 22, 1980, an auxiliary boiler tube failure resulted in the release of radioactive material to the unrestricted area in excess of technical specification limits. This type of malfunction was not evaluated in the Final Safety Analysis Report. Performing this change in facility operation without prior Commission approval is in noncompliance (50-325/80-12-01 and 50-324/80-11-01) with 10 CFR 50.59.

This matter was discussed with CP&L at the enforcement conference described later in these details (paragraph 4), and the plant manager was informed of this item of noncompliance at the time of the exit interview.

The inspector reviewed the PNSC minutes from April 1978 to March 1980 and noted that no review had been conducted concerning the operation of the auxiliary steam system in a contaminated mode.

Technical Specification 6.5.1.6.G, states that the Plant Nuclear Safety Committee (PNSC) shall be responsible for review of facility operations to detect potential safety hazards. Failure of the PNSC to review the potential safety hazard of operating the auxiliary boiler system with elevated amounts of radioactive material present in the boiler return condensate and mud tank is in noncompliance (50-325/80-12-01 and 50-324/80-11-01) with Technical Specifications 6.5.1.C.G. Operation of the auxiliary boiler system in a contaminated mode began on April 26, 1978, and continued until February 22, 1980, when the system was shut down due to an auxiliary boiler tube rupture causing the release of radioactive material to the unrestricted area in excess of technical specification limits.

This item of noncompliance was discussed at the enforcement conference on April 15, 1980, and was reviewed with plant management at the exit interview.

c. The Release to the Environs

On February 21, 1980, the No. 1 auxiliary boiler operated without abnormal conditions being observed. The auxiliary operator on watch remembers noting at 8:00 p.m. that the boiler stack gas was clean, but he did not observe it after that time. This indicates the boiler tube leak could have started at any time afterwards up to the next stack observation at 5:00 a.m. on February 22. At that time, the operator noted water dripping from beneath the No. 1 boiler firebox and small amounts of steam was noted coming from the boiler stack. An RC&T technician was requested to sample the leaking water and the affected soil.

The results of the water and soil samples when obtained at about 6:00 a.m. indicated some contamination, about 1000 dpm/100 cm^2. The Shift Operating Supervisor was notified. No air samples were taken, either downwind or in the immediate vicinity of the auxiliary boiler.

Some confusion exists as to why the auxiliary boiler was not immediately shut down. The licensee's chronology of events indicates that it was desired to cool the boiler after shutdown by dragging steam through the liquid nitrogen vaporizer (CAC system). Prior to shutdown a valve in the steam supply to that system was found frozen shut, and by 7:00 a.m. the Shift Operating Supervisor ordered immediate boiler shutdown. The auxiliary boiler was finally cooled to the point that steam was no longer issuing from the stack by 8:00 a.m., a total potential time for the leak to have been occurring of 12 hours. Water still was coming from the firebox and would continue for several hours until the mud tank was drained.

According to the licensee's chronology of events, over the next two days, February 22 and 23, extensive sampling was conducted of both soil and water samples on site to determine the extent of the liquid release. On the afternoon of February 22, the Plant Manager informed the NRC, Region II Office by telephone that a liquid release from the auxiliary boiler had taken place, but that information available to him at that time indicated no release to the unrestricted area was expected as a result of the leak. Samples taken at the lift station, not in operation at the time of the liquid release, indicated some contamination had reached the storm drains, and appropriate measures were taken to ensure there would be no release to the environment via this pathway. The inspector examined results of surveys and had no questions regarding the actions taken.

The Plant E&RC Supervisor stated that on the afternoon of February 22, he directed that the environmental low volume air sample located 1000 yards downwind of the plant be collected and brought into the plant

for analysis. Because of the low volume of the sample and due to the background levels on the plant counting equipment, the results of this sample were deemed to be inconclusive, and it was sent to the New Hill laboratory at the Shearon Harris Nuclear Plant site near Raleigh, North Carolina. The more sensitive counting equipment located there would enable a more accurate analysis to be obtained than was available in the plant. No special priority was attached to the counting of this sample and it entered the flow of routine samples counted at that lab.

Emergency Implementing (EI) Procedure, EI 27.3, entitled Abnormal Release of Radioactive Material - Airborne, requires extensive sampling to be conducted in order to determine the extent of any unmonitored release of radioactive material. Two days prior to the accident this procedure had undergone a minor revision and been reviewed by the PNSC. Its provisions were specific, and had the surveys required been conducted, subsequent calculation (described in another part of these details) would have dictated the declaration of a site emergency. This would have resulted in NRC, State, and other notifications which would have been beneficial to the evaluation of the event. The inspector observed that sufficient information was available to plant personnel at the time of the tube rupture to enable them to gauge the magnitude of the release to the atmosphere through the auxiliary boiler stack.

Technical Specification 6.8.1(e) states that written procedures shall be developed, implemented and maintained relating to emergency plan implementation. Emergency Plan Section 2.1.2 states that releases exceeding the instantaneous radiological technical specifications by a factor of 10 are classified as local emergencies. Also, Emergency Implementing Procedure (EI) 27.3, Abnormal Release of Radioactivity-Airborne, requires surveys to determine the magnitude of releases to unrestricted areas. Failure to initiate surveys to determine the magnitude of release when a boiler tube failure resulted in releasing contaminated steam from the auxiliary boiler stack on February 22, 1980 is in noncompliance (50-325/80-12-02 and 50-324/50-11-02) with Technical Specification 6.8.1. Calculations indicate that the actual release exceeded the T. S. instantaneous release rate limit by a factor greater than 20. Failure to determine the magnitude of the release precluded initiating a local emergency as required by the emergency plan.

This item of noncompliance was reviewed with licensee management as described in Paragraph 4 of these details.

CP&L employees stated that the licensee continued to obtain and analyze environmental samples over the following 31 days before arriving at the conclusion that a significant quantity of radioactive material had been released to the environment. The environmental aspects of the release are described in the Details III section of this report.

d. Determination of Quantity and Rate of Radioactive Release

A licensee representative stated that after the auxiliary boiler had cooled, maintenance personnel entered the firebox and located the ruptured tube. A 1/8-inch diameter hole was found near the middle of a vertical section of the tube, half way between the mud tank and boiler steam drum. This location, during operation of the boiler, is near the steam/water interface and it can be postulated that the physical state of the water was such that as it sprayed into the firebox nearly 100 percent of it turned to steam and was carried out the boiler stack. Plant personnel described the hole as being typical of an erosion type, a condition probably due to the high concentration of suspended solids in the boiler mud tank left there because of the difficulty experienced in blowdown of the highly contaminated water. Blowdown restrictions had also caused the boiler to be operated with an acid pH and this would have contributed to corrosion and rapid tube failure.

Calculations performed by the licensee and reviewed by the inspector determined the liquid flow rate through the boiler tube hole under the observed conditions in the boiler to be 4.61 gal/min. By multiplying this flow rate by the concentration of each isotope present in the January 24 mud tank sample, and summing the products, the licensee calculated and the inspector confirmed the total release rate from the boiler stack to be 3.77 microcuries per second for iodine and radioactive materials in particulate form with half-lives greater than eight days.

The total quantity of radioactive material released was calculated by the licensee and confirmed by the inspector to be approximately 165 millicuries based on the following assumptions:

(1) The release took place over a 12-hour period. This is reasonable and conservative. No observations of the boiler stack were made after 8:00 p.m. on February 21, 1980.

(2) The release was at a uniform flow of 4.61 gpm. Though other failure models could be proposed, a conservative model would assume that once tube-wall breakthrough had occurred, erosion of the hole edges would be quite rapid until some hypothetical equilibrium was attained.

Although it was calculated by the inspector that the concentration of isotopes at the point of release from the boiler stack exceeded restricted area MPC for the mixture by a factor of 41 for 12 hours, it is doubtful that significant personnel exposure due to the release took place within the restricted area due to the elevation of the auxiliary boiler stack and the fact that the particulate activity was entrained in the heated stack gasses. However, if a sample of this gas had been obtained, at the time of the release as required by procedure EI 27.3 the seriousness of the release would have been

apparent and proper and timely action could have been taken (notification of proper authority and extensive immediate environmental sampling, as well as immediate shutdown of the auxiliary boiler).

Calculations of the total release were not put into their final form by the licensee until April 1, 1980, after correction by the inspector. These calculations were possible upon the determination of the tube rupture size because all other information was available to the licensee at that time. Had they been done in a timely manner, the importance of the environmental release would have been apparent at an earlier time.

e. Reporting Requirements

The release of radioactive material to the environment via the auxiliary boiler stack took place on February 22, 1980. As noted below, technical specifications require NRC notification within 14 days of such an event. Written notification was therefore required by March 7, 1980. This written report has not been submitted.

The inspector determined that NRC personnel at the site during the period when evaluations were being made were not informed of the airborne release. The Senior NRC Resident Inspector at the plant site could have been informed by the licensee that efforts were being made to determine the extent of elevated environmental contamination when it was first discovered on February 27, 1980. Also, when two Radiation Specialists were on site for a routine inspection from March 10 to 14, 1980, as described in Details I of this report, they might have been told of the investigation in progress. At that time, some results indicated levels from 10 to 100 times greater than normal background for Cs^{137}.

Technical Specification Appendix B, Section 5.4.2.b, states that a written report shall be made to the Director of the appropriate regional office (copy to the Director of Nuclear Reactor Regulation), within 14 days of an environmental event. Violations of an environmental technical specification, including unplanned release of radioactive materials of significant quantity from the site shall be reported to the NRC within 14 days. On February 22, 1980, a significant quantity of radioactive material, potentially as much as 160 milliCuries by calculations, and at a rate in excess of technical specification limits, was released from the site to the offsite uncontrolled area. Failure to submit a written report within 14 days of the event is in noncompliance with Technical Specification, Appendix B, Section 5.4.2.b (50-325/80-12-03 and 50-324/80-11-03).

As of April 21, 1980, no written report had been submitted. Though notification to the NRC Region II staff had been made by telephone on March 26, 1980, this was 19 days after the report was due.

4. Licensee Enforcement Conference

a. Attendees at the Carolina Power and Light Company - Nuclear Regulatory Commission meeting on April 15, 1980, at the NRC Region II office were:

Carolina Power and Light Company

B. J. Furr, Vice President, Operations
A. C. Tollison, Jr., General Manager, BSEP
A. M. McCauley, Corporate Nuclear Safety
J. L. Kiser, Radiation Control and Test Engineer, BSEP
B. H. Webster, Director, Radiation Control and Environmental Services

Office of Inspection and Enforcement, Region II

J. P. O'Reilly, Director, Region II
J. P. Stohr, Chief, Fuel Facility and Material Safety Branch
R. C. Lewis, Chief, Reactor Operations and Nuclear Support Branch
A. F. Gibson, Chief, Radiation Support Section, FFMS
G. R. Jenkins, Chief, Environmental and Special Projects Section, FFMS
P. J. Kellogg, Chief, Reactor Projects Section No. 3, Reactor Operations and Nuclear Support Branch
J. M. Puckett, Radiation Specialist, Radiation Support Section, FFMS
G. T. Gibson, Radiation Specialist, Environmental and Special Projects Section, FFMS
A. K. Hardin, Project Inspector, Reactor Projects Section No. 3, Reactor Operations and Nuclear Support Branch
J. E. Ouzts, NRC Senior Resident Inspector, BSEP

b. Conference Summary

On April 15, 1980, representatives of Carolina Power and Light Company (CP&L) management met with NRC Region II personnel in Atlanta, Georgia to discuss the environmental release of radioactive material on February 22, 1980, and associated topics and negative inspection findings in Brunswick Plant Health Physics Program. (See Details I.)

The following specific topics were discussed by J. P. Stohr, A. F. Gibson and G. J. Jenkins with CP&L management in attendance. CP&L management responses were as indicated.

(1) Noncompliance with 10 CFR 50.59 and failure of the Plant Nuclear Safety Committee (PNSC) to evaluate an item of potential safety significance.

It was stressed to the licensee that these noncompliances reach to the heart of the problem in that had these requirements been met, the release would have been unlikely.

The licensee stated that the evaluation was not performed because the significance of auxiliary boiler contamination was not recognized.

The licensee also noted that several efforts had been made to clean the auxiliary boiler system.

(2) Instantaneous Technical Specification release rate limits were exceeded by a factor of greater than 20.

It was pointed out to the licensee that procedures were in effect at the time of the accident that could have mitigated the consequences of the event by prompting immediate shutdown of the auxiliary boiler and would also have allowed a more accurate assessment of the environmental insult had these procedures been followed. In addition, an aggressive Health Physics Program would have reacted to the known release of radioactive material.

The licensee agreed that hindsight indicated the response was not adequate and suggested that the significance was not understood at the time of the release. This resulted in a slower reaction than was desirous.

(3) Technical Specification Reporting Requirements

The reporting requirements of Technical Specification Appendix B, Section 5.4.2.b were reviewed with the licensee and it was stressed that these reports are the route by which the NRC obtains information both to ensure compliance and in the case of unusual occurrances, to assist the licensee and protect the public health and safety.

The licensee representatives acknowledged the noncompliance.

It was also pointed out to the licensee that the inspectors involved were concerned that the exchange of information with regard to the release had not been as free and complete as desirable.

A licensee management representative stated emphatically that full cooperation with the NRC is a matter of CP&L policy.

(4) Adequacy of the BSEP Health Physics Program

The four items of noncompliance; failure to inform workers of radiation hazards, failure to post a high radiation area, failure to properly mark radioactive materials, and failure to adhere to the requirements of the licensee's Technical Specifications regarding high radiation areas, were cited, as well as the slow reaction to a significant environmental release of radioactive material, as examples of inadequate performance of the responsibilities of the Health Physics Program.

The licensee agreed that problems in this area existed and have already been recognized.

(5) Followup of Confirmation of Action Letter

On March 28, 1980, a Confirmation of Action letter was sent the licensee by Mr. James P. O'Reilly, Director of Region II. The licensee was asked to review his actions in response to this letter's four items of concern.

The licensee representative indicated that the actions had been taken and described them to the satisfaction of Region II personnel.

(6) The licensee was informed that the NRC was considering application of various enforcement sanctions and that he would receive communication regarding enforcement action to be taken at a later date.

DETAILS III

Prepared by: _____ 6/11/80
G. T. Gibson, Date Signed

Reviewed by: _____ 6/13/80
George R. Jenkins, Section Chief, FFMS Branch Date Signed

Dates of Inspection: April 1-3, 1980

1. Personnel Contacted

Licensee

*A. C. Tollison, Jr., General Manager
*R. M. Polk, NRC Coordinator
*L. Tripp, E&RC Supervisor
*D. Edwards, Radiological Environmental Engineer
*J. L. Kiser, Radiation Control Engineer
H. Caylor, RC&T Technician

Other

R. Price, Brunswick County Agricultural Agent
R. Fehskens, Brunswick County Agricultural Agent
F. Fong, State of North Carolina, North Carolina Department of Human Resources

*Present at exit interview

2. Review of Records Relating to February 22, 1980 Incident

The inspector reviewed the following documents, records and procedures:

a. Brunswick Steam Electric Plant Emergency Plan

b. Emergency Instruction Series EI, including EI27.3, "Abnormal Release of Radioactivity-Airborne".

c. Licensee results of environmental samples collected February 22, February 25, February 28, March 5, March 26, April 11.

d. State of North Carolina, results of environmental samples collected February 1, March 26.

e. NRC results of environmental samples collected March 27.

f. Brunswick Steam Electric Plant, Environmental Surveillance Report(s) January 1, 1979 through December 31, 1979; January 1, 1978 through December 31, 1978; January 1, 1977 through December 31, 1977.

g. Brunswick Steam Electric Plant, Auxiliary Boiler: Chronology of Events, April 1, 1980.

h. BSEP/79-866 - Milch Animal Survey 1979

i. (Untitled), BSEP, Land Use Survey, November 1978

j. (Untitled), BSEP, February 22, 1980 Meteorology

k. National Oceanic and Atmospheric Administration, National Climatic Center, February through March Climatic Data Records, Wilmington, North Carolina Recording Station.

3. Licensee Actions Relating to February 22, 1980 Incident

a. As previously presented in Details II of this report, at approximately 5:00 a.m. on February 22, 1980, a tube leak in the auxiliary boiler released steam into the atmosphere which was observed by licensee personnel. A survey of water under the boiler, at approximately 6:00 a.m. confirmed radioactivity was present. In addition, the inspector was informed licensee personnel, including the plant manager and plant Environmental and Radiation Control supervisor, were aware the auxiliary boiler contained contaminated material.

b. The afternoon of February 22, an environmental low-volume air sample filter, in the downwind sector, was removed and sent to the CP&L New Hill Laboratory for analysis after a cursory scan by plant equipment. No analysis of the magnitude of the release was made, nor were high volume air samples or vent gas samples obtained.

c. On February 27, results of the low-volume air sample were available and indicated increased environmental gross beta activity.

d. On February 28, three terrestrial vegetation (TV) samples (pine needles) were obtained at 500 yard intervals from the plant in the downwind direction. On March 4 the results of the TV samples were available and indicated increased (factor of 142) environmental Cs-137 activity.

e. On March 5, additional TV samples were taken offsite downwind. On March 12, the results of the TV samples were available and indicated increased (factor of 17) environmental Cs-137 activity off site.

f. On March 17, more TV samples were taken offsite downwind. On March 26, the results of the TV samples were available and indicated increased (factor of 52) environmental Cs-137 activity offsite.

g. On March 26, licensee personnel informed the NRC and State of North Carolina of increased environmental radioactivity observed in TV samples. Subsequent samples were obtained by the State of North Carolina and the NRC. The results of all samples by date are presented in Table III.1 and Figure III-1. Correlation of the results to downwind direction is presented in Figure III-2, with wind direction arrows

indicating direction/30 minutes from midnight to 8:30 a.m. with 6:00 a.m. to 8:30 a.m. wind direction shaded.

b. On April 3, the licensee, at NRC request, concluded evaluation of a source term for the accident, of 3.7 μCi/sec, of which 1.5 μCi/sec was Cs-137.

i. The inspector requested on April 3 that a detailed land use survey be performed (completed April 11); on April 16 reviewed the licensee's meteorology; and on April 18, after consulting with NRR specialists in meteorology, requested CP&L to reevaluate the dose impact based upon NRC approved models and calculational techniques.

4. Unusual Events, Local, and Site Emergency Classification

a. The BSEP Emergency Plan Section 9.1 defines an "Unusual Event" as the "a. Instantaneous radiological technical specifications exceeded". Emergency Plan Section 9.2 defines a "Local Emergency" as "Release in excess of 10 times the instantaneous technical specification limits". The technical specification limit is .17 μCi/sec.

Emergency Instruction EI27.3, Section 4.4, "Supplementary Actions" states, "If any of the following limits are exceeded...at the restricted area boundary, refer to the Emergency Plan...airborne particulate activity greater than 300 $\mu Ci/m^3$ = Site Emergency".

b. BSEP Emergency Instruction EI27.3, Section 3.0, "Immediate Actions", Part 2, "Manual Actions", states "c. Isolate the source of airborne activity if instantaneous release limit is greater than Technical Specification limit. d. Take radiation and airborne surveys...". Also, Section 4.0, "Supplementary Actions", Part 2 states, "If, for some reason, the Instantaneous Technical Specification release limits are exceeded...the incident shall be declared an emergency and the Emergency Plan shall be placed into effect".

c. On April 3, 1980, the licensee completed an analysis of the source term of the release. The licensee calculated a release rate of 3.7 μCi/sec. This release rate exceeds the instantaneous technical specification by a factor of approximately 21. On April 16, 1980, the licensee completed the determination of atmospheric dispersion factors (X/Q) for existing meteorological conditions of February 22, 1980. For the time period 5:00 a.m. to 6:00 a.m., when the release was in progress at the calculated 3.7 μCi/sec release rate, the licensee calculated a X/Q of 8.5 E-5 sec/m^3 at the 1000 meter restricted area boundary. This resulted in a calculated restricted area boundary airborne particulate activity of 314 pCi/m^3.

d. The licensee failed to implement EI27.3, and did not determine the instantaneous release rate nor take proper samples to evaluate airborne particulate activity of the release from February 22, 1980 until April 3, 1980. This constitutes an item of noncompliance with Technical Specification 6.8.1.e, requiring implementation of emergency plan implementing procedures (50/324-80-11-02 and 50/324-80-12-02).

e. The inspector discussed with licensee personnel the importance of immediately implementing EI27.3 to assure compliance with the BSEP Emergency Plan. Failure to properly implement EI27.3 resulted in licensee failure to recognize and properly evaluate the potential significance of the unplanned release of airborne radioactivity.

f. During the April 15, 1980 management meeting between CP&L senior management and the NRC, the NRC emphasized the seriousness of the licensee's failure to react promptly and adequately to the unplanned, unmonitored release. Licensee personnel acknowledged that the actions taken did not allow CP&L to realize the magnitude or severity of the event.

5. Environmental Consequences

a. The inspector reviewed available records of environmental samples. It was noted that no food samples were obtained until April 5, 1980. The following items were identified as deficient techniques:

(1) Reliance of TV (pine needle) samples for quantative comparison is not acceptable. Pine needles do not intake radionuclides, but form a surface deposition area. The licensee was unable to provide any correlation documentation relating activity on pine needles to airborne concentrations or foodstuff levels. These samples should "trigger" action to obtain further environmental food samples when elevated levels are observed. This item shall be considered an open item (324/80-11-8 and 325/80-12-08) pending licensee review of sampling and sample selection procedures.

(2) The air samples obtained from the projected maximum airborne concentration (PMAC) location and other locations were from low-volume air samplers (1 cfm) which did not take sufficient sample volume in 3 to 12 hours to allow quantitative analyses to be conducted. In addition, licensee reported results were not adjusted to consider the effect of the short duration release. This item shall be considered an open item (324/80-11-09 and 325/80-12-09) pending licensee review of emergency sampling procedures.

(3) The licensee was unaware, prior to conducting a land use census requested by the inspector, of local gardens and truck farms which were growing and harvesting edible collard greens, cabbage, mustard greens, and turnips during late February and early March. This precluded the licensee from obtaining samples directly exposed to the release, because by April 5, when the land use census was conducted, the crops had been harvested and eaten. The licensee currently does not conduct any land use surveys, to identify potential pathways. Although not an NRC requirement, this item was discussed with licensee representatives at the exit interview and the licensee will review the desirability of performing periodic land use surveys (324/80-11-10 and 325/80-12-10).

b. Since the samples taken from February 22 to April 4 were only terrestrial vegetation, the inspector reviewed these levels against previous background samples. As shown in Table III.1 and Figure III.1, the levels of activity were elevated by a maximum factor of 164 onsite and 51 offsite (9 miles NE at Snow's Cut). However, the licensee acknowledged that the effects of rain and snow (noted in Figure III.1) would act to "wash off" the activity from the pine needles. Table III-2 shows the amount of precipitation, measured by the National Oceanic and Atmospheric Administration, at Wilmington, North Carolina. Currently, there are no studies or documentation available to determine the "retention factor" of pine needles.

c. Upon discovery of gardens at Kure Beach, Wilmington Beach, and gardens and a truck farm at Carolina Beach, the licensee collected edible vegetable samples on April 11, 1980, planted since February 22. The collard green samples from the Kure Beach home garden and Carolina Beach truck farm contained 3.3 E-2 pCi/gm (washed) and 3.2 E-2 pCi/gm (washed), respectively. These samples were also subject to "wash off" as were the pine needles; however, vegetables are usually washed prior to ingestion.

d. The inspector confirmed that if a child consumed 26 kg/yr (12 month average intake) of the collard greens, the resultant dose would be approximately 0.3 mR bone dose and approximately 1 mR whole body.

e. Since the samples taken by the licensee were insufficient to determine airborne concentrations, the inspector reviewed the source term calculations. On April 16, the inspector reviewed preliminary meteorological diffusion (X/Q) analyses prepared by CP&L, based upon plant conditions. On April 18, the inspector requested CP&L to reevaluate the meteorology and dose calculations, and confirm the acceptability of the calculational techniques with the NRC's Office of Nuclear Reactor Regulation, Division of Site Evaluation (324/80-11-11 and 325/80-12-11).

6. Significance of Off-Site Release

Although the dose of 0.3 mR bone and 1 mR whole body from Cs-137 in the collard greens is considered to be below Protective Action Guide (USEPA, 1975) action levels, the fact remains that material was released from the facility and the licensee did not appreciate the potential for offsite consequences.

7. Exit Interview

As discussed in the exit interview section of Details II, the inspector discussed the scope and findings with licensee personnel on April 3, a management meeting was held on April 15, and additional telephone discussions were held April 16, 17 and 18, 1980.

Table 11.1

BRUNSWICK NPS ENVIRONMENTAL ANALYSES

Date Sampled	Date Analyzed	Sample Location	Licensee Result	State Result	NRC Result
2-22 0500	2-22	H20 Under Boiler	~1000 DPM/100 cm^2		
2-22 PM	2-22	PHAC Air	Inconclusive		
	2-27	PHAC Air	.46 pCi/m^3 β		
2-25 PM	2-27	PHAC Air	.46 pCi/m^3 β		
2-28 PM	3-4	TV1 Onsite	9.97 pCi/gm Cs^{137} 7.80 pCi/gm Cs^{134}		
2-28 PM	3-4	TV2 Onsite	2.16 pCi/gm Cs^{137} 1.24 pCi/gm Cs^{134}		
2-28 PM	3-4	TV3 Onsite	.93 pCi/gm Cs^{137} .74 pCi/gm Cs^{134}		
3-5	3-12	TV1 Onsite	8.1 pCi/gm Cs^{137} 6.1 pCi/gm Cs^{134}		
3-5	3-12	TV3 Onsite	1.2 pCi/gm Cs^{137} .54 pCi/gm Cs^{134}		
3-5	3-12	TV 2.1 mi NE	1.2 pCi/gm Cs^{137} .69 pCi/gm Cs^{134}		
3_5	3-12	TV 1.6 mi ENE	.07 pCi/gm Cs^{137}		
3-5	3-12	TV 8.1 mi NE	.94 pCi/gm Cs^{137}		
3-5	3-12	TV 8.1 mi NE	.57 pCi/gm Cs^{137}		
3-17	3-26	TV 9 mi NE	3.66 pCi/gm CS^{137}		

Date Sampled	Date Analyzed	Sample Location	Licensee Result	State Result	NRC Result
3-26	4-2	Air FMAC		.010 pCi/m^3 Cs^{137}	
4-1	4-2	Air FMAC		.006 pCi/m^3 Cs^{137}	
4-1	4-2	Turnup		.008 pCi/gm Cs^{137}	
3-27	4-3	TV 7 miles NNE			.95 pCi/gm Cs^{137}
3-27	4-3	Soil 7 miles NNE			10 pCi/gm Cs^{137}
3-27	4-3	TV 10 miles NNE			.11 pCi/gm Cs^{137}
3-27	4-3	Soil 10 Miles NNE			.19 pCi/gm Cs^{137}
3-27	4-3	TV 10 miles N			.17 pCi/gm Cs^{137}
3-27	4-3	Soil 10 miles N			.30 pCi/gm Cs^{137}
3-27	4-3	TV 15 miles NNE			.14 pCi/gm Cs^{137}
3-27	4-3	Soil 15 miles NNE			.17 pCi/gm Cs^{137}
3-27	4-3	TV 9 miles NE			.17 pCi/gm Cs^{137}
3-27	4-3	TV 8 miles NE			1.33 pCi/gm Cs^{137}
3-27	4-3	TV 5 miles ENE			.22 pCi/gm Cs^{137}
3-27	4-3	TV 1 mile WNW			.33 pCi/gm Cs^{137}
3-27	4-3	TV 1 mile W			<.13 pCi/gm Cs^{137}
4-11	4-14	TV TV1	6.33 pCi/gm Cs^{137}		
4-11	4-14	TV 9 miles NE	.07 pCi/gm Cs^{137}		

Date Sampled	Date Analyzed	Sample Location	Previous Result	Date Result	Notes
3-17	3-26	TV 9 mi NE	.17 pCi/gm Cs^{137}		
3-17	3-26	TV 8 mi ENE	.23 pCi/gm Cs^{137}		
3-17	3-26	TV 7.5 mi ENE	.04 pCi/gm Cs^{137}		
3-17	3-26	TV 6 mi ENE	.07 pCi/gm Cs^{137}		
3-17	3-26	TV 1 mi W	< MDA		
3-17	3-26	TV 1 mi W	.05 pCi/gm Cs^{137}		
3-26	4-2	TV 300 yards NE		11.5 pCi/gm Cs^{137}	(3/27)
3-26	4-2	TV 2000 yards SW		.18 pCi/gm Cs^{137}	
3-26	4-2	TV TV3 Onsite		1.92 pCi/gm Cs^{137}	
3-26	4-2	TV 2000 yards NE		1.28 pCi/gm Cs^{137}	
3-27	4-2	TV 2500 yards NNE		.09 pCi/gm Cs^{137}	
3-26	4-2	TV 2500 yards ENE		.05 pCi/gm Cs^{237}	
3-26	4-2	TV 3000 yards NE	.22 pCi/gm Cs^{137}	.66 pCi/gm Cs^{137}	
3-26	4-2	TV 5 miles E		.02 pCi/gm Cs^{137}	(3/27) 1.12 pCi/gm Cs^{237}
3-26	4-2	TV 7 miles NE		.28 pCi/m^3 Cs^{137}	.36 pCi/m^3 Cs^{137} (3/27)
3-26	4-2	TV 8 miles NE		.32 pCi/m^3 Cs^{137}	(3/27) .14 pCi/m^3 Cs^{137}
3-26	4-2	TV 9 miles NE		.22 pCi/m^3 Cs^{137}	(3/27) .95 pCi/m^3 Cs^{137}
3-26	4-2	TV 13 miles NNE		.08 pCi/m^3 Cs^{137}	(3/27) .67 pCi/m^3 Cs^{137}
3-4	4-2	Air PMAC		.136 pCi/m^3 Cs^{137}	

TABLE III-2

Wilmington, NC

National Oceanic and Atmospheric Administration

National Climatic Center Data Records

Precepitation

February

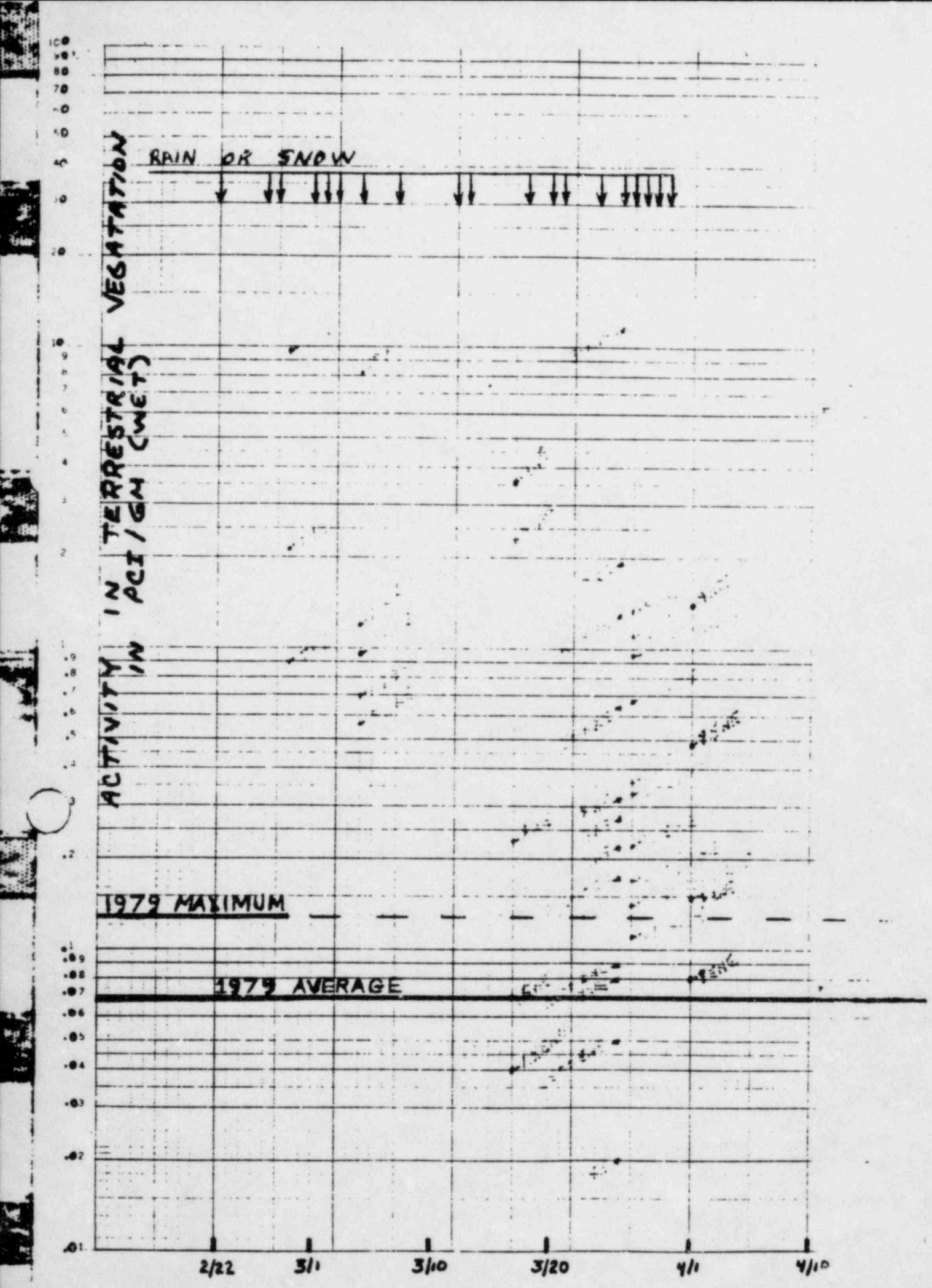
21	Trace
22	.15 in.
25	Trace
26	Trace

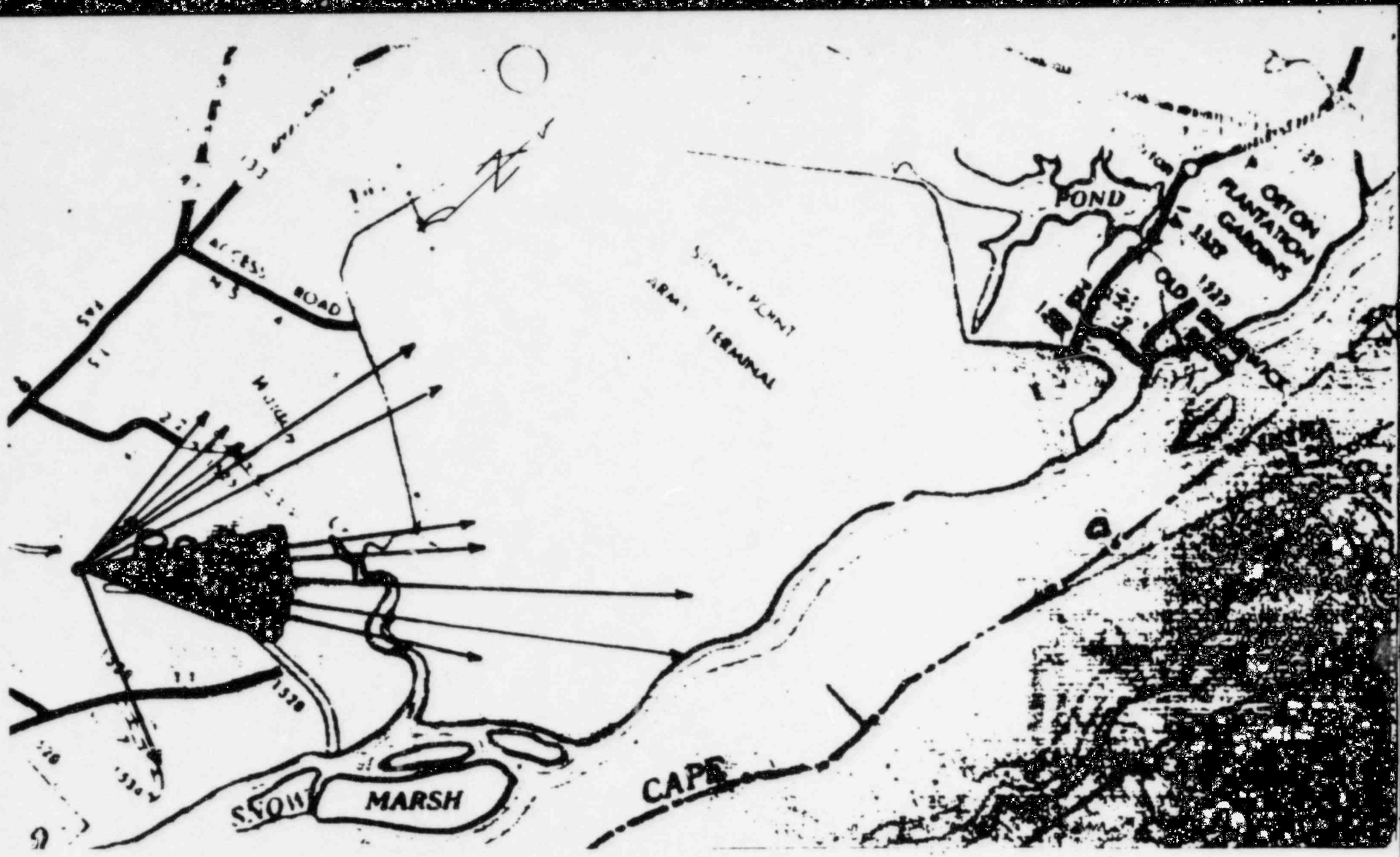
March

1	.43 in. (snow)
2	.92 in. (snow)
3	.02 in. (snow)
5	.04 in.
8	.23 in.
12	.84 in.
13	.74 in.
18	.79 in.

March (Continued)

20	.19 in.
21	.41 in.
24	.30 in.
26	Trace
27	.01 in.
28	.20 in.
29	.51 in.
30	.40 in.
31	Trace


RAIN OR SNOW
ACTIVITY IN TERRESTRIAL VEGETATION
IN PCI/GM (WET)
1979 MAXIMUM
1979 AVERAGE
2/22
3/1
3/10
3/20
4/1
4/10


POND
MARSH
CAPE

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT

UNITS 1 & 2

EMERGENCY INSTRUCTIONS: EI-27.3

ABNORMAL RELEASE OF RADIOACTIVITY - AIRBORNE

Revision No.

9

Recommended By: S. E. [signature] Date: 2-7-79
Operating Supervisor

Approved By: [signature] Date: 2-7-79
Plant Manager

LIST OF EFFECTIVE PAGES

Pages	Revision
1	7
2 - 7	8
APP. A	8
APP. B, i	9
APP. B, ii & iii	8

1.0 Discussion

The purpose of this EI is to specify actions for releases of gaseous activity outside the plant. Releases that are contained within the plant are treated by EI 23. Radioactive gases released from the Reactor Building and Turbine Building exhaust vent and main stack are continuously monitored.

2.0 Symptoms

1. Routine surveys indicate high radiation and/or high airborne activity.

2. Reactor Building Vent Exhaust high radiation alarm annunciates.

3. CAM alarms.

4. Environs Monitoring System radiation level increases.

5. Stack Monitor high radiation alarm annunciates.

6. AOG System Vent radiation high alarm annunciates.

7. Off Gas high radiation alarm annunciates.

8. In case of abnormal release into the Control Building via the ventilation air intake, the Control Building ventilation supply air high radiation alarm will be annunciated.

3.0 Immediate Actions

1. Automatic Actions

a. For abnormal high radiation levels in the Reactor Building ventilation, the Reactor Building supply and exhaust dampers close, fans trip, and the standby gas treatment system initiates from the Reactor Building Vent Exhaust high radiation level (11 mr/hr).

b. If the radiation monitor in the Control Building ventilation air supply duct senses high radiation, the Control Building Ventilation system is isolated and emergency recirculation, with a minimum of makeup, is established through the emergency recirculation filters.

c. In case of high-high off gas radiation, the off gas timer will initiate and isolate the Off Gas system after a time delay of 15 minutes.

2. Manual Actions

a. Determine magnitude of gaseous release by performing calculations in OC 6. If the release is confined to the plant, refer to EI 23.

b. For off gas high radiation refer to EI 26.

c. Isolate the source of airborne activity if instantaneous release limit is greater than Tech. Spec. limit.

3.0 Immediate Actions - (Cont'd)

1. d. Take radiation and airborne surveys. Evacuate personnel to sheltered areas. Respiratory protection is required in areas of high activity.

e. To prevent the spread of airborne activity, maintain the integrity of building spaces by verifying that all outside and in-between personnel access doors, windows, and other openings are closed, and the ventilation systems are working as designed.

f. Calculate the offside exposure isopleth using the nomogram and overlays presented on Pages 3-7 of this instruction. Additional guidance, if necessary, is presented in Appendix B. Function 4 (OD 42) on the operator's panel for the process computer will call up the weather data. Option 0, start weather program on one-hour cycle. Option 1, run program now. Option 2, turn program off. Option 3, bring last good data.

g. If unable to gather isopleth information from computer or RCST, data must be obtained at the MET tower itself. Refer to Appendix A for instructions.

h. If the stack gas abnormal activity is due to a trip of one of the two AOG systems and cannot be reset immediately, revert to double-feed operation with the operable AOG system in service. (Refer to Off Gas OP-33 for double-feed operation.)

j. Reduce the load or shut down the plant if necessary to minimize the release as per instructions of the Shift Foreman.

4.0 Supplementary Actions

1. Minimize personnel exposure and minimize the total release.

2. If, for some reason, a gaseous radioactivity release cannot be brought under control, the incident shall be declared an emergency and the emergency plan shall be placed into effect.

3. If any of the following limits are exceeded in the primary assembly area or at the restricted area boundary, refer to the emergency plan:

Area Radiation greater than 500 mr/hr - General Emergency.
Airborne Iodine activity greater than 9 x 10 - 9 μCi/ml - Site Emergency.
Airborne particulate activity greater than 3 x 10 - 7 μCi/ml - General Emergency.
Any other airborne activity greater than 100 x MPC - General Emergency.

PDR

(3)

JUN 11 1980

Carolina Power and Light Company
ATTN: Mr. J. A. Jones, Senior Executive
Vice-President and Chief Operating
Officer
411 Fayetteville Street
Raleigh, North Carolina 27602

Docket Nos.: 50-324
50-325
EA-80-26

Gentlemen:

On February 22, 1980, there was an unmonitored, uncontrolled release of airborne radioactive material to the environment from the Brunswick facility. This release was due to improper operation of the auxiliary boiler with radioactive contamination present in the boiler mud tank. The environmental consequences of the actual event were minor; however, your failure to recognize the potential safety significance of the situation and the inadequacy of your response to the event are matters of serious concern. This matter was discussed with Mr. B. J. Furr by telephone on March 28, 1980, by Mr. James P. O'Reilly, Director of our Region II office. The results of this conversation and our understanding of your planned corrective actions were discussed in a letter to you from Mr. O'Reilly, dated March 28, 1980. These initial corrective actions were confirmed by our onsite inspection personnel.

In addition, our recent inspection of your radiation protection program revealed several items of noncompliance, one of which was recurrent in nature. Both of these matters were discussed in a meeting held on April 15, 1980, in the Region II office in Atlanta, Georgia, between Mr. James P. O'Reilly, Director of Region II and his staff, and Mr. B. J. Furr and others of your staff.

The situation involving the release of radioactive material indicated a programmatic weakness in the operation of the Brunswick facility. The continued operation of the auxiliary boiler in a contaminated mode for a period in excess of twenty-one (21) months demonstrated weaknesses in your ability to identify, evaluate, and correct, as needed, matters of potential safety significance. The failure to promptly determine the amount of radioactivity released to the atmosphere from the auxiliary boiler tube leak and slowness in assessing the environmental consequences of this release precluded the initiation of a timely response - a matter of serious concern had the significance of the event been more severe. In addition, we are concerned that notification with regard to the airborne release was not made to the NRC until thirty-three (33) days after known radioactively contaminated steam was observed being released from the auxiliary boiler stack.

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

In addition to the weaknesses demonstrated by your inadequate evaluation and response to the auxiliary boiler tube leak, our findings during recent inspections have further demonstrated shortcomings in your overall health physics program. Our findings were confirmed by examples of failure to provide adequate personnel monitoring in high radiation areas, radiation areas not properly posted, containers of radioactive material not properly labeled, and workers not fully informed of radiation levels expected to be encountered.

Therefore, we propose to impose civil penalties for the items of noncompliance set forth in Appendix A to this letter in the cumulative amount of $24,000. Appendix B of this letter is a Notice of Proposed Imposition of Civil Penalties. You are required to respond to this letter; in preparing your response, you should follow the instructions in Appendices A and B.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosures will be placed in the Commission's Public Document Room.

Sincerely,

Original Signed by
V. Stello

Victor Stello, Jr.
Director
Office of Inspection
and Enforcement

Enclosures:
1. Appendix A - Notice of Violation
2. Appendix B - Notice of Proposed Imposition of Civil Penalties

cc w/encl:
A. C. Tollison, Jr.
Plant Manager
Box 458
Southport, NC 28461

SEE PREVIOUS YELLOW FOR CONCURRENCES

Distribution:
PDR
LPDR
NSIC
TIC
ACRS (3)
SECY
VStello, IE
RDeYoung, IE
NMoseley, IE
JSniezek, IE
CA (3)
FIngram, PA
JMurray, ELD
JLieberman, ELD
RHoefling, ELD
JCrooks, MPA
JCummings, OIA
Enforcement Coordinators, RI, RII, RIII, RIV, RV
TBrockett, IE
IE Files
Central Files
Civil Penalty Book
CON
XOOS Reading File
EDO Reading File
JHannon, NRR
HDenton, NRR

J. Ouzts, Resident Inspector
Post Office Box 11057
Southport, NC 28461

Division of Facility Services
ATTN: Dayne H. Brown, Chief
Radiation Protection Section
P. O. Box 12200
Raleigh, NC 27605

Office of the Attorney General
ATTN: Hon. Rufus L. Edmisten
Attorney General
Justice Building
P. O. Box 629
Raleigh, NC 27602

Utilities Commission
ATTN: Mr. Robert Koger
Chairman
Dobbs Building
430 N. Salisbury St.
Raleigh, NC. 27611

APPENDIX A
NOTICE OF VIOLATION

Carolina Power and Light Company
Brunswick

Docket Nos. 50-324 and 50-325
License Nos. DPR-71 and DPR-62
EA-80-26

Based on the NRC inspections conducted on March 10-14, 1980, and March 29 to April 3, 1980, certain of your activities were apparently not conducted in full compliance with NRC requirements as indicated below:

A. 10 CFR 50.59(a) provides that a licensee may make changes in the facility as described in the Final Safety Analysis Report (FSAR) without prior Commission approval, unless the proposed change involves an unreviewed safety question. A proposed change shall be deemed to involve an unreviewed safety question if a possibility of an accident or malfunction of a different type than any evaluated previously in the FSAR may be created. 10 CFR 50.59(b) provides that a licensee is required to maintain records which include a written safety evaluation providing the bases for the determination that the change does not involve an unreviewed safety question.

Technical Specification 6.5.1.7.b states that the Plant Nuclear Safety Committee (PNSC) is specifically responsible for performing the 10 CFR 50.59 safety evaluation. Technical Specification 6.5.1.6 states that the PNSC is specifically responsible for reviewing all proposed changes or modifications to plant systems or equipment that affect nuclear safety and all facility operations to detect potential safety hazards.

Contrary to the above, the auxiliary boiler system was operated from April 25, 1978 to February 22, 1980, with the condensate return water and auxiliary boiler and tank water contaminated up to 1.3×10^{-2} microcuries per milliliter. Operation of the auxiliary boiler system during this period in a contaminated mode constitutes a change in the facility as described in the FSAR. FSAR Section 10.18 describes the auxiliary boiler system. That description contains no indication that this system is to be operated in a contaminated mode and no analysis of the consequences of potential failures in the system when operated in a contaminated condition. Consequently, the operation of the auxiliary boiler as a radioactively contaminated system represented a change in the facility that had not been previously described and evaluated in the FSAR. The PNSC failed to perform the required 10 CFR 50.59 safety evaluation. The PNSC also failed to detect and evaluate the potential safety hazard of the contaminated auxiliary boiler.

This is a violation. (Civil Penalty - $5,000)

B. Technical Specification 6.8.1(e) requires that written procedures be developed, implemented, and maintained relating to emergency plan implementation. Emergency Plan Section 2.1.1 states that releases exceeding the instantaneous radiological Technical Specifications by a factor of 10 are classified as local emergencies. Also, Emergency Implementing Procedure (E.I.) 27.3., Abnormal Release of Radioactivity-Airborne, requires immediate action to determine the magnitude of a release when it occurs and immediate radiation and airborne surveys to further assist in assessing the radiological consequences.

Contrary to the above, immediate actions were not taken to determine the magnitude of release and surveys were not properly initiated when a boiler tube failure resulted in releasing contaminated steam from the auxiliary boiler stack on February 22, 1980. Calculations performed later indicate that the actual release exceeded the Technical Specification instantaneous release rate limit of 0.17 microcuries per second by a factor of 22. Failure to determine the magnitude of the release and the associated radiological consequences precluded initiating a local emergency as required by the emergency plan.

This is a violation. (Civil Penalty - $4,000)

C. Technical Specification, Appendix B, Section 5.4.2.b requires a written report to be made to the Director of the appropriate NRC Regional Office (copy to the Director of Nuclear Reactor Regulation), within 14 days of an environmental event, i.e., violation of an environmental Technical Specification including the unplanned release of radioactive materials of significant quantity from the site shall be reported to the NRC within 14 days.

Contrary to the above, on February 22, 1980, an atmospheric release of a significant quantity of radioactive material occurred at the site. The release was potentially as much as 160 millicuries by calculation and was released at a rate in excess of the Technical Specification limit of 0.17 microcuries per second.

Within the required 14 day period, the NRC was not informed that an airborne release had occurred nor was the required written report submitted.

This is an infraction. (Civil Penalty - $4,000)

D. 10 CFR 20.203(c) requires that each high radiation area be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words CAUTION (or DANGER) HIGH RADIATION AREA.

Contrary to the requirements of 20.203(c), on March 11, 1980, a high radiation area near the southern most scram discharge header in the Unit 2 reactor building was not posted.

This is an infraction. (Civil Penalty - $3,000)

E. 10 CFR 20.203(f)(1) and (2) require that each container of licensed material containing quantities greater than those listed in Appendix C of 10 CFR 20 bear a durable, clearly visible label identifying the radioactive contents and the radiation caution symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL." The label shall also provide sufficient information to permit individuals handling or using the containers, or working in the vicinity thereof to take precautions to avoid or minimize exposures.

Contrary to the requirements of 20.203(f)(1) and (2), during the period March 10-14, 1980, several containers of radioactive material in the Unit 2 Reactor Building, Warehouse "C" and in the plant yard near the auxiliary boilers were not labeled with the appropriate warnings and information. Radiation levels measured by the inspector indicated that the containers contained quantities of radioactive material in excess of those quantities specified in 10 CFR 20, Appendix C, which require labeling. The exceptions to labeling requirements specified by 10 CFR 20.203(f)(3) did not apply.

This is an infraction. A similar item was brought to your attention in a Region II letter dated February 12, 1980. (Civil Penalty $4,000)

F. Technical Specification 6.12.1 requires any individual or group of individuals permitted to enter a high radiation area to be provided with or accompanied by one or more of the following:

1. A radiation monitoring device which continuously indicates the radiation dose rate in the area.

2. A radiation monitoring device which continuously integrates the radiation dose rate in the area and alarms when a pre-set integrated dose is received.

3. An individual qualified in radiation protection procedures who is equipped with a radiation dose rate monitoring device.

10 CFR 19.12 requires all individuals working in or frequenting any portion of a restricted area to be kept informed of radiation in such portions of the restricted area.

Contrary to the above, on March 13, 1980, a group of individuals was observed working in the Unit 2 drywell, a high radiation area, without the required monitoring device(s) or the presence of a qualified individual to monitor for them. This group of individuals had not been informed of the presence of the high radiation levels from a source near their work area and were incurring unnecessary whole body exposures as a result.

This is a violation. (Civil Penalty - $4,000)

This Notice of Violation is sent to you pursuant to the provisions of Section 2.201 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. You are hereby required to submit to this office, within twenty-five (25) days of the date of this letter, a written statement or explanation in reply, including for each item of noncompliance: (1) admission or denial of the alleged item of noncompliance; (2) the reasons for the item of noncompliance, if admitted; (3) the corrective steps which have been taken by you and the results achieved; (4) the corrective steps which will be taken to avoid further noncompliance; and (5) the date when full compliance will be achieved.

Appendix B

NOTICE OF PROPOSED IMPOSITIONS OF CIVIL PENALTIES

Carolina Power and Light Company

Docket Nos. 50-324 and 50-325
License Nos. DPR-71 and DPR-62
EA-80-26

This office proposes to impose civil penalties pursuant to Section 234 of the Atomic Energy Act of 1954, as amended, (42 USC 2282), and to 10 CFR 2.205 in the cumulative amount of Twenty-Four Thousand Dollars for the specific items of noncompliance set forth in Appendix A to the cover letter. In proposing to impose civil penalties pursuant to this section of the Act and in fixing the proposed amount of the penalties, the factors identified in the Statements of Considerations published in the Federal Register with the rule making action which adopted 10 CFR 2.205 (36 FR 16894) August 26, 1971, and the "Criteria for Determining Enforcement Action," which was sent to NRC licensees on December 31, 1974, have been taken into account.

Carolina Power and Light Company may, within twenty-five days of the date of this notice pay the civil penalties in the cumulative amount of Twenty-Four Thousand Dollars or may protest the imposition of the civil penalties in whole or in part by a written answer. Should Carolina Power and Light Company fail to answer within the time specified, this office will issue an order imposing the civil penalties in the amount proposed above. Should Carolina Power and Light Company elect to file an answer protesting the civil penalties, such answer may (a) deny the items of noncompliance listed in the Notice of Violation in whole or in part, (b) demonstrate extenuating circumstances, (c) show error in the Notice of Violation, or (d) show other reasons why the penalties should not be imposed. In addition to protesting the civil penalties in whole or in part, such answer may request remission or mitigation of the penalties. Any written answer in accordance with 10 CFR 2.205 should be set forth separately from your statement or explanation in reply pursuant to 10 CFR 2.201, but you may incorporate by specific reference (e.g., giving page and paragraph numbers) to avoid repetition.

Carolina Power and Light Company's attention is directed to the other provisions of 10 CFR 2.205 regarding, in particular, the failure to answer and ensuing orders; answer, consideration by this office, and ensuing orders; requests for hearings, hearings and ensuing orders; compromise, and collection.

Upon failure to pay any civil penalty due which has been subsequently determined in accordance with the applicable provisions of 10 CFR 2.205, the matter may be referred to the Attorney General, and the penalty, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Atomic Energy Act of 1954, as amended, (42 USC 2282).

Dupe of
8006240057

(3)EA-[illegible]6
Re[illegible]'S.

CP&L

Carolina Power & Light Company

Brunswick Steam Electric Plant
P. O. Box 10429
Southport, N. C. 28461

July 3, 1980

FILE: B09-13514 SERIAL: BSEP/80-1126

Mr. V. Stello, Jr., Director
Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 & 2
LICENSE NOS. DPR-71 AND DPR-62
DOCKET NOS. 50-325 AND 50-324
RESPONSE TO NOTICE OF VIOLATION

Dear Mr. Stello:

Carolina Power & Light Company has received your letter of June 11, 1980, transmitting a Notice of Violation and a Notice of Proposed Impositions of Civil Penalties for the Brunswick Steam Electric Plant.

Enclosed, please find a check in the amount of twenty-four thousand dollars ($24,000) and a response to the Notice of Violations.

Carolina Power & Light Company recognizes the importance of a well-defined and implemented radiation protection and health physics program. Also, the importance of a well-defined safety evaluation program and the associated prompt notification requirements are understood. Carolina Power & Light Company is actively pursuing a course of action that will upgrade its present programs such that as future events occur, they can be evaluated and proper action taken to prevent a violation of regulations or other accepted work codes.

Very truly yours,

B J Furr

B. J. Furr
Vice President
Nuclear Operations

RMP/bd

cc: Mr. R. A. Hartfield
Mr. J. P. O'Reilly

RESPONSE TO ITEMS OF NONCOMPLIANCE
AUXILIARY BOILER RELEASE AND RADIATION PROTECTION PROGRAM

1. Failure to perform a safety analysis on the auxiliary boiler: The failure to recognize the potential for a nonconforming off-site release of radioactive material was the reason for not performing an analysis and establishing an activity limit once the boiler became contaminated. Establishment of an upper activity level would have prevented a release that would exceed technical specifications. On the day of the initial contaminating event (April 26, 1978), the NRC Region II office was notified by telephone. On April 28, 1978, a more detailed confirmation letter was sent from the Brunswick Plant Manager to Mr. R. F. Sullivan of the NRC Region II office (see enclosed letter). On subsequent occasions, difficulties experienced decontaminating the auxiliary boilers and trying to keep them decontaminated had been discussed with NRC inspectors. Both the volume and activity level of the auxiliary boilers have been low when compared with storage tanks on the plant site. The failure to recognize the ability of the auxiliary boilers to volatalize the boiler contents appears to be the key factor that was overlooked in informally considering the potential for a problem. The following corrective actions have been taken with regard to the auxiliary boiler:

   a. The boiler has been removed from service for decontamination and repair. Modifications to preclude a recurrence of a similar problem are presently under investigation.

   b. A package boiler has been installed for the interim period. Prior to initial operation, a radiological safety analysis was performed. RC&T Procedure 1050 (approved April 1, 1980) was developed to establish a maximum operating concentration of radioactivity in the boiler (as per the safety analysis. This procedure also requires daily sampling for radioactivity during periods of boiler operation.

   c. This incident is being included in the operator retraining program.

   d. A review was conducted at Carolina Power & Light Company's H. B. Robinson Plant to assure that a similar event could not occur there.

   e. An indepedent audit was conducted in June 1980, of CP&L's health physics/contamination control programs by a team of well known health physics authorities.

   f. In accordance with IE Bulletin 80-10, a review has been made to identify similar types of problems.

This type of event has been recognized as an industry-wide concern, and has resulted in the issuance of NRC IE Bulletin 80-10, which requires a written response from all NRC licensees after reviewing their facilities for similar potential events.

2. Failure to declare a local emergency in the auxiliary boiler release: The reason for the [illegible] was because the auxiliary boiler was not a [illegible] and the initial evaluation did not indicate that [illegible] of an emergency. Therefore, quanti- [illegible] released [illegible] was not possible in the same manner as [illegible] Reactor Buildings, Turbine Buildings, and main [illegible] limits were thought to have been [illegible] guidelines were exceeded based on a [illegible]. These calculations were [illegible], and several general [illegible] radioactivity released via [illegible]. In actuality, a large [illegible] the boiler and contained [illegible] the quantification was [illegible]. this information was made [illegible] no need to declare a local [illegible]

[illegible] Procedure [illegible] (approved April [illegible] operating limits for [illegible] not result in exceeding [illegible]

[illegible] April [illegible], 1980.

3. [illegible]: At the time of the incident, [illegible] notification was required. The [illegible] liquid spill were reported to [illegible] on February 22, 1980, as a matter [illegible] limits were known to have [illegible] of Mr. [illegible] on [illegible] was discussed. At that [illegible] did not indicate that a [illegible] had occurred, nor that [illegible] was notified by [illegible] Carolina Beach, [illegible] limit had been [illegible] following the February [illegible] and extent of the [illegible] to Mr. J. P. [illegible] which was, in fact, [illegible] techniques.

[illegible] event of a future incident [illegible] radioactivity of significant [illegible] it is the intention of Carolina Power & Light Company to report [illegible] a timely manner.

The [illegible] actions associated with this item have been completed.

Failure to post a high radiation area: The failure to post this area as a high radiation area apparently occurred as the result of an inadequate survey. The radiation in this area was found to be 120 mR by the inspector, which was greater than the 100 mR limit above which the area must be posted as a high radiation area. Only a small portion of the upper body could have been exposed to ionizing radiation in excess of 100 mR/hr at anytime. The intent of this regulation is to assure that personnel working in or near a high radiation area are aware of the area so they can minimize their personal exposure by avoiding the area or spending as little time as possible in the area. This area had been previously surveyed and recognized as an area where one could be exposed to significant radiation. As such, this area was posted with signs instructing people not to loiter. Although the posting did not satisfy the high radiation area posting requirements, the intent of minimizing personnel exposure had been accomplished.

To prevent a recurrence of this incident, the importance of performing adequate surveys was stressed to all RC&T technicians. This corrective action was completed prior to April 1, 1980. In addition, consideration is being given to modifying the ocean discharge header to allow flushing, and thereby reducing radiation levels.

Periodic surveys in the area apparently indicated levels of radiation less than 100 mR/hr prior to this incident. It is possible that some buildup of radioactivity may have resulted from the operation of the control rod drives, which draw some water from the bottom of the reactor pressure vessel, a primary source of activated corrosion products. During the NRC inspection, the radiation levels, as measured by the NRC, increased from less than 100 mR/hr to as high as 150 mR/hr by the end of the week.

3. Failure to label contaminated material in the plant: As stated in the Notice of Violation, a similar item was brought to the attention of Carolina Power & Light Company in an NRC Region II letter, dated February 12, 1980. Upon receiving this notice, a program was undertaken to assure that containers of licensed material were labeled in full compliance with 10CFR20.203. Prior to this time, these containers were labeled in a way previously considered to be acceptable, and most were packaged and labeled in accordance with applicable DOT shipping regulations. The first step in this program was to obtain a sufficient number of radioactive material labels to complete the job. At the time of the March 10-14, 1980 inspection, labels had not been obtained from the manufacturer in sufficient quantities to bring the container labeling program into full compliance with 10CFR20.203. This program is now fully operational. In order to prevent a recurrence of this problem, RC&T technicians have been reinstructed to survey and post radioactive material containers in accordance with federal regulations. This corrective action was completed prior to April 1, 1980. In addition, an administrative instruction has been written to improve plant housekeeping, thus reducing the quantity of low level radioactive waste produced. This procedure, AI-17, Plant Housekeeping, was approved and issued on June 25, 1980.

6. Individual in a high radiation area without proper monitoring equipment: In this event, a contract Health Physics (HP) technician had been assigned to provide continuous monitoring and inform workers of potential hazards to meet the Technical Specification requirements. The technician assigned to this duty left the drywell immediately prior to the entrance of the NRC inspector. A second technician at the drywell checkpoint realized what had happened, but felt the job was adequately covered due to a remote dose rate instrument located in the work area with an audible alarm. The following corrective actions have been taken to prevent a recurrence of this situation:

a. The contract technician assigned to drywell coverage has been terminated from work at CP&L facilities for failure to adequately perform the HP duties associated with the job. This action was completed on the same day the inspector informed the NRC Supervisor of his findings.

b. The NRC Supervisor has instructed the HP checkpoints to maintain continuous health physics coverage in all high radiation areas where work is in progress, without use of the remaining two monitoring options of Technical Specification 6.12.1 is available. This action was completed prior to April 1, 1980.

c. The training program for contract HP personnel has been expanded, with increased emphasis of 10CFR20 monitoring requirements and the need to maintain personnel exposures as low as reasonably achievable (ALARA). HC&T Procedure 0000: Contract Health Physics Technician Orientation, was approved on June 25, 1980, to implement this corrective action. This expanded coverage has also been applied in the orientation and training of CP&L HP personnel.

d. Additional experienced contract HP personnel were added to the existing staff to provide increased job coverage during the 1980 refueling/ maintenance outages.

e. Twelve portable dose rate instruments (Dosimeter Corporation of America Mini-Rad) have been ordered. Three of these devices arrived at BSEP in early June.

f. Approximately 12 portable alarming dosimeters (Panasonic Digital Alarm Dosimeter) have been purchased and are currently on site.

g. To enhance health physics coverage of jobs in progress, a significant reduction in construction and contract labor forces was implemented and the Unit No. 1 refueling/maintenance outage was split with some major work being delayed until fall 1980.