

December 4, 1992

Docket Nos. 50-325  
and 50-324

Mr. R. A. Watson  
Senior Vice President  
Nuclear Generation  
Carolina Power & Light Company  
Post Office Box 1551  
Raleigh, North Carolina 27602

Dear Mr. Watson:

SUBJECT: ISSUANCE OF AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. DPR-71 AND AMENDMENT NO. 190 TO FACILITY OPERATING LICENSE NO. DPR-62 REGARDING - BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2, (TAC NOS. M84408 AND M84409)

The Nuclear Regulatory Commission has issued the enclosed Amendment No.159 to Facility Operating License No. DPR-71 and Amendment No. 190 to Facility Operating License No. DPR-62 for Brunswick Steam Electric Plant, Units 1 and 2. The amendments change the Technical Specifications (TS) in response to your submittal dated August 25, 1992.

The amendments change the TS to increase the acceptable limits for control rod average scram insertion times from 0.040 to 0.049 seconds for each of the rod positions listed in TS 3.1.3.3. and 3.1.3.4. In addition, the values of  $\mu$ ,  $\sigma$  and  $\tau_A$  specified in TS 3.2.2.2 would be revised.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's bi-weekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY:

Ronnie H. Lo, Senior Project Manager  
Project Directorate II-1  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 159 to License No. DPR-71
2. Amendment No. 190 to License No. DPR-62
3. Safety Evaluation

cc w/enclosures:  
See next page

\*See previous concurrence

OFC	LA:PD21:DRPE	PE:PD21:DRPE	PM:PD21:DRPE	OGC*	D:PD21:DRPE
NAME	SLittle	CCarpenter:tms	RHLo	JHu11	EAdensam
DATE	12/4/92	12/4/92	12/4/92	11/25/92	12/4/92

Document Name: BRN84408.AMD

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

December 4, 1992

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and 50-324 -

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Senior Vice President  
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The amendments change the TS to increase the acceptable limits for control rod average scram insertion times from 0.040 to 0.049 seconds for each of the rod positions listed in TS 3.1.3.3. and 3.1.3.4. In addition, the values of  $\mu$ ,  $\sigma$  and  $\tau_A$  specified in TS 3.2.2.2 would be revised.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's bi-weekly Federal Register Notice.

Sincerely,

Ronnie H. Lo, Senior Project Manager  
Project Directorate II-1  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 159 to License No. DPR-71
2. Amendment No. 190 to License No. DPR-62
3. Safety Evaluation

cc w/enclosures:  
See next page

Mr. R. A. Watson  
Carolina Power & Light Company

Brunswick Steam Electric Plant  
Units 1 and 2

cc:

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State of South Carolina  
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AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. DPR-71 BRUNSWICK, UNIT 1  
AMENDMENT NO. 190 TO FACILITY OPERATING LICENSE NO. DPR-62 BRUNSWICK, UNIT 2

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-325

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 159  
License No. DPR-71

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated August 25, 1992, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. DPR-71 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 159, are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: December 4, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 159

FACILITY OPERATING LICENSE NO. DPR-71

DOCKET NO. 50-325

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

Remove Pages

Insert Pages

3/4 1-6

3/4 1-6

3/4 1-7

3/4 1-7

3/4 2-3

3/4 2-3

3/4 2-4

3/4 2-4

REACTIVITY CONTROL SYSTEMS

CONTROL ROD AVERAGE SCRAM INSERTION TIMES

LIMITING CONDITIONS FOR OPERATION

---

3.1.3.3 The average scram insertion time of all OPERABLE control rods from the fully withdrawn position, based on de-energization of the scram pilot valve solenoids as time zero, shall not exceed any of the following:

<u>Position Inserted From</u> <u>Fully Withdrawn</u>	<u>Average Scram Inser-</u> <u>tion Time (Seconds)</u>
46	0.358
36	1.096
26	1.860
6	3.419

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

With the average scram insertion time exceeding any of the above limits, be in at least HOT SHUTDOWN within 12 hours.

SURVEILLANCE REQUIREMENTS

---

4.1.3.3 All control rods shall be demonstrated OPERABLE by scram time testing from the fully withdrawn position as required by Surveillance Requirement 4.1.3.2.



REACTIVITY CONTROL SYSTEMS

FOUR CONTROL ROD GROUP SCRAM INSERTION TIMES

LIMITING CONDITION FOR OPERATION

---

3.1.3.4 The average scram insertion time, from the fully withdrawn position, for the three fastest control rods in each group of four control rods arranged in a two-by-two array, based on deenergization of the scram pilot valve solenoids as time zero, shall not exceed any of the following:

<u>Position Inserted From Fully Withdrawn</u>	<u>Average Scram Inser- tion Time (Seconds)</u>
46	0.379
36	1.162
26	1.971
6	3.624

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

With the average scram insertion times of control rods exceeding the above limits, operation may continue and the provisions of Specification 3.0.4 are not applicable provided:

- a. The control rods with the slower than average scram insertion times are declared inoperable,
- b. The requirements of Specification 3.1.3.1 are satisfied, and
- c. If within the preset power level of the RWM, the requirements of Specification 3.1.4.1.d are also satisfied, and
- d. The Surveillance Requirements of Specification 4.1.3.2.c are performed at least once per 92 days when operation is continued with three or more control rods with slow scram insertion times.

Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

---

4.1.3.4 All control rods shall be demonstrated OPERABLE by scram time testing from the fully withdrawn position as required by Surveillance Requirement 4.1.3.2.

POWER DISTRIBUTION LIMITS

3/4.2.2 MINIMUM CRITICAL POWER RATIO (ODYN OPTION B)

LIMITING CONDITION FOR OPERATION

3.2.2.2 For the OPTION B MCPR limits provided in the CORE OPERATING LIMITS REPORT to be used, the cycle average 20% (notch 36) scram time ( $\tau_{ave}$ ) shall be less than or equal to the OPTION B scram time limit ( $\tau_B$ ), where  $\tau_{ave}$  and  $\tau_B$  are determined as follows:

$$\tau_{ave} = \frac{\sum_{i=1}^n N_i \tau_i}{\sum_{i=1}^n N_i}, \text{ where}$$

- i = Surveillance test number,
- n = Number of surveillance tests performed to date in the cycle (including BOC),
- $N_i$  = Number of rods tested in the  $i^{th}$  surveillance test, and
- $\tau_i$  = Average scram time to notch 36 for surveillance test i

$$\tau_B = \mu + 1.65 \left( \frac{N_1}{\sum_{i=1}^n N_i} \right)^{1/2} (\sigma), \text{ where:}$$

- i = Surveillance test number
- n = Number of surveillance tests performed to date in the cycle (including BOC),
- $N_i$  = Number of rods tested in the  $i^{th}$  surveillance test
- $N_1$  = Number of rods tested at BOC,
- $\mu$  = 0.830 seconds  
(mean value for statistical scram time distribution from de-energization of scram pilot valve solenoid to dropout on notch 36),
- $\sigma$  = 0.019 seconds  
(standard deviation of the above statistical distribution)

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 25% RATED THERMAL POWER.

POWER DISTRIBUTION LIMITS

LIMITING CONDITIONS FOR OPERATION (Continued)

ACTION:

Within twelve hours after determining that  $\tau_{ave}$  is greater than  $\tau_B$ , the operating limit MCPRs shall be either:

- a. Adjusted for each fuel type such that the operating limit MCPR is the maximum of the non-pressurization transient MCPR operating limit specified in the CORE OPERATING LIMITS REPORT or the adjusted pressurization transient MCPR operating limits, where the adjustment is made by:

$$MCPR_{adjusted} = MCPR_{option B} + \frac{\tau_{ave} - \tau_B}{\tau_A - \tau_B} (MCPR_{option A} - MCPR_{option B})$$

where:  $\tau_A = 1.096$  seconds, control rod average scram insertion time limit to notch 36 per Specification 3.1.3.3,

MCPR<sub>option A</sub> = Specified in the CORE OPERATING LIMITS REPORT,  
MCPR<sub>option B</sub> = Specified in the CORE OPERATING LIMITS REPORT, or,

- b. The OPTION A MCPR limits specified in the CORE OPERATING LIMITS REPORT.

SURVEILLANCE REQUIREMENTS

4.2.2.2 The values of  $\tau_{ave}$  and  $\tau_B$  shall be determined and compared each time a scram time test is performed. The requirement for the frequency of scram time testing shall be identical to Specification 4.1.3.2.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-324

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 190  
License No. DPR-62

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated August 25, 1992, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. DPR-62 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 190, are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: December 4, 1992

ATTACHMENT TO LICENSE AMENDMENT NO. 190

FACILITY OPERATING LICENSE NO. DPR-62

DOCKET NO. 50-324

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

Remove Pages

3/4 1-6

3/4 1-7

3/4 2-3

3/4 2-4

Insert Pages

3/4 1-6

3/4 1-7

3/4 2-3

3/4 2-4

REACTIVITY CONTROL SYSTEMS

CONTROL ROD AVERAGE SCRAM INSERTION TIMES

LIMITING CONDITIONS FOR OPERATION

---

3.1.3.3 The average scram insertion time of all OPERABLE control rods from the fully withdrawn position, based on de-energization of the scram pilot valve solenoids as time zero, shall not exceed any of the following:

<u>Position Inserted From Fully Withdrawn</u>	<u>Average Scram Inser- tion Time (Seconds)</u>
46	0.358
36	1.096
26	1.860
6	3.419

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

With the average scram insertion time exceeding any of the above limits, be in at least HOT SHUTDOWN within 12 hours.

SURVEILLANCE REQUIREMENTS

---

4.1.3.3 All control rods shall be demonstrated OPERABLE by scram time testing from the fully withdrawn position as required by Surveillance Requirement 4.1.3.2.

REACTIVITY CONTROL SYSTEMS

FOUR CONTROL ROD GROUP SCRAM INSERTION TIMES

LIMITING CONDITION FOR OPERATION

---

3.1.3.4 The average scram insertion time, from the fully withdrawn position, for the three fastest control rods in each group of four control rods arranged in a two-by-two array, based on deenergization of the scram pilot valve solenoids as time zero, shall not exceed any of the following:

<u>Position Inserted From</u> <u>Fully Withdrawn</u>	<u>Average Scram Inser-</u> <u>tion Time (Seconds)</u>
46	0.379
36	1.162
26	1.971
6	3.624

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

With the average scram insertion times of control rods exceeding the above limits, operation may continue and the provisions of Specification 3.0.4 are not applicable provided:

- a. The control rods with the slower than average scram insertion times are declared inoperable,
- b. The requirements of Specification 3.1.3.1 are satisfied, and
- c. If within the preset power level of the RWM, the requirements of Specification 3.1.4.1.d are also satisfied, and
- d. The Surveillance Requirements of Specification 4.1.3.2.c are performed at least once per 92 days when operation is continued with three or more control rods with slow scram insertion times.

Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

---

4.1.3.4 All control rods shall be demonstrated OPERABLE by scram time testing from the fully withdrawn position as required by Surveillance Requirement 4.1.3.2.



## POWER DISTRIBUTION LIMITS

### 3/4.2.2 MINIMUM CRITICAL POWER RATIO (ODYN OPTION B)

#### LIMITING CONDITION FOR OPERATION

3.2.2.2 For the OPTION B MCPR limits provided in the CORE OPERATING LIMITS REPORT to be used, the cycle average 20% (notch 36) scram time ( $\tau_{ave}$ ) shall be less than or equal to the OPTION B scram time limit ( $\tau_B$ ), where  $\tau_{ave}$  and  $\tau_B$  are determined as follows:

$$\tau_{ave} = \frac{\sum_{i=1}^n N_i \tau_i}{\sum_{i=1}^n N_i}, \text{ where}$$

- $i$  = Surveillance test number,
- $n$  = Number of surveillance tests performed to date in the cycle (including BOC),
- $N_i$  = Number of rods tested in the  $i^{th}$  surveillance test, and
- $\tau_i$  = Average scram time to notch 36 for surveillance test  $i$

$$\tau_B = \mu + 1.65 \left( \frac{N_1}{\sum_{i=1}^n N_i} \right)^{1/2} (\sigma), \text{ where:}$$

- $i$  = Surveillance test number
- $n$  = Number of surveillance tests performed to date in the cycle (including BOC),
- $N_i$  = Number of rods tested in the  $i^{th}$  surveillance test
- $N_1$  = Number of rods tested at BOC,
- $\mu$  = 0.830 seconds  
(mean value for statistical scram time distribution from de-energization of scram pilot valve solenoid to dropout on notch 36),
- $\sigma$  = 0.019 seconds  
(standard deviation of the above statistical distribution)

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 25% RATED THERMAL POWER.

POWER DISTRIBUTION LIMITS

LIMITING CONDITIONS FOR OPERATION (Continued)

---

ACTION:

Within twelve hours after determining that  $\tau_{ave}$  is greater than  $\tau_B$ , the operating limit MCPRs shall be either:

- a. Adjusted for each fuel type such that the operating limit MCPR is the maximum of the non-pressurization transient MCPR operating limit specified in the CORE OPERATING LIMITS REPORT or the adjusted pressurization transient MCPR operating limits, where the adjustment is made by:

$$\text{MCPR}_{\text{adjusted}} = \text{MCPR}_{\text{option B}} + \frac{\tau_{\text{ave}} - \tau_B}{\tau_A - \tau_B} (\text{MCPR}_{\text{option A}} - \text{MCPR}_{\text{option B}})$$

where:  $\tau_A = 1.096$  seconds, control rod average scram insertion time limit to notch 36 per Specification 3.1.3.3,

$\text{MCPR}_{\text{option A}}$  = Specified in the CORE OPERATING LIMITS REPORT,  
 $\text{MCPR}_{\text{option B}}$  = Specified in the CORE OPERATING LIMITS REPORT, or,

- b. The OPTION A MCPR limits specified in the CORE OPERATING LIMITS REPORT.

SURVEILLANCE REQUIREMENTS

---

4.2.2.2 The values of  $\tau_{ave}$  and  $\tau_B$  shall be determined and compared each time a scram time test is performed. The requirement for the frequency of scram time testing shall be identical to Specification 4.1.3.2.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. DRP-71  
AND AMENDMENT NO. 190 TO FACILITY OPERATING LICENSE NO. DPR-62  
CAROLINA POWER & LIGHT COMPANY  
BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2  
DOCKET NOS. 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated August 25, 1992, Carolina Power & Light Company requested changes to the Technical Specifications (TS) for the Brunswick Steam Electric Plant, Units 1 and 2. The proposed changes would increase the acceptable limits for control rod average scram insertion times from 0.040 to 0.049 seconds for each of the rod positions listed in TS 3.1.3.3 and 3.1.3.4. In addition, the proposed changes would revise the values of  $\mu$ ,  $\sigma$ , and  $\tau_A$  in TS 3.2.2.2.

Technical Specifications 3.1.3.3 and 3.1.3.4 ensure that control rod insertion times are consistent with those used in the accident analysis. Control rod scram insertion times are listed in the TS to ensure that actual control rod drive performance during a plant transient is bounded by the reactivity assumed in the safety analysis to be inserted by a reactor scram. Both the current and proposed scram insertion times of TS 3.1.3.3 are based on the 67B scram insertion time curve.

Technical Specification 3.1.3.3 provides requirements for the average scram insertion time of all OPERABLE control rods for four insertion positions. Technical Specification 3.1.3.4 provides requirements for the average scram insertion time of each group of four control rods (arranged in a two-by-two array).

2.0 EVALUATION

The proposed changes are a result of installation of the NUMAC-based rod worth minimizer (RWM) hardware and the resulting measurement of the rod insertion times to a different position. The RWM hardware was upgraded to a NUMAC-based system in 1989 for Unit 1 and in 1988 for Unit 2. This system allows the insertion times to be measured from de-energization of the scram solenoid to dropout of the notch position reed switch. Previously the measurements were made to the pickup position.

The proposed notch position insertion times are given to the nearest millisecond, which is consistent with the edit of the NUMAC System. The current TS 3.1.3.3 and 3.1.3.4 list insertion times to the nearest hundredths of a second.

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To maintain consistency, the proposed change revises the values of  $\mu$ ,  $\sigma$  and  $\tau_A$  in TS 3.2.2.2 to values appropriate for dropout of the reed switch, and the proposed TS 3.1.3.3 notch 36 scram insertion time.

The changes to the insertion times in TS 3.1.3.3 and 3.1.3.4 are due to measuring the insertion times to slightly different positions. This is possible because of the NUMAC-based RWM hardware which was installed. The proposed insertion times are consistent with those of other similar plants, which use the same rod insertion scram curve for accident analysis. The staff has reviewed the licensee's analysis and finds it to be bounded by a previous analysis found to be acceptable. Thus, these changes are acceptable.

The changes to TS 3.2.2.2 are being made to maintain consistency by having all rod insertion time values appropriate for measurement to the dropout of the reed switch. These changes are acceptable.

### 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of North Carolina official was notified of the proposed issuance of the amendment. The State official had no comments.

### 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (57 FR 45077). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

### 5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: M. Chatterton, SRXB/DSSA

Date: December 4, 1992